

パキスタン国
シンド州畜産局

パキスタン国
シンド州持続的畜産開発プロジェクト

業務完了報告書
(別添資料 1)

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パキスタン国シンド州持続的畜産開発プロジェクト
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Baseline Survey on Target Farmers

The baseline survey on target farmers, the Survey, was implemented by a selected subcontractor for the purpose to quantitatively grasp technologies level which target farmers apply to livestock at project areas, to refer the result in order to develop appropriate technologies, and to utilize the result as a baseline data for monitoring of progress on technology development and extension activities. Principals, an outline, and a result of this survey are summarized as following.

1) Principals of the baseline survey on target farmers

- The Survey was recognized as a supplemental study to various studies conducted during the Master Plan Project. In the concrete, a questionnaire of this study is mainly composed of yes-no questions on livestock technologies, such as have/don't have animal shed, vaccinated/not vaccinated, with/without of record keeping, etc, based on "the Appropriate Technology Checklist" developed by the Project. "The Appropriate Technology Checklist" consists of basic techniques on feeding management, fodder, animal health, farm management and so on.
- Since there are many basic elements of appropriate technologies on the checklist, the elements were rated from "A" to "C" according to priority to be improved. The Project applies a percentage of target farmers who utilize the basic elements rated as "A" as one of indicators of PDM.
- It is assumed that there is no significant difference which makes the Project to modify appropriate technologies and project activities among target districts except animal breeding and fodder. Therefore the Survey is designed and implemented by focusing on not individual districts but target districts as a whole.
- In order to get numerical information such as income and milk production, the Survey has to rely on objective and sensuous memory of respondents, and the Survey has to spend reasonable time and care to acquire accurate data. In addition, a close observation is required in order to conclude if a change is caused by the Project. Therefore these kinds of numerical information are not obtained by the Survey, but are obtained by the regular monitoring.

2) Outline of the Survey

a. Title of the Survey

The Baseline Survey for the Project on Sustainable Livestock Development for rural Sindh

b. Study Objective

To investigate current situation, especially applied technologies for livestock, of livestock farmers in Sindh

c. Outline of the Survey

i) Target group

Target group of the Survey is non-farmers, tenants, marginal scale farmers, small scale farmers, and medium scale farmers in surveyed districts. The definition of farmers is shown in the below table.

Criteria	Definition
Medium scale farmers	Farmers who own more than 5 up to 20 acres of land
Small scale farmers	Farmers who own more than 2.5 up to 5 acre of land
Marginal scale farmers	Farmers who own up to 2.5 acres of land
Tenants	Farmers who don't own land but rent land for agriculture
Non-farmers	Persons who work as agricultural labor and who work for

	non-agriculture activities such as shop keeper, artisan, business, services, etc
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ii) Target area

Badin district and Matiari district are selected as target districts of the Survey. One village where a pilot farmer selected by the Project lives (pilot village) and one village where a pilot farmer selected by the Project does not live (non-pilot village) are selected as target villages of the Survey in Badin and Matiari district respectively; Four villages, two pilot villages and two non-pilot villages, are selected by the Project. The names of the targeted villages are shown in the below table.

District	Pilot village	Non-pilot village
Badin	Talluqa Talhar, UC Peero Lashari, Village Tayyab Sand	Talluqa Badin UC Muhammad Khan Bhurgari, Village Yousof Soomro
Matiari	Talluqa Matiari, UC Sekhat, Village Adur Faquir Noohpoto	Talluqa Saeedabad, UC Shahmir Rao, Village Shahmir Raho

iii) Sample size

Sampling method in each village is shown in the below table. Since the Survey was conducted in four villages, the targeted sample size was 200 in total.

	Who rear 1 to 5 cattle/buffalo	Who rear more than 5 cattle/buffalo
Medium scale farmers	5	5
Small scale farmers	5	5
Marginal scale farmers	5	5
Tenants	5	5
Non-farmers	5	5

iv) Methods

Individual interview with a structured questionnaire is applied. Contents of the questionnaire are following. The questionnaire is attached at the end of this section.

- Basic information of the household such as number of household member, educational level of household head, income of agriculture/livestock/others, owned land, number of owned livestock, experience to rear livestock, caste, religion, etc
- Applied technologies for livestock (technologies will be listed up, then, yes/no check)
- Received technical assistant

3) Result of the Survey

Based on the above criteria, finally 212 samples were interviewed and the result was summarized into reports by the subcontractor. The reports prepared by the subcontractor are attached at the end of this section.

4) Appropriate Technology Checklist

“The Appropriate Technology Checklist” consists of basic techniques on feeding management, fodder, animal health, farm management and so on. Through the internal discussion among project counterparts and Japanese experts, the basic techniques were rated from “A” to “C” according to priority to be improved, and the Project also set up target percentage of target farmers who apply the basic techniques. The result of the baseline

survey submitted by the subcontractor in August, 2014 was claimed that the result does not reflect the actual situation of rural farmers. The subcontractor agreed and conducted the survey over again under a supervision of project counterparts. The result of the redo was accepted and was included into “the Appropriate Technology Checklist” as “current situation”. “The Appropriate Technology Checklist” with current situation, project target, and rank was summarized as shown below. As shown in the below table, in case of some elements such as shade and washing hands, the current situation is better than the project target. The Project plans to discuss this contradictory among the project counterparts and Japanese experts, and will modify “The Appropriate Technology Checklist”.

Table The Appropriate Technology Checklist

No	Technology	Answer	Current situation (Baseline)	Project target	Target rank
1	What kinds of record on farm management are you keeping?	Purchase of agricultural materials	6%	30%	A
		Purchase of livestock materials	7%	40%	
		Sales record of milk	8%	50%	
		Sales record of livestock	3%	50%	
		Vaccination	3%	50%	
2	Do you have a shade for cattle/buffalos?	Yes (Kacha/Pakka roof)	83%	50%	A
3	Before milking, do you wash your hands?	Yes	97%	30%	A
	If yes, do you wash your hands before you milk next cow/buffalos?	Yes	82%	5%	
4	Do you wipe all teats of all milking cattle/buffalos?	Yes	36%	10%	B
5	Do you use an antiseptic solution for both your hands and teats of cattle/buffalos?	Yes	1%	5%	C
6	What kinds of activities do you collaboratively work with other households?	Grazing animals without payment	12%	10%	C
		Selling livestock	3%	10%	
		Selling milk	4%	20%	A
		Carrying water for animals	9%	5%	C
		Cutting and carrying fodder	2%	5%	
7	Do your cattle/buffalos have their hoof cut when your cattle/buffalos have difficulty to walk?	Yes	45%	5%	C
	If yes, do you pay for it?	Yes	39%	5%	
9	Do you cultivate any hybrid green fodder? (for landholder)	Yes	-	10%	B
	Do you cultivate any hybrid green fodder? (for tenant farmer)	Yes	-	5%	B
10	Do you provide salt to cattle/buffalos?	Yes	65%	50%	B
11	How do you store fodder?	Silage	0%	-	C
		Hay for calves	0%	30%	
		Ammonia fermentative	0%	5%	

No	Technology	Answer	Current situation (Baseline)	Project target	Target rank
		treatment			
12	What kinds of record on reproduction are you keeping?	Delivery date	18%	20%	A
		Matting date	17%	20%	
		Date of dry	5%	20%	
13	Have your cattle/buffalos received diagnosis of pregnancy by rectal palpation?	Yes	6%	20%	B
14	Have you received any treatment for un-pregnant female cattle/buffalos?	Yes	10%	20%	C
15	Have your female cattle/buffalos received artificial insemination?	Yes	3%	5%	C
16	Did your cattle/buffalos take FMD vaccines in last 5 years?	Yes, every year	32%	5%	B
17	Did your cattle/buffalos take HS vaccines in last 5 years?	Yes, every year	26%	30%	A
18	Do you de-worm your cattle/buffalos against endoparasite regularly? (at least once a year)	Yes	34%	5%	B
19	Do you de-worm your cattle/buffalos against ectoparasite regularly? (at least once a year)	Yes	15%	5%	B
20	Have your cattle/buffalos tested for brucellosis?	Yes	0%	5%	C
	If your cattle/buffalos were diagnosed positive, what did you do?	Killed and buried the animals	-	0.001%	
		Isolated the animals from other animals	-	0.10%	
21	Have your cattle/buffalos taken tuberculosis test?	Yes	0%	5%	C
	If your cattle/buffalos were diagnosed positive, what did you do?	Killed and buried the animals	-	0.001%	
		Isolated the animals from other animals	-	0.10%	
22	Have your adult cattle/buffalos died within a year?	Yes	6%	2%	B
	Have your young (from 6 month to 2 years) cattle/buffalos died within a year?	Yes	4%	2%	
	Have your calves (under 6 month) died within a year?	Yes	7%	5%	
23	Do your cattle/buffalos have clinical mastitis within a year?	Yes	25%	10%	B
24	Have your cattle/buffalos tested for mastitis regularly? (at least once a month)	Yes	1%	2%	B
	Were your cattle/buffalos diagnosed positive on subclinical mastitis?	Yes	1%	0.5%	
	Did you treat cattle/buffalos after the positive diagnosis?	Yes	1%	0.5%	
25	Have your cattle/buffalos aborted within a year?	Yes	13%	10%	B
26	Have your cattle/buffalos got retained placenta	Yes	12%	5%	C

No	Technology	Answer	Current situation (Baseline)	Project target	Target rank
	within a year?				
27	Have you reared calves within a year?	Yes	86%	80%	A
28	Did your calves get diarrhea?	Yes	39%	20%	A
29	Do you practice sharing of dry buffalos?	Yes	25%	20%	A

گلوں کا نام	Code	Route
Q3	Code (125)	Route
Interviewer: kindly note the Type of Village. [SA]		
برائے مہربانی گلوں کی قسم نوٹ کریں۔ [SA]		
Pilot Village	1	
پائلٹ ولیج		
Non-Pilot Village	2	
غیر پائلٹ ولیج		
Q4	Code (126)	Route
Interviewer: Kindly note the Landholding Criteria. (as per the given Def.) [SA]		
انٹرویویر: برائے مہربانی جو اہلندہ کی قسم کے مطابق نوٹ کریں۔ [SA]		
Non-farmer: (Persons who work as agricultural labor and who work for non-agriculture activities such as shop keeper, artisan, business, services, etc) غیر کاشتکار: ایسے لوگ جو بطور مزدور کاشتکاری کا کام کرتے ہیں اور وہ جو کاشتکاری کے علاوہ دوسرے کام کرتے ہیں مثلاً دوکاندار، کاریگر، کاروبار، خدمات، وغیرہ)	1	
Tenant: (Farmers who don't own land but rent land for agriculture) مقاطمہ دار: ایسے کاشتکار جن کے پاس اپنی اراضی نہیں ہوتی بلکہ وہ کاشتکاری کے لیے اراضی مقاطعے پر لیتے ہیں)	2	
Marginal: (Farmers who own less than 2.5 acres of land) حاشیہ بردار: ایسے کاشتکار جو اڑھائی ایکڑ سے کم اراضی کے مالک ہوں)	3	
Small: (Farmers who own 2.5 to 5 acre of land) چھوٹا کاشتکار: ایسے کاشتکار جو اڑھائی سے پانچ ایکڑ اراضی کے مالک ہوں)	4	
Medium farmers: (Farmers who own 5 to 10 acres of land) درمیانی کاشتکار: ایسے کاشتکار جو پانچ سے دس ایکڑ اراضی کے مالک ہوں)	5	
Q5	Code (127)	Route
Kindly tell us how many animals (Cattle and Buffalos) do you have? [SA]		
برائے مہربانی ہمیں یہ بتائیے کہ آپ کے پاس کتنے مویشی (گائے اور بھینسین ہیں)؟ [SA]		
Not more than 5 animals (cattle and buffalos)	1	
پانچ یا پانچ مویشی سے کم		
More than 5 animals	2	
پانچ سے زائد مویشی		
Q6	Code (128)	Route
For phone number give number limit of 11 digits Interviewer: Note the respondent Details [SA]		
انٹرویویر: جو اہلندہ کی تفصیل نوٹ کریں: [SA]		

Study ID	3941	(101-104)	Resp. No.	(105-107)
Interviewer No.		(111-114)	Interview Length	(115-116)
No. Of Queries		(117-118)	Reference No.	(119-122)

Introduction

Hello, Assalam-o-Alaikum! My name is _____ and I represent a marketing research company Nielsen Pakistan. Our company conducts various researches for many National and Multi-national clients, on the basis of which, these companies try to improve their products and services. And that's the reason why we have come to you today also. I would appreciate if you could spare sometime and participate in this survey.

Before starting the interview we need you to ensure us that you are not busy for the next hour and a half.

تعارف:
السلام علیکم جب امیرا نام ہے اور میں ایک مارکیٹنگ ریسرچ کمپنی نیلسن پاکستان کی نمائندگی کر رہا ہوں۔ ہماری کمپنی کسی ملکی اور بین الاقوامی کمپنیوں کے لیے ریسرچ کا کام کرتی ہے، اس ریسرچ کی بنیاد پر وہ کمپنیاں اپنی مصنوعات کو بہتر بنانے کی کوشش کرتی ہیں۔ اور اسی مقصد کے لیے ہم آج آپ کے پاس بھی آئے ہیں۔ اگر آپ تھوڑا سا ٹائم نکال کر اس سروے میں حصہ لیں تو میں آپ کا شکرگزار رہوں گا۔

انٹرویو شروع کرنے سے پہلے مہربانی ہمیں یہ تسلی کرنا کہ آپ اگلے ایک ٹوڑھ گھنٹے کے لیے فارغ ہیں۔

Code	Route
Code (123)	Route
Interviewer: kindly note the District. [SA]	
انٹرویویر: برائے مہربانی ضلع نوٹ کریں۔ [SA]	
Badin	1
بڈین	
Matlari	2
مٹلاری	

Code	Route
Code (124)	Route
Interviewer: Kindly note the Taluqa, Union Council and Village Name. [MA]	
انٹرویویر: برائے مہربانی تعلقہ، یونین کونسل اور گاؤں کا نام نوٹ کریں۔ [MA]	
Taluqa	1
تعلقہ	
Union Council	2
یونین کونسل	
Village Name	3

Name	[SA]
Phone	1 نام
Address	2 فون 3 اڈریس

Q7 Interviewer: Kindly Note the Gender of the respondent. [SA]		Code (129)	Route
- انٹرویور: برائے مہربانی جو اینڈینہ کی جنس نوٹ کریں۔ [SA]		1 مرد	
Male		2 عورت	
Female			

Q8 Kindly confirm your Age? برائے مہربانی اپنی عمر بتائیے؟	

(130-133)	

Q9 SHOW CARD Kindly now tell us your relationship with the head of Household? [SA]		Code (134)	Route
برائے مہربانی اب مجھے یہ بتائیے کہ آپ کا گھر کے سربراہ کے ساتھ کیا رشتہ ہے؟		1 خود	
In person		2 شریک حیات	
Spouse		3 بیٹا	
Son		4 بچی	
Daughter		5 دیگر) وضاحت کریں)	
Others (Specify)			

Q10 SHOW CARD Kindly now tell us the Educational level of your household head? [SA]		Code (135)	Route
برائے مہربانی اب اپنے گھر کے سربراہ کی تعلیمی قابلیت کے بارے میں بتائیے؟			
No formal education		1 کوئی باقاعدہ تعلیم نہیں	
Primary		2 پرائمری	
Secondary		3 سیکنڈری	
Higher secondary,		4 ہائر سیکنڈری	
Collage		5 کالج	
University		6 یونیورسٹی	
Master/Doctor		7 ماسٹر / ڈاکٹر	

Q11 SHOW CARD Now kindly tell us your religion? [SA]		Code (136)	Route
برائے مہربانی اب مجھے اپنا مذہب بتائیے؟			
Muslim		1 مسلم	
Hindu		2 ہندو	
Christian		3 عیسائی	
Buddhism		4 بدھ مت	
Other (Specify)		5 دیگر) وضاحت کریں)	

Q12 Now kindly confirm your Caste?		Code (137-140)	Route
اب برائے مہربانی اپنی ذات بتائیے؟			

Q13	Route	Code (141)
Kindly give a radio button for each response with an open end box to record numbers. Kindly confirm for how many years have you been rearing animals? [SA]		
برائے مہربانی یہ بتائیے کہ آپ کتنے سالوں سے مویشی پال رہے ہیں؟ [SA]		
More than 20 years	20 سال سے زائد	1
10-20 years	10 سے 20 سال	2
5-10 years	5 سے 10 سال	3
Less than 5 years	5 سال سے کم	4

AP-8

Q14a	Q14a	Q14b
Show only R1 and R2 in Q14 a Response to be noted in Numbers as an Open End Kindly note responses in Acres Now kindly confirm how much cultivable land do you hold? [MA]	Owned land (acre) (142)	Tenant land (acre) (146)
Q14b Show Only R3 & R4 in Q14 b Response to be noted in Numbers as an Open End Kindly note responses in Acres Kindly tell me how much Non-Cultivable land do you hold? [MA]	اب پاشی والی (143)	1 (147)
برائے مہربانی یہ بتائیے کہ آپ کے پاس تقابلی کاشت کتنی اراضی ہے؟ [MA]	غیر آب پاشی والی (144)	1 (148)
	پہاڑا (145)	1 (149)
	دیگر (146)	1 (150)
Irrigated (R1)		
Non-irrigated (R2)		
Homestead (R3)		
Others (R4)		

Q15a	Q15a	Q15b	Q15c
The responses have to be noted in numbers as open ends If answer is non note as '00' Kindly tell us the Number of animals, including young animals and calves, you own. [MA]	No. of animals you own (150)	No. of animals you share (160)	No. of animals you rear now (170)
اگر کوئی جواب نہ ہو تو '00' ریکارڈ کریں برائے مہربانی ہمیں ان مویشیوں کی تعداد بتائیں بشمول بچھڑوں اور نوزائیدہ جن کے آپ مالک ہیں۔ [MA]	بڑی بھینس 1 (151)	1 (161)	1 (171)
The responses have to be noted in numbers as open ends If answer is non note as '00' Kindly tell us the Number of animal, including young animals and calves, you share. [MA]	کٹا / کٹی 1 (152)	1 (162)	1 (172)
اگر جواب 'کوئی نہیں' دے کر '00' درج کریں اور اس میں ہمیں ان مویشیوں کی تعداد بتائیں بشمول بچھڑوں اور نوزائیدہ، جن کو آپ شیر کرتے ہیں۔ [MA]	نوزائیدہ کٹا / کٹی 1 (153)	1 (163)	1 (173)
The responses have to be noted in numbers as open ends If answer is non note as '00' Kindly tell us the Number of animal, including young animals and calves, you rear now. [MA]	گائے 1 (154)	1 (164)	1 (174)
اگر جواب 'کوئی نہیں' دے کر '00' درج کریں اور اس میں ہمیں سے ہمیں ان مویشیوں کی تعداد بتائیں بشمول بچھڑوں اور نوزائیدہ، جو آپ اس وقت پال رہے ہیں۔ [MA]	بڑی گائے 1 (155)	1 (165)	1 (175)
	بچھڑا / بچھیا 1 (156)	1 (166)	1 (176)
Adult Buffalo (R1)			
Young Buffalo (R2)			
Calf Buffalo (R3)			
Cattle Buffalo (R4)			
Adult Buffalo (R5)			
Young Buffalo (R6)			

Calf Buffalo (R7)	1 (157)	1 (167)	1 (177)
Sheep Buffalo (R8)	1 (158)	1 (168)	1 (178)
Goat Buffalo (R9)	1 (159)	1 (169)	1 (179)
Camel Buffalo (R10)	1	1	1

Q84 The responses have to be noted in numbers as open ends if answer is non note as '00'.
Kindly tell us the Number of animal, including young animals and calves, you rear on sharing basis.
[MA]

Adult Buffalo (R1)	بڑی بھینس	1 (150)
Young Buffalo (R2)	کنا / کٹی	1 (151)
Calf Buffalo (R3)	بوزائیدہ کنا / کٹی	1 (152)
Cattle (R4)	گائے	1 (153)
Adult Cattle (R5)	بڑی گائے	1 (154)
Young Cattle (R6)	چھڑا / بچھیا	1 (155)
Calf (Cattle) (R7)	بوزائیدہ چھڑا / بچھیا	1 (156)
Sheep (R8)	بھینس	1 (157)

Goat (R9)	بکری	1 (158)
Camel (R10)	اونٹ	1 (159)

Q16	If coded 2 in Q16 go to Q19 Kindly tell us, do you sell your milk? [SA]	Code (180)	Route
Yes	ہاں	1	
No	نہیں	2	

Q17	Ask if coded 1 in Q16 As you said you sell milk kindly confirm at what price do you sell milk? آپ نے کہا کہ آپ دودھ فروخت کرتے ہیں، برائے مہربانی یہ بتائیے کہ آپ کس قیمت (فی کلو) پر دودھ فروخت کرتے ہیں؟	
(R1) Rs.		
		(211-214)

Q18	Ask if coded 1 in Q16 SHOW CARD As you said you sell your milk, kindly tell us to whom do you sell your milk most? [SA]	Code (215)	Route
	Neighboring household	1	گھر کے بڑوسوں کو
	Nearby Shop	2	دوکان کے قریبی لوگوں کو
	Middle man	3	سیلانڈر کو
	Nearby town	4	قریبی شہر کو

Dairy company (chiller tank)		5
Others (specify)	(دیگر)	6

Q19a Response to be noted in Numbers as Open Ends
 The sum of Response in R2 & R3 should not exceed R1
 Do not show R2 & R3 for Column 2 (14 years old and below)
 Kindly confirm the number of Male members in your household?
 [MA]
 برائے مہربانی اپنے گھر کے مرد ممبران کی تعداد بتائیے؟
 [MA]

Q19b Response to be noted in Numbers as Open Ends
 The sum of Response in R2 & R3 should not exceed R1
 Do not show R2 & R3 for Column 2 (14 years old and below)
 Kindly confirm the number of Female members in your household?
 [MA]
 برائے مہربانی اپنے گھر کی خواتین ممبران کی تعداد بتائیے؟
 [MA]

	Q19a	Q19b
Total (R1)	15 years old and above 14 سال یا اس سے بڑا (216)	14 years old and below 14 سال یا اس سے چھوٹا (219)
Employed (R2)	1 (217)	1 (220)
Unemployed (R3)	1 (218)	1 (221)

Below questions are about dairy animals (calf, young, and adult female/male buffalo and cattle)
 مندرجہ ذیل سوالات دودھ دینے والے مویشیوں کے بارے میں ہیں (میں) نوزائیدہ، جوان اور بڑے نر / مادہ بھیہنس اور گائے)

Farm Management / Marketing

فارم کے انتظامات / مارکیٹنگ

Q20 Are you recording the information on farm management?
 [SA]
 کیا آپ فارم کے انتظامات کے سلسلے میں معلومات کا ریکارڈ رکھتے ہیں؟
 [SA]
 Yes 1
 No 2

Q21 Ask if coded 1 in Q20
SHOW CARD
 What kinds of record are you keeping?
 [MA]
 آپ کس قسم کا ریکارڈ رکھتے ہیں؟
 [MA]
 1 کاشتکاری کے سامان کی خریداری کا ریکارڈ
 2 مویشیوں کے سامان کی خریداری کا ریکارڈ
 3 دودھ فروخت کرنے کا ریکارڈ
 4 مویشیوں کی فروخت کا ریکارڈ
 5 **Vaccinations** جانوروں کی ادویات
 6 Others (Specify) دیگر وضاحت کریں)

Feeding Management
 غذا کے انتظامات

Q22 How do you keep animals?
 [SA]
 آپ مویشیوں کو کس طرح رکھتے ہیں؟
 [SA]
 1 مویشیوں کی ٹانگ میں رسی باندھ کر
 2 Tether a neck of animals

موشیوں کی گرن میں رسی باندھ کر	3
Free in the paddock	3
Others (Specify)	4
دیگر) وضاحت کریں	4

Code (225)	Route
Do you have a shade for animals? [SA]	
آپ کے پاس موشیوں کے لیے چھاؤں کا انتظام ہے؟ [SA]	
Yes	1
No	2

Code (226)	Route
if coded 1 in Q23	
If yes, what is the material of the shed? [SA]	
اگر ہاں تو چھاؤں کے لیے کیا استعمال کیا گیا ہے؟ [SA]	
Kacha roof	1
Pakka roof	2
Tree	3
Others (Specify)	4
دیگر) وضاحت کریں	4

Code (227)	Route
Before milking, do you wash your hands? [SA]	
دودھ دینے سے پہلے آپ اپنے ہاتھ دھوتے ہیں؟ [SA]	
Yes	1
No	2

Code (228)	Route
Ask if coded 1 in Q25	
If yes, do you wash your hands before you milk next cow/buffalos? [SA]	

اگر ہاں تو کیا آپ ہر گائے / بھینس کا دودھ دینے سے پہلے ہاتھ دھوتے ہیں؟ [SA]	
Yes	1
No	2

Code (229)	Route
Do you clean up animals' teats before milking? [SA]	
دودھ دینے سے پہلے کیا آپ موشی کے تھن صاف کرتے ہیں؟ [SA]	
Yes	1
No	2

Code (230)	Route
Ask if coded 1 in Q27	
Do you wipe all teats of all milking animals? [SA]	
کیا آپ دودھ دینے والے تمام موشیوں کے سارے تھن پونچھتے ہیں؟ [SA]	
Yes	1
No	2

Code (231)	Route
SHOW CARD Do you use an antiseptic solution for your hands and/or nipples of animals? [SA]	
(Antiseptic Solution) محلول (Antiseptic Solution) کے تھنوں کے لیے مصفی محلول (Antiseptic Solution) کے تھنوں اور / یا موشیوں کے تھنوں کے لیے مصفی محلول (Antiseptic Solution) سے استعمال کرتے ہیں؟ [SA]	
I use it for both my hands and animals' nipples میں اسے دونوں، اپنے ہاتھوں اور موشیوں کے تھنوں، کے لیے استعمال کرتا ہوں	1
I use it for only my hands میں صرف اپنے ہاتھوں کے لیے اسے استعمال کرتا ہوں	2
I use it for only animals' nipples میں صرف موشیوں کے تھنوں کے لیے اسے استعمال کرتا ہوں	3
I don't use an antiseptic solution میں کوئی مصفی محلول استعمال نہیں کرتا	4

Code	Route
Q27	
Q28	
Q29	
Q30	

Do you manage your livestock in collaboration with other households? [SA]	(232)
کیا آپ مویشیوں کے انتظامات کے سلسلے میں اپنے گھر کے دیگر افراد سے بھی تعاون لیتے ہیں؟ [SA]	
Yes	1
No	2

Q31	Ask if coded 1 in Q30 SHOW CARD What kinds of activities do you collaboratively work with other household? [MA]	Code (233)	Route
	کون سی سرگرمیوں میں آپ اپنے گھر کے دیگر افراد سے تعاون لیتے ہیں؟ [MA]		
	Grazing (without payment)	1	گھاس چراننا (بغیر کسی اجرت کی ادائیگی کے)
	Milking	2	دودھ دینا
	Selling of livestock	3	مویشیوں کی فروخت
	Selling milk	4	دودھ کی فروخت
	Carrying water for animals	5	مویشیوں کے پانی لانا
	Cutting and carrying fodder	6	چارہ کاٹنا اور لانا
	Others (specify)	7	دیگر) وضاحت کریں (

Q32	Do you cattle/buffaloes have their hoof cut when you cattle/buffaloes have difficulty to walk? [SA]	Code (234)	Route
	کیا آپ کے مویشیوں کے کُھر کٹے ہوئے ہیں؟ [SA]		
	Yes	1	ہاں
	No	2	نہیں

Q32	Ask if coded 1 in Q32 Do you pay for hoof cutting? [SA]	Code (370)	Route
	کیا آپ مویشیوں کے کُھر کٹنے کے لیے رقم دیتے ہیں؟ [SA]		

کیا آپ کھرا کھرانے کے لئے اجرت دیتے ہیں؟ [SA]	
Yes	1
No	2

Fodder	چارہ
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Q33	Do you purchase concentrate? [SA]	Code (235)	Route
	کیا آپ کھڑا/بھوسا خریدتے ہیں؟ [SA]		
	Yes	1	ہاں
	No	2	نہیں

Q34	ASK IF CODED 1 in Q34 What kinds of concentrate do you purchase? [SA]	Code (236)	Route
	کس قسم کا سنڈر آپ خرید کرتے ہیں؟ [SA]		
	Wheat bran	1	گھم جوکر
	Cotton seed cake	2	گیہاں کے بیج کا بنا ہوا چارہ
	Rice polish	3	چاروں کا چارہ
	Mustard cake	4	سرسوں کا چارہ
	Others (Specify)	5	دیگر) وضاحت کریں(

Q35a	SHOW CARD Do you use following roughages? [MA]		
	کیا آپ مندرجہ ذیل سخت قسم کے چارے استعمال کرتے ہیں؟ [MA]		
Q35b	Only show responses coded as 'Yes' in Q35b		

As you said you use certain Roughages, kindly tell us do you pay for it? [MA]

جیسا کہ آپ نے بتایا کہ آپ خاص سخت غذا استعمال کرتے ہیں، برائے مزیدانی یہ بتائیے کہ کیا آپ اس کی قیمت ادا کرتے ہیں؟ [MA]

	Q35a		Q35b	
	Yes	No	Pay for it اس کی قیمت ادا کرتے ہیں	It is free وہ مفت ہے
Rice straw (R1)	1 (237)	2	1 (242)	2
چاول کے پودوں کا بیوسا				
Wheat straw (R2)	1 (238)	2	1 (243)	2
گندم کے پودوں کا بیوسا				
Sugar cane top (R3)	1 (239)	2	1 (244)	2
گنے کا چھلکا اور پھول				
Agricultural residue (R4)	1 (240)	2	1 (245)	2
کھیتوں میں بچی کھجی گیاس بیوسا				
Others (specify) (R5)	1 (241)	2	1 (246)	2
دیگر (وضاحت کریں)				

Q36

Do you cultivate / hybrid any green fodder? [SA]

کیا آپ نے کوئی سبز چارہ کاشت کیا ہے؟

	Code (247)	Route
Yes	1	ہاں
No	2	نہیں

Q37

ASK-ONLY-IF-CODED-IN-Q36
SHOW-CARD
If yes, which green fodder have you cultivated? [SA]

اگر ہاں تو کون سا سبز چارہ آپ نے کاشت کیا ہے؟ [SA]

	Code (248)	Route
Berseem	1	ہاں
Lucerne/Aalfalfa	2	نہیں

Maize	3
Sorghum	4
Barley	5
Others (Specify)	6

Q38

Do you provide salt to Cattle/buffalos (including occasional provision)? [SA]

کیا آپ مویشیوں کو نمک فراہم کرتے ہیں؟ [SA]

	Code (249)	Route
Yes	1	ہاں
No	2	نہیں

Q38

Ask if coded 1 in Q38

Do you Give salt in Routine or as per the need? [SA]

جیسا کہ آپ نے کہا کہ آپ مویشیوں کو نمک فراہم کرتے ہیں، برائے مہربانی یہ بتائیے کہ کیا آپ ان کو روزانہ نمک دیتے ہیں یا ضرورت پڑنے پر دیتے ہیں؟ [SA]

	Code (370)	Route
In Routine	1	روزانہ
As per the Need	2	ضرورت پڑنے پر
Other (Please Specify: _____)	3	کوئی اور (واضح کریں) _____

Q39

Do you provide mineral mix to animals? [SA]

کیا آپ مویشیوں کو کوئی معدنیات مکس (Mineral Mix) کر کے فراہم کرتے ہیں؟ [SA]

	Code (250)	Route
Yes	1	ہاں
No	2	نہیں

Q40

Have you stored fodder? [SA]

	Code (251)	Route
Yes	1	ہاں
No	2	نہیں

Yes	کیا آپ نے چارہ ذخیرہ کیا ہوا ہے؟ [SA]	
No	ہاں	1
	نہیں	2

Q41	ASK ONLY IF CODED 1 in Q40 SHOW CARD How do you store fodder? [SA]	Code (252)	Route
	آپ چارے کو کس طرح ذخیرہ کرتے ہیں؟ [SA]	1	
	Wheat Store / Rice Store	2	
	Silage	3	
	Hay	4	
	Hay for Calves (Processional)	5	
	Ammonia fermentative treatment	6	
	Others (specify)		

Reproduction	افزائش نسل
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Q42	Are you keeping a record for reproduction? [SA]	Code (253)	Route
	کیا آپ افزائش نسل کا ریکارڈ رکھتے ہیں؟ [SA]	1	
	ہاں	2	
	نہیں		

Q43	ASK ONLY IF CODED 1 in Q42 What kinds of record reproduction are you keeping? [SA]	Code (254)	Route
	آپ کس قسم کی معلومات کا ریکارڈ رکھتے ہیں؟		

[SA]	
Date of dry	1
Delivery date	2
Mating date	3
AI date	4
Others (specify)	5

Q44	Have your cattle/buffalos received diagnosis of pregnancy by rectal palpation? [SA]	Code (255)	Route
	کیا آپ نے گائے/بھینسوں کو ملاشی کے ذریعے یعنی ہاتھ کی انگلیوں سے چھو کر حمل کی تشخیص کا پتا کرایا ہے؟ [SA]	1	
	ہاں	2	
	نہیں		

Q45	Have you received any treatment for un-pregnant female cattle/buffalos? [SA]	Code (256)	Route
	کیا آپ نے غیر حاملہ مادہ گائے یا بھینس کا کوئی علاج کرایا ہے؟ [SA]	1	
	ہاں	2	
	نہیں		

Q46	Have your female cattle/buffalos received Artificial insemination? [SA]	Code (257)	Route
	کیا آپ نے گائے یا بھینس کی کوئی مصنوعی نسل کشی کرائی ہے؟ [SA]	1	
	ہاں	2	
	نہیں		

Animal Health

مویشیوں کی صحت	
Q47	<p>Did your cattle/buffalos take FMD vaccines in last 5 years? [SA]</p> <p>کیا آپ کے مویشیوں کو گزشتہ پانچ سال کے دوران FMD ویکسی نیشن ملی ہے؟</p> <p>Yes, every year Yes, a few times Yes, once No</p> <p>1 جی ہاں، ہر سال 2 جی ہاں، بعض دفعہ 3 جی ہاں، ایک بار 4 نہیں</p> <p>Code (258)</p> <p>Route</p>
Q48	<p>Did your cattle/buffalos take HS vaccines in last 5 years? [SA]</p> <p>کیا آپ کے مویشیوں کو گزشتہ پانچ سال کے دوران گلگوٹو/کگو ویکسی نیشن ملی ہے؟</p> <p>Yes, every year Yes, a few times Yes, once No</p> <p>1 جی ہاں، ہر سال 2 جی ہاں، بعض دفعہ 3 جی ہاں، ایک بار 4 نہیں</p> <p>Code (259)</p> <p>Route</p>
Q49	<p>Did you de-worm your cattle/buffalos against endoparasite regularly? [SA]</p> <p>آپ نے گزشتہ 2 سالوں میں پیٹ میں ہونے والے کیروں کے خلاف اپنے جانوروں کو دوا پلائی ہے؟</p> <p>Yes, every year Yes, a few times Yes, once No</p> <p>1 جی ہاں، ہر سال 2 جی ہاں، بعض دفعہ 3 جی ہاں، ایک بار 4 نہیں</p> <p>Code (260)</p> <p>Route</p>

Q50	<p>Do you de-worm your cattle/buffalos against ectoparasite regularly? [SA]</p> <p>آپ نے گزشتہ 2 سالوں میں کھال میں ہونے والے کیروں کے خلاف اپنے جانوروں کو دوا پلائی ہے؟</p> <p>Yes, every year Yes, a few times Yes, once No</p> <p>1 جی ہاں، ہر سال 2 جی ہاں، بعض دفعہ 3 جی ہاں، ایک بار 4 نہیں</p> <p>Code (261)</p> <p>Route</p>
Q51	<p>IF CODED 2 IN Q51 go to Q54</p> <p>Have your cattle/buffalos tested for brucellosis? [SA]</p> <p>کیا آپ نے مویشیوں کا ایک سال کے دوران بروسیلا کے ٹیسٹ کرایا ہے؟</p> <p>Yes No</p> <p>1 ہاں 2 نہیں</p> <p>Code (262)</p> <p>Route</p>
Q52	<p>ASK IF CODED 1 IN Q51</p> <p>Were your cattle/buffalos diagnosed positive of brucellosis? [SA]</p> <p>کیا آپ کے مویشیوں میں بروسیلا بیماری مثبت ہوئی؟</p> <p>Yes No</p> <p>1 ہاں 2 نہیں</p> <p>Code (263)</p> <p>Route</p>
Q53	<p>ASK IF CODED 1 IN Q52</p> <p>If your cattle/buffalos were diagnosed positive, what did you do? [SA]</p> <p>اگر آپ کے مویشیوں میں بروسیلا بیماری مثبت ہوئی تو آپ نے کیا کیا؟</p> <p>Did nothing and kept rearing them as same as before Sold the animals</p> <p>1 کچھ نہیں کیا اور انہیں پہلے کی طرح پالتے رہے 2 انہیں بیچ دیا</p> <p>Code (264)</p> <p>Route</p>

Slaughtered	ان مویشیوں کو فروخت کر دیا	3	
Killed and buried the animals	قربانی کر دی	4	
Isolated the animals from other animals	مویشیوں کو مار کر جلا دیا	5	
Others (specify)	دیگر مویشیوں سے الگ کر دیا	6	
دیگر) وضاحت کریں)			
Q54	ASK ALL IF CODED 2 IN Q54 GO TO Q57 Have your cattle/buffalos taken tuberculosis test? [SA] کیا آپ کے مویشیوں کا تپ دق (TB) کا ٹیسٹ کیا گیا تھا؟ [SA]	Code (265)	Route
Yes		1	ہاں
No		2	نہیں
Q55	ASK ONLY IF CODED 1 IN Q54 If yes, were your cattle/buffalos diagnosed positive of tuberculosis? [SA] اگر ہاں تو کیا آپ کے مویشیوں میں تپ دق ثابت ہوا؟ [SA]	Code (266)	Route
Yes		1	ہاں
No		2	نہیں
Q56	ASK ONLY IF CODED 1 IN Q55 If your cattle/buffalos were diagnosed positive, what did you do? [SA] جب آپ کے مویشیوں میں تپ دق ثابت ہوا تو آپ نے کیا کیا؟ [SA] Did nothing and kept rearing them as same as before Sold the animals Slaughtered Killed and buried the animals	Code (267)	Route
1			
2			
3			
4			

Isolated the animals from other animals Others (specify)	دیگر مویشیوں سے الگ کر دیا (دیگر) وضاحت کریں)	5	
6			
Q57	ASK ALL Have your cattle/buffalos died within a year? [SA] کیا ایک سال کے دوران آپ کا کوئی مویشی مر گیا ہے؟ [SA]	Code (268)	Route
Yes		1	ہاں
No		2	نہیں
Q58	ASK ONLY IF CODED 1 IN Q57 Calf means an animal up to 6 month old while young animal means an animal more than 6 month old How many animals died within a year? کمزور بڑے مویشی کا مطلب چھ ماہ سے زائد بڑے مویشی ہے؟ ایک سال کے دوران کتنے مویشی مر گئے؟		
(R1) Calf			چھ ماہ
		(269-272)	
(R2) Young			جوان
		(273-276)	
(R3) Adult			بڑے
		(277-280)	

(R4) Total

(311-314)

Q59

Do your cattle/buffalos had get clinical mastitis within a year?
[SA]

کیا ایک سال کے دوران آپ کے مویشیوں کو پستانوں کے ورم کے لیے کلینک کا علاج ملا؟
[SA]

Yes	ہاں	1
No	نہیں	2

Code (315)

Route

Q60

ASK ONLY IF CODED 1 IN Q59

How many animals got clinical mastitis?
کتنے مویشیوں کو کلینک کا علاج ملا؟

(316-319)

Q61

IF CODED 2 IN Q61 GO TO Q64

Have your cattle/buffalos tested for mastitis regularly (at least once a month)?
[SA]

کیا ایک سال کے دوران آپ کے مویشیوں کے پستانوں کے ورم کا ٹیسٹ لیا گیا ہے؟
[SA]

Yes	ہاں	1
No	نہیں	2

Code (320)

Route

Q62

ASK ONLY IF CODED 1 IN Q61

Were your animals diagnosed as positive subclinical mastitis?
[SA]

Code (321)

Route

کیا آپ کے مویشیوں میں پستانوں کا ورم ثابت ہوا؟
[SA]

Yes	ہاں	1
No	نہیں	2

Q63

ASK ONLY IF CODED 1 IN Q62

If yes, what did you do after the positive diagnosis?
[SA]

اگر ہاں، تو مثبت ثابت ہونے پر آپ نے کیا کیا؟
[SA]

Did nothing	کچھ نہیں کیا	1
Treated and cured	علاج اور تندرست ہو گیا	2
Treated but not cured	علاج کیا مگر تندرست نہیں ہوا	3
Others (specify)	دیگر (وضاحت کریں)	4

Code (322)

Route

Q64

ASK ALL

Have your animals aborted within an year?
[SA]

کیا ایک سال کے دوران آپ کے مویشیوں کا اسقاط حمل (Abortion) ہوا ہے؟
[SA]

Yes	ہاں	1
No	نہیں	2

Code (323)

Route

Q65

ASK IF CODED 1 IN Q64

If yes, how many animals aborted?
اگر ہاں تو کتنے حمل اسقاط ہوئے؟

Code (324-327)

Route

Have your animals got retained placenta within a year? [SA]	(328)
کیا ایک سال کے دوران آپ کے کسی بھی مویشیوں کی جبر رہ گئی ہے؟ [SA]	1 ہاں
Yes	2 نہیں
No	

Q67 ASK ONLY IF CODED 1 IN Q66

If yes, how many animals got retained placenta?
اگر ہاں، کتنے مویشیوں کی آئول کو برقرار رکھا گیا؟

_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____

(329-332)

Q68

Have you reared calves within a year?
[SA]

کیا آپ نے ایک سال کے دوران چھوٹے بچھڑوں کو پالا ہے؟
[SA]

Yes

No

Code (333)	Route
1 ہاں	
2 نہیں	

Q69 ASK ONLY IF CODED 1 IN Q68

Note in Numbers

How many calves have you reared?
عد میں نوٹ کریں
آپ نے کتنے چھوٹے بچھڑے پالے ہیں؟

_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	(334-337)
-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-----------

Q70 Answer in Q70 should not exceed answer in Q69

Note in Numbers

And how many calves among them got diarrhea?
ان چھوٹے بچھڑوں میں سے کتنے بچھڑوں کو دست ہوئے؟
عد میں نوٹ کریں

_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____

(338-341)

Animal Sharing

مویشیوں میں حصہ داری

Q71

Do you practice sharing of dry buffalos?
[SA]

کیا آپ گائے / بھینسوں میں حصہ داری کرتے ہیں؟
[SA]

Yes

No

Code (342)	Route
1 ہاں	
2 نہیں	

Q72a ASK ONLY IF CODED 1 IN Q71

Which animals do you share?
[MA]

کون سے مویشیوں میں آپ حصہ داری کرتے ہیں؟
[MA]

Q72a	Buffale	Cattle
1	2	3
1	2	3
1	2	3

Male Calf (R.1)

Male Adult (R.2)

Female-Calf (R.3)	345	خرچوان
Female-Adult (milking) (R.4)	346	لاند چوڑا
Female-Adult (not milking) (R.5)	347	لاند حوان (دودھ نہ کرنے والے)
		لاند حوان (دودھ نہ کرنے والے)

Q73: ASK ONLY IF CODED 1 IN - Q71 ONLY SHOW OPTIONS CODED IN - Q72 GIVE DROPPED DOWN MENU WITH OPTIONS "OWNER" and "GATE-TAKER"

And are you owner or take career of the animal?

(MMA)

لوگ کیا آپ مالک ہوتے ہیں یا مویشیوں کو سنبھالتے ہیں؟ (MMA)

	Q73	
	Buffale	Cattle
Male-Calf (R.1)	348	خرچوان
Male-Adult (R.2)	349	لاند چوڑا
Female-Calf (R.3)	350	خرچوان
Female-Adult (milking) (R.4)	351	لاند چوڑا
Female-Adult (not milking) (R.5)	352	لاند حوان (دودھ نہ کرنے والے)
		لاند حوان (دودھ نہ کرنے والے)

Q74: ASK ONLY IF CODED 1 IN - Q73 ONLY SHOW OPTIONS CODED IN - Q72

Answers to be noted as OEs-in number

How many in number do you share?

(MMA)

جیسا کہ آپ نے کیا کیا سویش میں حصہ داری کرتے ہیں ان کا کتنا تعداد کیا ہے؟ (MMA)

	Q74
--	-----

	Buffale	Cattle
Male-Calf (R.1)	353	خرچوان
Male-Adult (R.2)	354	لاند چوڑا
Female-Calf (R.3)	355	خرچوان
Female-Adult (milking) (R.4)	356	لاند چوڑا
Female-Adult (not milking) (R.5)	357	لاند حوان (دودھ نہ کرنے والے)
		لاند حوان (دودھ نہ کرنے والے)

Q75: Are you willing to increase the number of sharing buffalos? [SA]

کیا آپ گائے / بھینسوں میں تعداد کے لحاظ سے حصہ داری بڑھانا چاہتے ہیں؟ [SA]

Yes	1	ہاں
No	2	نہیں

Q76: Are you interested in being involved in rearing of calves? [SA]

کیا آپ چوڑے بچڑوں کے پالنے میں دلچسپی رکھتے ہیں؟ [SA]

Yes	1	ہاں
No	2	نہیں

Q77: ASK ONLY IF CODED 1 IN Q76

How many calves can you rear at once?

ایک وقت میں آپ کتنے بچڑے پال سکتے ہیں؟

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(360-363)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Q78	<p>Rearing of calves means, for example, that a farmer receives 2 or more than 2 calves and rears them for a few year. Once those animals become adult, the farmer needs to return one animal to the owner but can acquire the rest of animals.</p> <p>چھڑوں کو پالتے سے مراد، مثلاً ایک کاشتکار کو کچھ سالوں کے لیے دو یا اس سے زائد چھڑوں بچڑے ملے۔ جب وہ بڑے بن گئے تو کاشتکار مالک کو ایک مویشی واپس کرے گا لیکن اس سے دیگر مویشی حاصل کر سکتا ہے۔</p> <p style="text-align: center;">توسیع / ٹریننگ</p>
Q79	<p>How often does an agriculture extension worker come to you? [SA]</p> <p>آپ کے پاس زرعی توسیعی ورکر کتنی باقاعدگی سے آتا ہے؟ [SA]</p> <p>Never met them Less than once a year Less than once per quarter More than once per quarter but less than once per month More than once per month More than once per quarter but less than once per month Less than once a year Less than once per quarter More than once per quarter but less than once per month</p> <p>اس نے نہیں ملا سال میں ایک بار سے بھی کم کمتر سے ایک بار سے بھی کم سہ ماہی میں ایک بار سے بھی کم سہ ماہی میں ایک سے زائد جبکہ، مہینے میں ایک بار سے کم مہینے میں ایک سے زائد اس نے نہیں ملا سال میں ایک بار سے بھی کم کمتر سے ایک بار سے بھی کم سہ ماہی میں ایک بار سے بھی کم</p>
Q80	<p>How often does a livestock extension worker come to you? [MA]</p> <p>آپ نے مویشیوں کے سلسلے میں کوئی ٹیکنیکل اعانت وصول کی ہے؟ [MA]</p> <p>Farm management Marketing Processing Feeding management Fodder Reproduction Animal health Vaccination De-worming Mastitis Breeding Any other (Specify)</p> <p>فارم کے انتظامات مارکیٹنگ کام کرنا غذائی انتظامات چارہ انفرانش نسل مویشیوں کی صحت ویکسی نیشن ڈی وارمنگ مستیتس پستانوں کا ورم تولیدی عمل گرمی اور وضاحت کریں)</p>
Q81	<p>Which technical assistant do you want to receive? [MA]</p> <p>کون سی ٹیکنیکل اعانت آپ وصول کرنا چاہتے ہیں؟ [MA]</p> <p>Farm management Marketing Processing Feeding management Fodder Reproduction</p> <p>فارم کے انتظامات مارکیٹنگ کام کرنا غذائی انتظامات چارہ انفرانش نسل</p>

More than once per month	سہ ماہی میں ایک سے زائد جبکہ، مہینے میں ایک بار سے کم	5
Q80	<p>Have you received any technical assistant on livestock? [MA]</p> <p>آپ نے مویشیوں کے سلسلے میں کوئی ٹیکنیکل اعانت وصول کی ہے؟ [MA]</p> <p>Farm management Marketing Processing Feeding management Fodder Reproduction Animal health Vaccination De-worming Mastitis Breeding Any other (Specify)</p> <p>فارم کے انتظامات مارکیٹنگ کام کرنا غذائی انتظامات چارہ انفرانش نسل مویشیوں کی صحت ویکسی نیشن ڈی وارمنگ مستیتس پستانوں کا ورم تولیدی عمل گرمی اور وضاحت کریں)</p>	Code (366) Route
Q81	<p>Which technical assistant do you want to receive? [MA]</p> <p>کون سی ٹیکنیکل اعانت آپ وصول کرنا چاہتے ہیں؟ [MA]</p> <p>Farm management Marketing Processing Feeding management Fodder Reproduction</p> <p>فارم کے انتظامات مارکیٹنگ کام کرنا غذائی انتظامات چارہ انفرانش نسل</p>	Code (368) Route

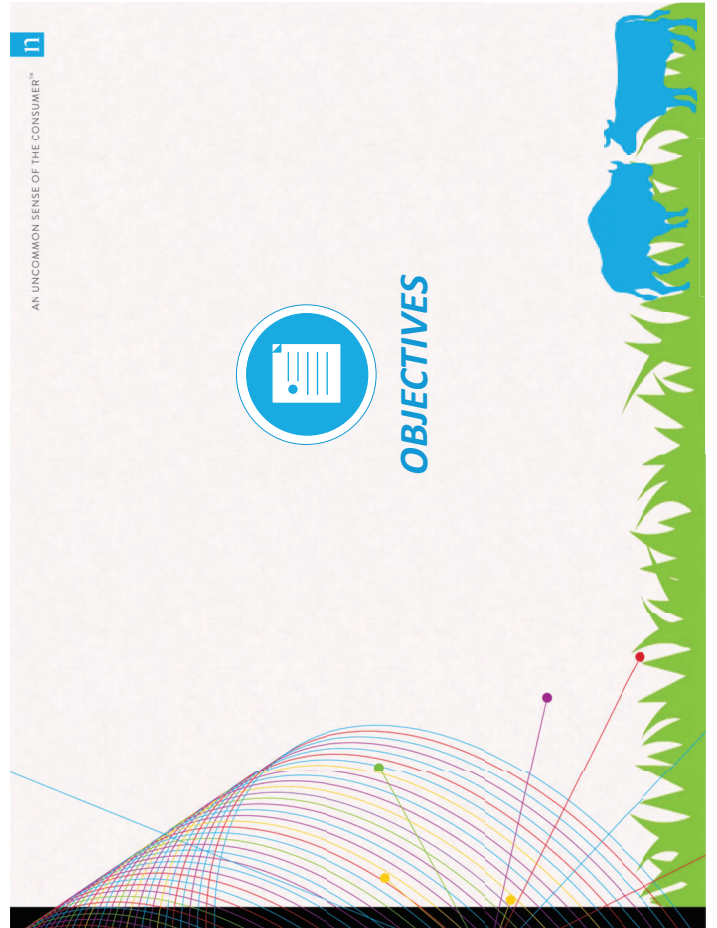
Animal health	افرائش نسل	
Vaccination	موتھيون جي صحت	07
De-worming	ويگسي نيشن	08
Mastitis	ٺٽي وارمگ	09
Breeding	پستلون ڪا ورم	10
Any other (Specify)	ٽوليدو عمل	11
	ڪوئي اور) وضاحت ڪريو)	12

THANK YOU!!

جوابدينده ڪا شڪريه ادا ڪريو

PROJECT LIVESTOCK

FARMER – OVERALL



OBJECTIVES

-
- To gauge the practices of handling, breeding, milking and sharing of animals in Badin and Matiari
 - The primary objective of this study was to create the base for the end line survey that will be conducted once the Livestock Development Program has been implemented.
 - The Data from the end line survey will be compared keeping this survey as the base.
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RESEARCH DESIGN



SCOPE

- The Survey consist of Five segments of Livestock's Farming:
 - Medium Scale Livestock Farmer
 - Small Scale Livestock Farmer
 - Marginal Scale Livestock Farmer
 - Tenants
 - Non-Farmers
- The Survey was conducted in four villages that were chosen from District Badin and Matiari



METHODOLOGY

- The recruitment of respondents was done through Snowballing technique in the chosen villages
- Face to Face interviews were conducted using structured questionnaire
- The questionnaire was administered via CAPI technique



GEOGRAPHICAL COVERAGE

- The Study was conducted in two districts of Sindh:
 - Badin
 - Matiari
- 2 villages were chosen from each district:
 - Badin:
 - Tayyab Sand
 - Yousof Soomro
 - Matiari:
 - Shahmir Rao
 - Adur Faqir Noohpoto



DISTRICT & LOCATION



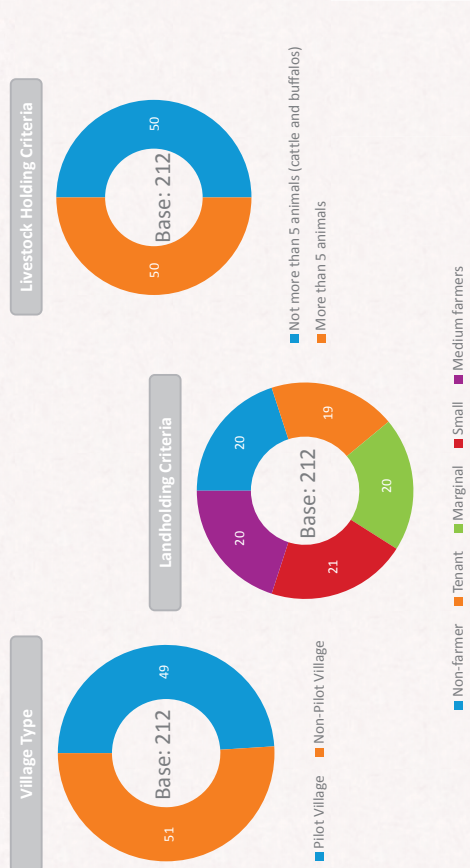
All Figures in Percentages



FINDINGS

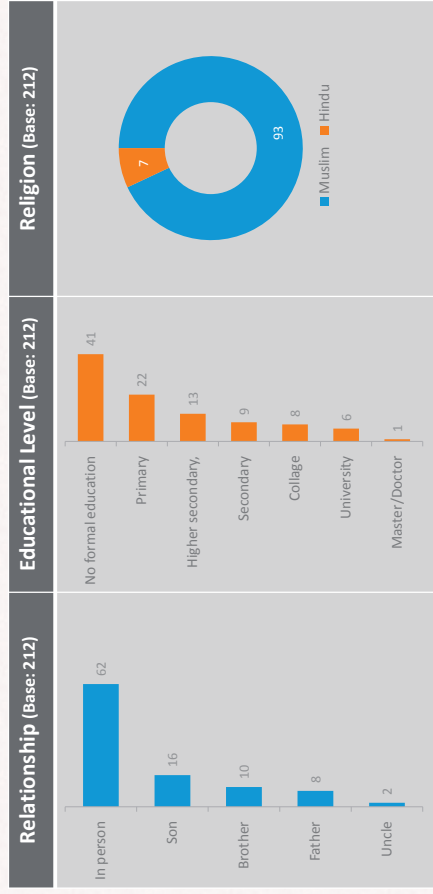


RESPONDENT DETAILS



All Figures in Percentages

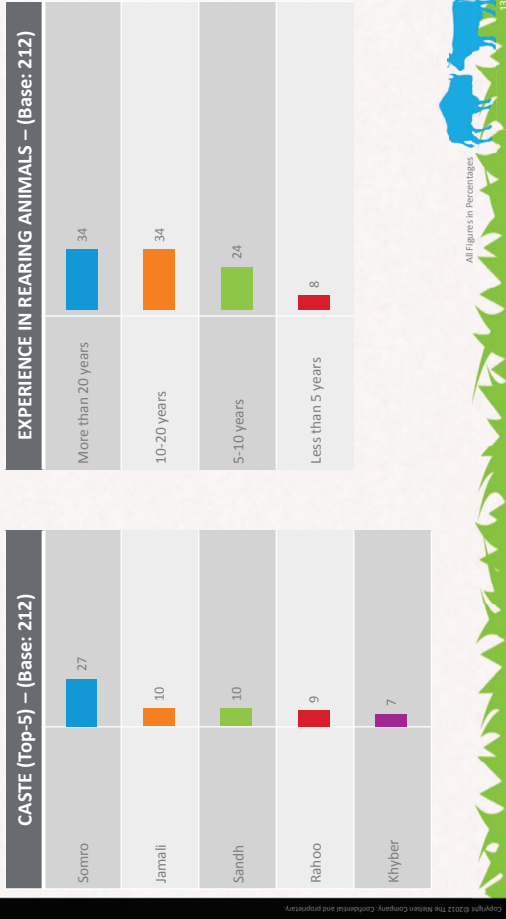
RESPONDENT DETAILS



All Figures in Percentages

Reference: Q12 & Q13

CASTE & EXPERIENCE IN REARING ANIMALS



All Figures in Percentages

Reference: Q14a

OWNED LAND (IN ACRES)

	Acres		Pilot (63)	Non-Pilot (67)
	Irrigated	Non-Irrigated		
Cultivable Land	0	-	-	-
	1 to 3	47	47	47
	4 to 6	31	31	30
	7 to 10	24	24	20
	0	84	84	84
Non-Cultivable Land	1 to 3	16	16	15
	6	-	-	1
Non-Cultivable Land	0	98	98	94
	1 to 3	2	2	4
	10	-	-	1
	0	92	92	90
	1 to 5	9	9	9
10	-	-	1	

All Figures in Percentages

Reference: Q14b

TENANT LAND (IN ACRES)

	Acres		Pilot (83)	Non-Pilot (87)
	Irrigated	Non-Irrigated		
Cultivable Land	0	76	76	77
	1 to 3	4	4	8
	4 to 6	10	10	5
	7 to 10	7	7	6
	11 to 16	2	2	2
Non-Cultivable Land	0	98	98	94
	1 to 3	1	1	4
Non-Cultivable Land	6	-	-	1
	8	1	1	-
	0	100	100	99
	1	-	-	1
	0	99	99	94
1 to 3	1	1	5	

All Figures in Percentages

Reference: Q15a

TOTAL NUMBER OF ANIMAL

	Base: 212					
	1 to 3	4 to 6	7 to 9	More than 9	None	
Adult Buffalo	68	21	3	2	4	
Young Buffalo	51	5	2	-	42	
Calf Buffalo	63	5	2	-	29	
Adult Buffalo	17	4	-	-	78	
Young Buffalo	12	-	-	-	88	
Calf Buffalo	8	-	-	-	92	
Sheep Buffalo	1	-	-	-	98	
Goat Buffalo	26	10	4	4	54	
Camel Buffalo	-	-	-	-	100	

All Figures in Percentages

Reference: Q15b

NUMBER OF ANIMALS BEING SHARED

Base: 212	1	2	4	None
Adult Buffalo	4	1	-	95
Young Buffalo	3	-	1	95
Calf Buffalo	4	1	-	95
Adult Buffalo	-	-	1	98
Young Buffalo	-	-	-	100
Calf Buffalo	-	-	-	100
Sheep Buffalo	-	-	-	100
Goat Buffalo	-	1	-	99
Camel Buffalo	-	-	-	100

All Figures in Percentages



17

Reference: Q15c

NUMBER OF ANIMALS IN OWN REARING

Base: 212	1 to 3	4 to 6	7 to 9	More than 9	None
Adult Buffalo	68	19	3	2	5
Young Buffalo	50	4	2	-	43
Calf Buffalo	61	5	2	-	31
Adult Buffalo	17	2	-	-	81
Young Buffalo	12	-	-	-	88
Calf Buffalo	8	-	-	-	92
Sheep Buffalo	1	-	-	-	98
Goat Buffalo	25	10	4	4	56
Camel Buffalo	-	-	-	-	100

All Figures in Percentages



18

Reference: Q84

NUMBER OF ANIMALS REARED ON SHARING BASIS

Base: 212	1	2	4	5	None
Adult Buffalo	4	2	1	1	92
Young Buffalo	4	2	-	-	92
Calf Buffalo	2	-	-	-	97
Cattle	-	-	-	-	99
Adult Cattle	1	-	-	-	99
Young Cattle	-	-	-	-	100
Calf	-	-	-	-	100
Sheep	-	-	-	-	100
Goat	2	1	-	-	95
Camel	-	-	-	-	100

All Figures in Percentages

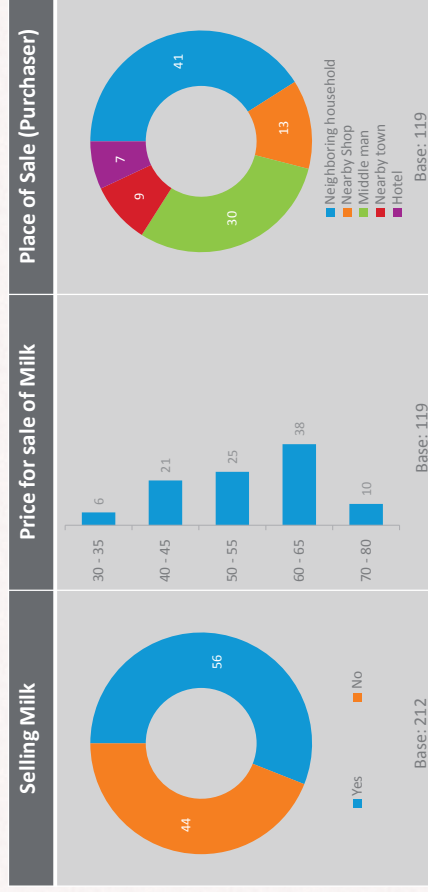


19

Reference: Q16, Q17 & Q18

SELLING OF MILK

- 56% of the individuals sell milk out of which about 38% sell it between a price range of Rs. 60 to 65 per KG
- Majority of the selling is being done in Neighboring Households followed by Middle Man; 30%



All Figures in Percentages



20

AN UNCOMMON SENSE OF THE CONSUMER™



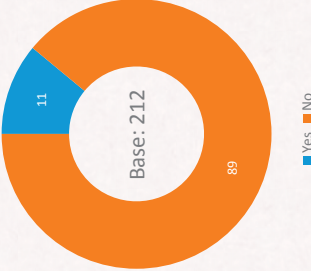
FARM MANAGEMENT / MARKETING



Reference: Q20 & Q21

RECORDING OF INFORMATION & TYPE OF RECORD MAINTAINED

- About 11% of Farmers keep record information
- Majority of which keep record of Milk Sold followed by Purchase record of Livestock Material



Base: 24	
Purchase of agricultural materials	54
Purchase of livestock materials	67
Sales record of milk	71
Sales record of livestock	29
Vaccinations	25
Delivery Date	4
Breeding	8
Nil	4

All Figures in Percentages

AN UNCOMMON SENSE OF THE CONSUMER™



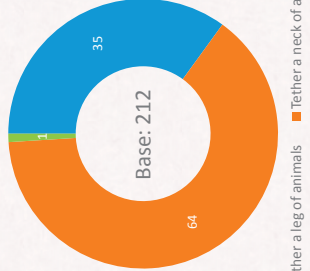
FEEDING MANAGEMENT



Reference: Q22

WAY OF KEEPING ANIMALS

- The most preferred method for keeping animals is by tethering their necks, followed by the method of tethering the leg of animals

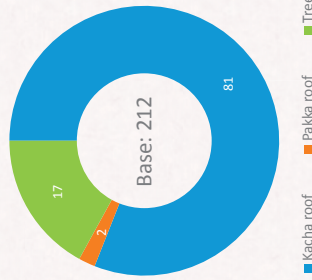
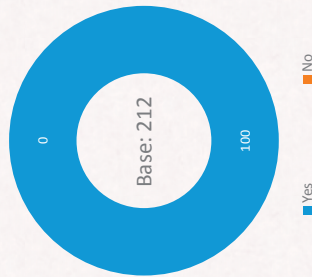


All Figures in Percentages

Reference: Q23

SHADE FOR ANIMALS & ITS TYPES

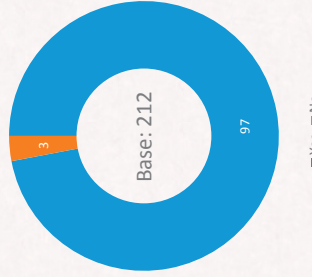
- Having shade for animals is universal for all
- Majority keep a kacha roof however a few also utilize the trees in the surrounding for shade



Reference: Q25

WASHING HANDS BEFORE MILKING

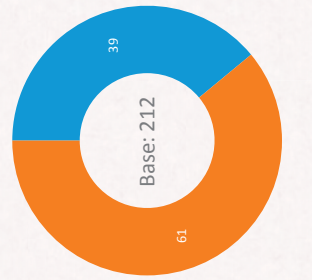
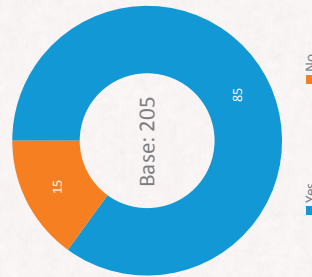
- Majority of the farmers wash their hands before milking the animals



Reference: Q26 & Q27

WASHING HANDS BEFORE MILKING ANOTHER COW/BUFFALO & CLEANING TEATS BEFORE MILKING

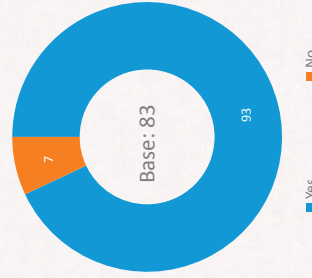
- Out of the 97% who wash hands about 85% wash hands again before milking another animals
- The practice of cleaning teats is not common among many farmers



Reference: Q28 & Q29

CLEANING ALL TEATS BEFORE MILKING & USE OF ANTISEPTIC SOLUTION

- However all those who practice cleaning of teats do it properly, only a few are such who do not clean all teats
- The use of antiseptic solution is very minimal

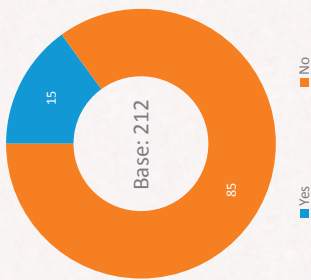


Response	Percentage
I use it for both my hands and animals' Teats	1
I use it for only my hands	5
I use it for only animals' Teats	1
I don't use an antiseptic solution	92

Reference: Q30 & Q31

MANAGING LIVESTOCK IN COLLABORATION & ACTIVITIES WHILE MANAGING LIVESTOCK IN COLLABORATION

- Majority of the farmers do not manage livestock in collaboration, however who do take help in Grazing, Milking and Carrying water mainly



Base: 32

Activity	Percentage
Grazing	81
Milking	59
Selling of livestock	19
Selling milk	28
Carrying water for animals	59
Cutting and carrying fodder	16
Carrying water for animals	3
Don't take others help	3
In taking medicine	3
Sanitation of farm	3

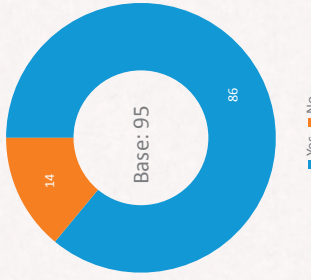
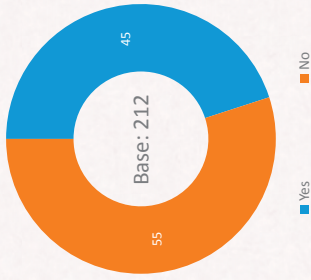
All Figures in Percentages

29

Reference: Q32 & Q32

HOOF CUTTING & PAYMENT FOR HOOF CUTTING

- About 4 out of 10 farmer get the Hoofs cut of their animals and about 3 out of 10 pay for it



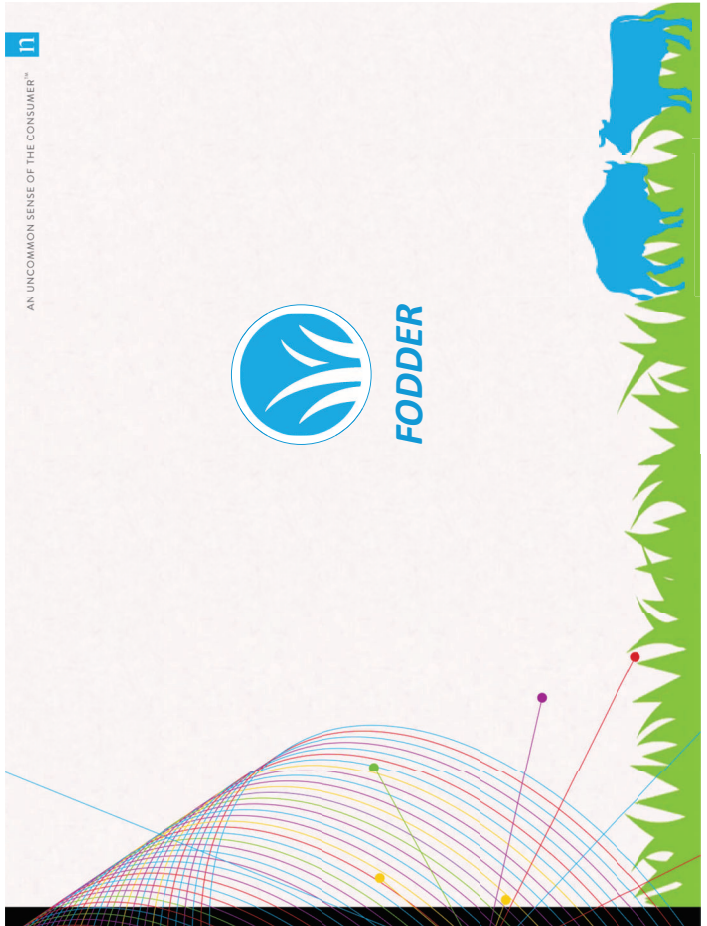
All Figures in Percentages

30

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n

AN UNCOMMON SENSE OF THE CONSUMER™

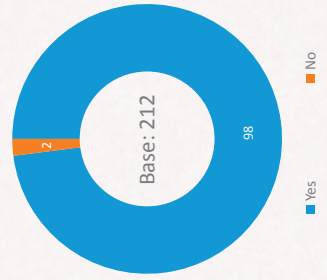


32

Reference: Q33 & Q34

PURCHASING OF CONCENTRATE & KIND OF CONCENTRATES PURCHASED

- Majority of the Farmers purchase concentrate
- The most popular ones are Wheat Bran and Cotton Seed Cake



Base: 207

Concentrate Type	Percentage
Wheat Bran	92
Cotton seed cake	88
Rice polish	43
Mustard cake	49

All Figures in Percentages

33

ROUGHAGES USED (PURCHASED OR FREE)

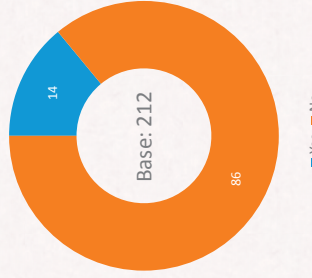
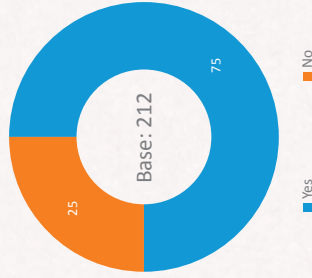
- Agricultural Residue and Wheat Straw are the most used Roughages
- Rice and Wheat Straw are mainly purchased where as Sugar Can Top and Agricultural Residue are procured for free



All Figures in Percentages

CULTIVATION OF GREEN FODDER & MINERAL MIX GIVEN TO ANIMALS

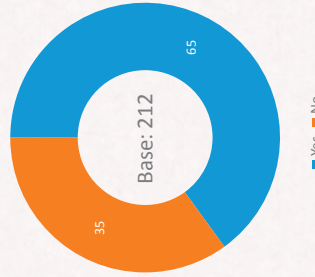
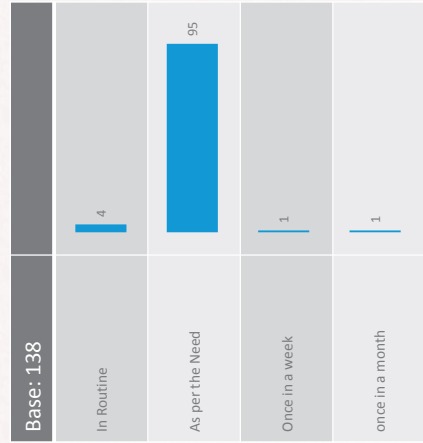
- 7 out of 8 Farmers cultivate Green Fodder
- Only a few farmers give mineral mix to their animals



All Figures in Percentages

SALT GIVEN TO ANIMALS (IN ROUTINE OR AS PER THE NEED)

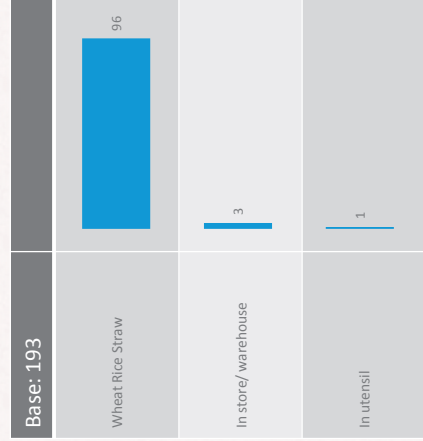
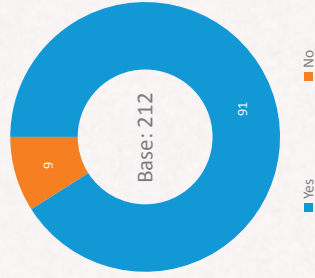
- Almost 6 out of 10 farmers give salt to their animals, however majority do so as per the need
- Only a few give salt in Routine



All Figures in Percentages

STORING FODDER & MODE OF STORING FODDER

- Majority of the farmers store fodder and they do so in the form of Wheat/Rice Straw



All Figures in Percentages

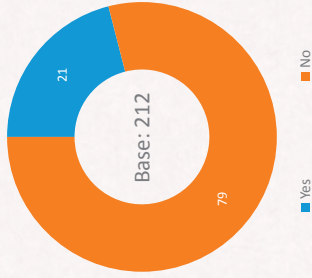


REPRODUCTION



MAINTAINING RECORD OF REPRODUCTION & RECORDS MAINTAINED OF REPRODUCTION

- About 21% farmers keep record of reproduction of the animals
- Mainly the record is kept of delivery and matting date



Base: 45

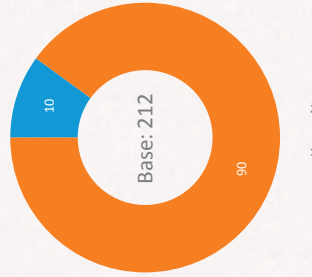
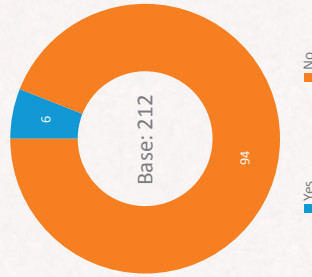
Delivery date	84
Matting date	80
AI date	7
Date of dry	22
None	4

All Figures in Percentages

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DIAGNOSIS OF PREGNANCY THROUGH RECTAL PALPATION & TREATMENT FOR UN-PREGNANT COW/BUFFALO

- The practice of diagnosing pregnancy through Rectal Palpation is very minimal
- Also the treatment for un-pregnant animals is not in practice of majority



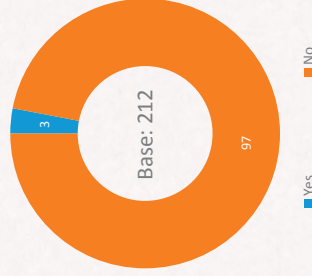
All Figures in Percentages

Reference: Q44 & Q45

Reference: Q46

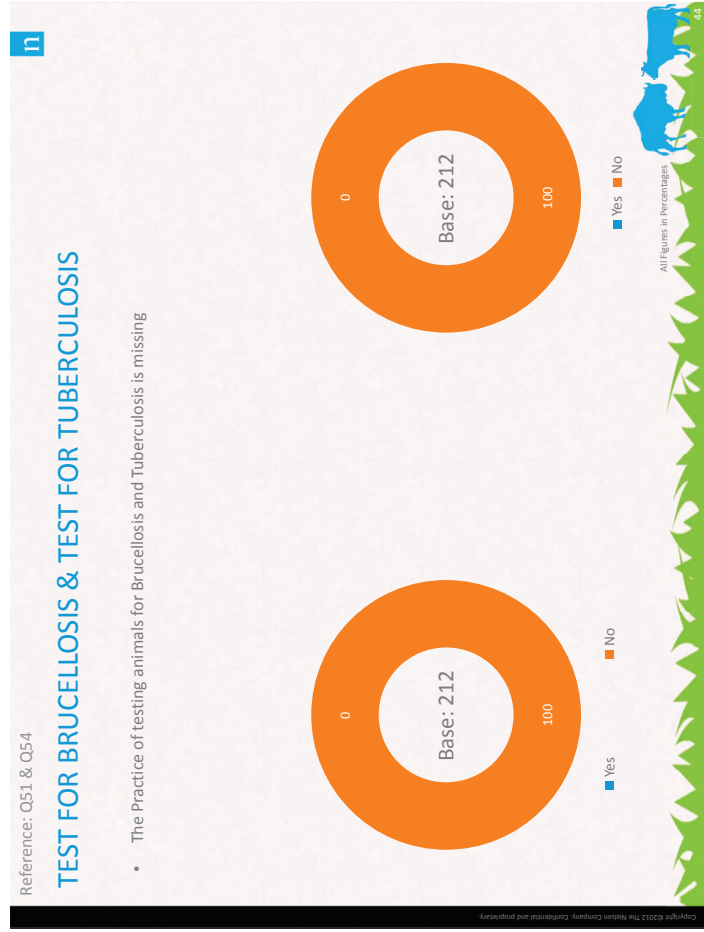
ARTIFICIAL INSEMINATION

- The method of Artificial Insemination is practiced by very few farmers



All Figures in Percentages

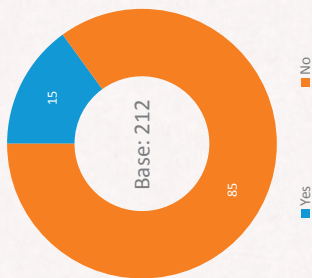
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Reference: Q57 & Q58

ANIMALS DIED WITHIN AN YEAR & THEIR COUNT

- About 15% farmers are such whose animals have died within the last year
- Majority are such whose 1 to 2 animals have died



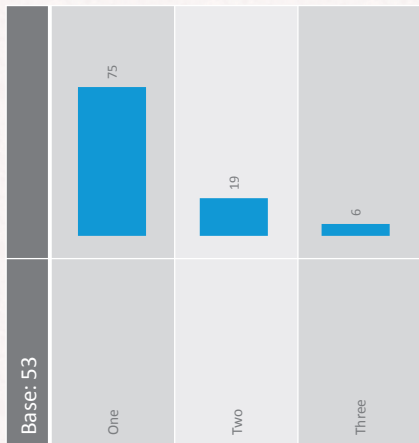
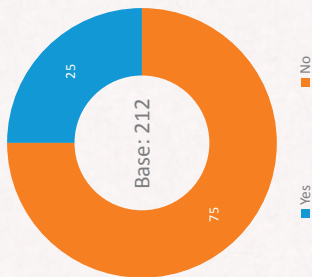
All Figures in Percentages

45

Reference: Q59 & Q60

CLINICAL MASTITIS & NUMBER OF ANIMALS OBSERVED

- About 25% farmers have observed Clinical Mastitis in their animals, out of which majority have observed this in one of their animal



All Figures in Percentages

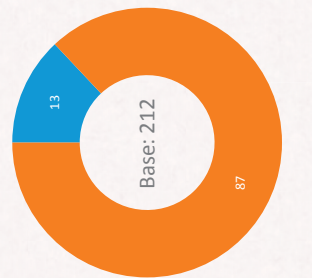
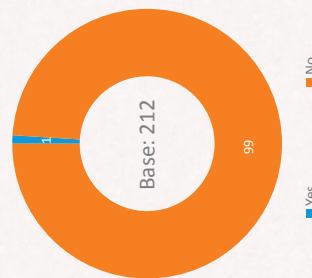
46

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Reference: Q61 & Q64

MASTITIS TEST & ANIMALS ABORTED

- A very few of the farmers have got their animals tested for Mastitis
- Almost 13% have got their animals aborted



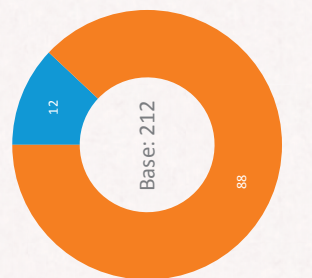
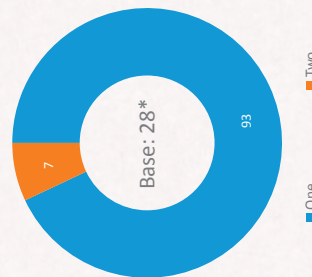
All Figures in Percentages

47

Reference: Q65 & Q66

NUMBER OF ANIMALS ABORTED & RETAINED PLACENTA

- Only 12% of the farmers have observed retained placentas in their animals



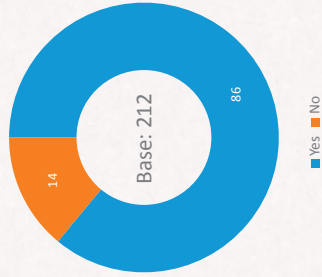
All Figures in Percentages

48

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CALVES REARING

- 8 out of 10 farmers have reared calves in the past 1 year



All Figures in Percentages

NUMBER OF CALVES REARED & NUMBER OF CALVES GOT DIARRHEA

- Majority of the farmers have reared Two (2) calves
- Majority say their Calves didn't get diarrhea, almost 30% say that one of the calves did get diarrhea

Calves Reared	Calves Reared	Calves got Diarrhea	Calves got Diarrhea
Base: 183	Base: 183	Base: 183	Base: 183
One	28	One	30
Two	43	Two	12
Three	16	Three	2
More than three	15	Eight	1
		None	56

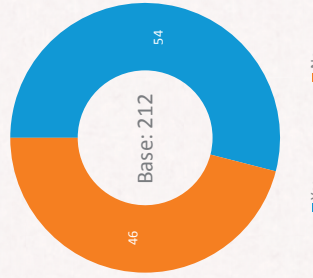
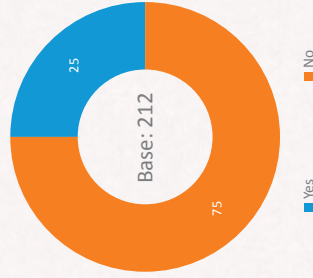
All Figures in Percentages



ANIMAL SHARING

SHARING OF ANIMALS & INCREASING NUMBER OF ANIMALS TO SHARE

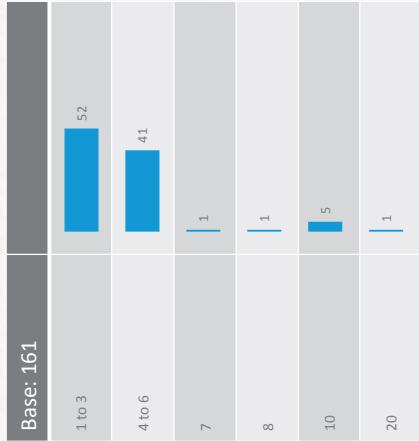
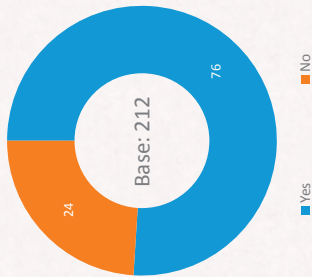
- The practice of sharing animals is low
- However farmers are interested in increasing the number



All Figures in Percentages

REARING OF CALVES (FOR A TIME PERIOD) & NUMBER OF CALVES THAT CAN BE REARED ONCE

- Majority of the farmers are interested in rearing calves for a time period and majority say they can rear 1 to 3 calves



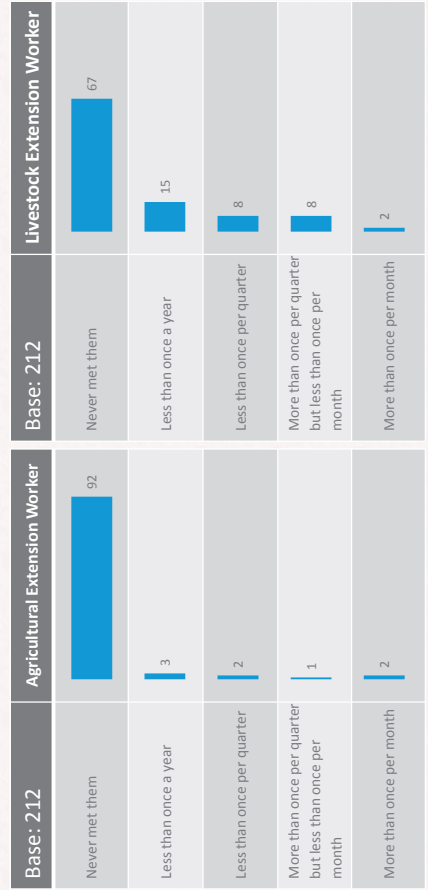
All Figures in Percentages



EXTENSION / TRAINING

AGRICULTURE EXTENSION WORKERS' & LIVESTOCK EXTENSION WORKERS' VISIT

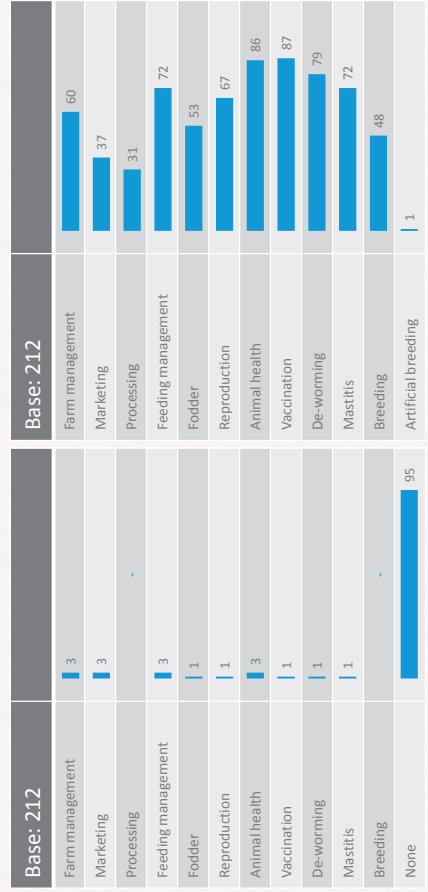
- Majority of the farmers haven't met any Agricultural or Livestock Extension Worker
- However the number of such farmers is low in case of Livestock Workers



All Figures in Percentages

TECHNICAL ASSISTANCE RECEIVED & TECHNICAL ASSISTANCE WANTED TO BE RECEIVED

- Majority haven't received any Technical Assistance
- However majority of them are looking forward to getting training on Animal Health and Vaccinations mainly



All Figures in Percentages

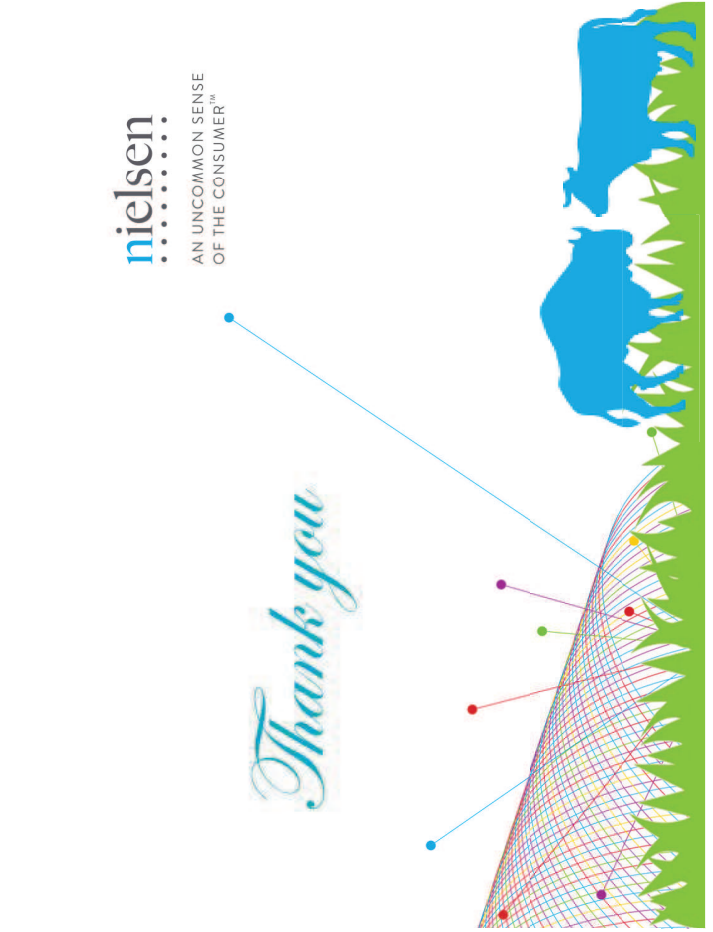
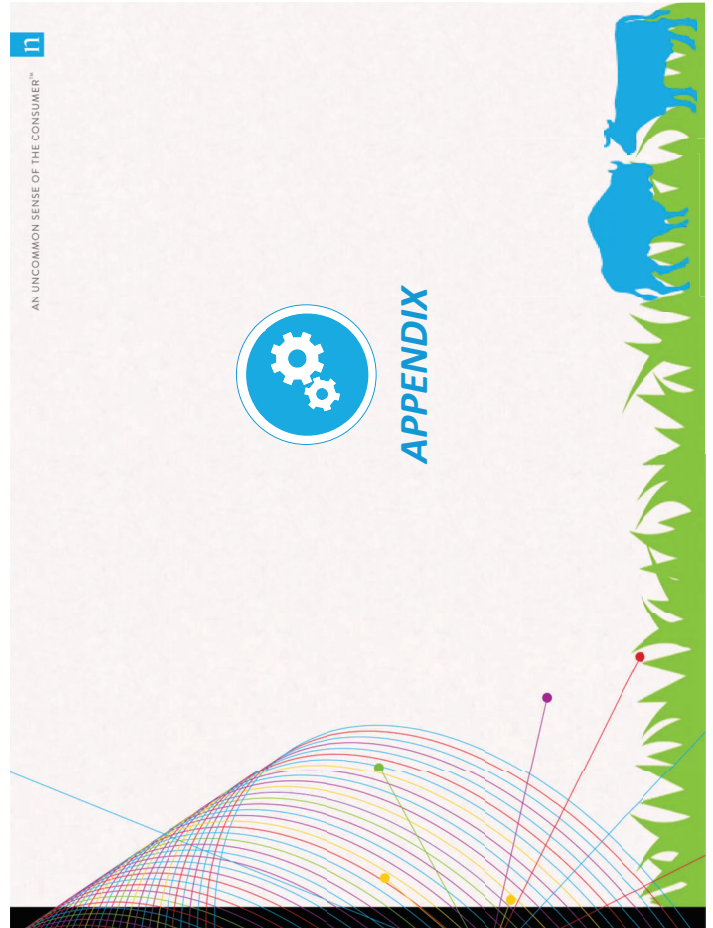


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INFERENCES

Sections	Inferences
Farm Management	<ul style="list-style-type: none"> Majority of the individuals do not maintain information of the farm
Feeding Management	<ul style="list-style-type: none"> Majority of the individuals Tether the neck of their animals and keep them in shades Majority of the individuals do keep care of hygiene by washing their hands before milking cows however the usage of antiseptic solution is almost negligible
Fodder	<ul style="list-style-type: none"> Concentrates and Roughages are mainly purchased whereas Green Fodder is mainly cultivated for animals Salt is given more to animals as compared to Mineral Mix but as and when required
Reproduction	<ul style="list-style-type: none"> 8 out of 10 individuals do not keep record of reproduction of animals
Animal Health	<ul style="list-style-type: none"> The usage of FMD Vaccines is relatively higher than HS Vaccines
Animal Sharing	<ul style="list-style-type: none"> The practice of sharing Animals is very low but they look forward to increase this practice
Extension/ Training	<ul style="list-style-type: none"> Visit of Agricultural and Livestock Extension workers is very low Technical Assistance on Animal Health and Vaccination are the most demanded ones

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別添資料 T0-2 ベースライン調査報告書：キャトルコロニーの農家現況調査

Baseline Survey on Farmers at Cattle Colony

There are several cattle colonies in Karachi and Hyderabad. Although farmers at the cattle colonies are not direct target of the Project, they are important stakeholders of the Project. Therefore the baseline survey on farmers at cattle colonies, the Survey, was conducted by the Project to quantitatively grasp technology level applied by farmers at the cattle colonies.

1) Outline of the Survey

i) Target group

Dairy farmers at cattle colonies in Karachi and Hyderabad

ii) Target area and Sample size

The Survey targets four cattle colonies as shown below. Sixty samples were targeted at four cattle colonies.

District	Colony	Sample size
Karachi	Nagori Cattle Colony	15
	Landhi Cattle Colony	15
Hyderabad	New Cattle Colony	15
	Old Cattle Colony	15
Total		60

The sample are selected based on the land-holding criteria and animal-holding criteria at each cattle colony as shown in the below table.

Number of animals	Land size	Up to 1acre of land (target sample in number)	More than 1 acre of land (target sample in number)
	Up to 150 animals		3 to 4	3 to 4
More than 150 animals		3 to 4	3 to 4

iii) Methods

Individual interview with a structured questionnaire is applied. Contents of the questionnaire is almost the same as one used for the baseline survey on target farmers. The questionnaire was attached at the end of this section

2) Result of the Survey

Based on the above criteria, finally 62 dairy farmers at the cattle colonies were interviewed as shown in the below table. The reports prepared by the subcontractor are attached at the end of this section.

Number of animals	Land size	Up to 1acre of land	More than 1 acre of land	Total
	Up to 150 animals		24	6	30
More than 150 animals		16	16	32
Total		40	22	62

Study ID	3941-C	(101-105)	Resp. No.	(106-109)
Interviewer No.		(113-116)	Interview Length	(117-118)
No. Of Queries		(119-120)	Reference No.	(121-124)

Introduction
Hello, Assalam-o-Alaikum! My name is _____ and I represent a marketing research company Nielsen Pakistan. Our company conducts various researches for many National and Multi-national clients, on the basis of which, these companies try to improve their products and services. And that's the reason why we have come to you today also. I would appreciate if you could spare sometime and participate in this survey.

Before starting the interview we need you to ensure us that you are not busy for the next hour and a half.

تعارف:
السلام علیکم جناب امیرا نام ہے اور میں ایک مارکیٹنگ ریسرچ کمپنی نیلسن پاکستان کی نمائندگی کر رہا ہوں۔ ہماری کمپنی ملکی اور بین الاقوامی کمپنیوں کے لیے ریسرچ کا کام کرتی ہے، اس ریسرچ کی بنیاد پر وہ کمپنیاں اپنی مصنوعات کو بہتر بنانے کی کوشش کرتی ہیں۔ اور اسی مقصد کے لیے ہم آج آپ کے پاس بھی آئے ہیں۔ اگر آپ تھوڑا سا تالم نکال کر اس سروے میں حصہ لیں تو میں آپ کا شکرگزار رہوں گا۔

انٹرویو شروع کرنے سے پہلے برائے مہربانی ہمیں یہ تسلی کرادیں کہ آپ اگلے ایک ٹیڑھ گھنٹے کے لیے فارغ ہیں۔

Q1	Interviewer: Kindly note the city. [SA]	Code (125)	Route
	Karachi	1	
	Hyderabad	2	

Q2	IF CODED 1 IN Q1 SHOW ONLY R1 & R2 IF CODED 2 IN Q1 SHOW ONLY R3 & R4 Kindly note the Location [SA]	Code (126)	Route
	برائے مہربانی جگہ/مقام نوٹ کریں: [SA]	1	
	لانڈھی بھینس کالونی کراچی.....		

	Nagori Cattle Colony in Karachi	2
	Old Cattle Colony in Hyderabad	3
	New Cattle Colony in Hyderabad	4

Q3	Interviewer: Kindly note the Farm Size [SA]	Code (127)	Route
	1 acre or below	1	
	More than 1 acre	2	

Q4	Interviewer: Kindly note the number of Cattle and Buffalos [SA]	Code (128)	Route
	150 cattle and buffalos or below	1	
	More than 150 cattle and buffalos	2	

Profile of Respondent/farm
جو ایدہ کے کونوا/فارم

Q5	Name of Respondent [SA]	Code (129)	Route
	Name	1	
	Address	2	
	Telephone Number	3	

Q6	Interviewer: Kindly Note the Gender of the respondent.	Code (130)	Route
----	--	------------	-------

[SA]	التزویر: برائے مہربانی جو ایندھ کی جنس نوٹ کریں:	
Male	.....	1
Female	.....	2

Q7

Kindly confirm your Age?

برائے مہربانی آپ اپنی عمر بتائیے؟

.....
.....

(131-134)

Q8

Interviewer: Kindly note the Farm's name

التزویر: برائے مہربانی آپ اپنے فارم/کھیت کا نام بتائیے؟

.....
.....

(135-138)

Q9

Position of the Respondent [SA]	Code (139)	Route
جوابدہ کا عہدہ/پیشے کی نوعیت		
Owner	1	
Manager	2	
Others (Specify)	3	

Q10 ASK ONLY IF CODED 2 OR 3 IN Q9

Code (140)	Route
------------	-------

Kindly confirm the Education of the Owner? [SA]

برائے مہربانی اب اپنے مالک کی تعلیمی قابلیت کے بارے میں بتائیے؟ [SA]

No formal education	.....	1
Primary	.....	2
Secondary	.....	3
Higher secondary,	.....	4
Collage	.....	5
University	.....	6
Master/Doctor	.....	7
Don't Know	.....	8

Q11 ASK ONLY IF CODED 2 OR 3 IN Q9

Kindly confirm the religion of the Owner [444]-[SA]

برائے مہربانی اب مجھے اپنے مالک کا مذہب بتائیے؟ [MA]

Muslim	.....	1
Hindu	.....	2
Christian	.....	3
Buddhism	.....	4
Other (Specify )	.....	5

Code (141) Route

Q12 ASK ONLY IF CODED 2 OR 3 IN Q9

Kindly confirm the caste of the Owner?

برائے مہربانی آپ اپنے مالک کی ذات بتائیے؟

.....
.....

(142-145)

Q13 Kindly tell us your level of education?
[SA]

برائے مہربانی آپ اپنی تعلیمی قابلیت کے بارے میں بتائیے؟
[SA]

No formal education	1	Route
Primary	2	
Secondary	3	
Higher secondary,	4	
Collage	5	
University	6	
Master/Doctor	7	

Q14 Kindly tell us your religion?
[SA]

مہربانی آپ ہمیں اپنا مذہب بتاسکتے ہیں؟
[SA]

Muslim	1	Route
Hindu	2	
Christian	3	
Buddhism	4	
Other (Specify)	5	

Q15 Caste of the Respondent

جو اہلحدیثہ کی ذات معلوم کریں:

.....
.....
.....
.....

(148-151)

Q16 Kindly show radio buttons with both responses and an OE box

How old is the farm?
آپ کا یہ فارم/کمیت کتنا پرانا ہے؟

(R1) Years

.....
.....
.....

(152-155)

(R2) Months

.....
.....
.....

(156-159)

Q17 Kindly note in Acres Landholding of the farm [MA]

برائے مہربانی ایکڑ میں نوٹ کریں فارم کی Landholding نوٹ کریں: [MA]

Owned land (acre)	1	Route
Tenant land (acre)	2	

Q18 Responses to be noted in OEs as numbers

Kindly confirm the Number of female animal the farm rears?
برائے مہربانی آپ اپنے مادہ جانوروں کی تعداد کی تصدیق کریں؟

Milking (R1).....	.....	.....	.....

Dry (Just before delivery) (R2).....	.....	.....	.....

Buffalo	Cattle
(161)	(162)
(163)	(164)
(165)	(166)

Dry (Just become dry) (R3).....	خشک بس خشک ہوجاتے ہیں.....	(167)	(168)
Calf (R4).....	بچھڑا.....		

Q19 Responses to be noted in OEs as numbers

Kindly tell us the number of Male animals the farm rears?
برائے مہربانی آپ اپنے نر جانوروں کی تعداد کی تصدیق کریں؟

	بھینس	Cattle	گائے
Adult (R1).....	Buffalo (169)	(170)	(171)
Calf (R2).....	(171)	(172)	بچھڑا.....

Q20 **Limit to 3 Digits**

Note quantity in KGs.
Kindly confirm the milk production day?
مقدار کو کلر گرام میں نوٹ کریں
برائے مہربانی یہ بتائیے کہ ایک دن میں دودھ کی کتنی پیداوار ہوجاتی ہے؟

(R1) Milk production per day (highest amount in a last year)
دودھ کی پیداوار ایک دن میں، گنتہ سال میں سب سے زیادہ مقدار ہے

(R2) Milk production per day (lowest amount in a last year)
دودھ کی پیداوار ایک دن میں، گنتہ سال میں سب سے کم مقدار ہے

(177-180)

Q21

To whom do you sell your milk most? Please rank 1, 2, 3 (rank 1 is the one you sell most)
آپ دودھ کسے فروخت کرتے ہیں؟ برائے مہربانی 1، 2، 3 کو رینک کریں۔ (1 رینک وہ

جسے آپ سب سے زیادہ دودھ فروخت کرتے ہیں)

From whom	RANK
(R1).....	
Wholesaler (based on annual contract)	(213-214)
(R2).....	
Brokers	(215-216)
(R3).....	
Brokers	(217-218)
(R4).....	
Sell milk at own shop	(219-220)
(R5).....	
Sell milk to retailers and/or consumer directly	(221-222)
(R6).....	
Others (specify)	(223-224)

Q22

How many dairy animals you buy within a year?
ہر بتائیے کہ آپ نے ایک سال میں کتنے دودھ دینے والے جانور خریدے ہیں؟

Number of Years
(R1).....

سال کی تعداد..... (225-226)

Q23

From whom or where have you bought dairy animal within a year?
[MA]

ہر بتائیے کہ آپ نے ایک سال کے اندر دودھ دینے والے جانور کس سے یا کہاں سے خریدے ہیں؟
[MA]

Code (227)	Route
1	From middleman
2	Livestock market in Karachi
3	Livestock market in other districts in Sindh
4	Livestock market in Punjab
5	Others (specify)

Q24 KINLDY SHOW RESPONSES CODED IN Q23

How many dairy animals have you purchased in the last year from each source?
ہر بتائیے کہ آپ نے گنتہ آخری سال میں دودھ دینے والے جانوروں ہر ذرائع سے خریدا ہے؟

(R1) From middleman

درمیانے طبقے سے

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

(228-231)

(R2) Livestock market in Karachi

کراچی میں منڈی مویشیاں

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

(232-235)

(R3) Livestock market in other districts in Sindh

منڈی مویشیاں اور دوسرے سمنڈھ کے ضلع سے

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

(236-239)

(R4) Livestock market in Punjab

پنجاب میں منڈی مویشیاں

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

(240-243)

(R5) Others (specify)

کوئی اور واضح کریں

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

(244-247)

Q25.a.

When you buy dairy animals, how do you pay for the dairy animals? [MA]

جب آپ دودھ دینے والے جانور خریدتے ہیں تو کس طرح دودھ دینے والے جانوروں کی ادائیگی کرتے ہیں؟

Code
1
2

(R1) By own savings

اپنی بچت کی طرف سے

(R2) Borrow money from middle man

بروکر سے قرضہ لے کر

(R3) Borrow money from relative/friends	اپنے دوست/رشتہ داروں سے قرضہ لے کر	3
(R4) Borrow money from bank	بینک سے قرضہ لے کر	4
(R5) Others (specify)	کوئی اور واضح کریں	5

Q25.b. SHOW ONLY RESPONSES CODED IN Q25.a.

When you buy dairy animals, how do you pay for the dairy animals? Please rank 1, 2, 3 (rank 1 is from what you pay most)

جانوروں کی ادائیگی کے تریکار کو رینک کریں، 1، 2، یا 3 کے حساب سے رینک کریں؟

	RANK
(R1) By own savings	(248-249)
(R2) Borrow money from middle man	(250-251)
(R3) Borrow money from relative/friends	(252-253)
(R4) Borrow money from bank	(254-255)
(R5) Others (specify)	(256-257)

Q26

Among dairy animals which you bought within a year, what was the condition of animals, before delivery?

Please rank 1-7-3 (rank 1 is the one you bought most)

پستانے ایک سال کے اندر اندر دودھ دینے والے جانور جو خریدے گئے ان جانوروں کی کیا صورت حال تھی؟

برائے سہولتی، 1، 2، 3 کو رینک کریں۔ (1 رینک وہ ہے جس سے آپ سب سے زیادہ دودھ خریدتے ہیں)

	RANK
(R1) More than a month before delivery	(258-259)
(R2) Less than a month before delivery	(260-261)

Q27

Among dairy animals which you bought within a year, what was the condition of animals, before and after delivery?

Please rank 1, 2, 3 (rank 1 is the one you bought most)

پستانے ایک سال کے اندر اندر دودھ دینے والے جانور جو خریدے گئے، زیادہ تر ان جانوروں کی صورتحال کیا تھی؟

برائے سہولتی، 1، 2، 3 کو رینک کریں۔ (1 رینک وہ ہے جس سے آپ سب سے زیادہ دودھ خریدتے ہیں)

	RANK
--	------

(R1) More than a month before delivery	(125-126)
(R2) Less than a month before delivery	(127-128)
(R3) Just after delivery	(129-130)
(R4) More than a month after delivery	(131-132)
(R5) Less than a month after delivery	(133-134)

Q28	Code (268)	Route
Are you interested in starting or increasing the number of dry animals which you should ask someone at rural area to keep animals until the animals start milking? [SA]	1	
کیا آپ خشک جانوروں کی تعداد بڑھانے میں دلچسپی رکھتے ہیں؟ اگر آپ کسی کے پاس رکو سکیں جب تک ان جانوروں کے دودھ آنے کا عمل شروع ہو جائے؟ [SA]	2	
Yes	ہاں	
No	نہیں	

Q29	ASK ONLY IF CODED 1 IN Q28
If yes, how many of your dry animals in a year do you want to ask someone at rural to keep animals until the animals start milking?	
اگر ہاں، تو آپ کے خشک جانوروں کو ایک سال میں چاہتے ہیں کہ انہیں علاقوں میں کسی کے پاس رکھیں جب تک ان جانوروں کے دودھ آنے کا عمل شروع ہو جائے؟	
Number of Animals	سال
(R1)	(269-271)

Q30	What did you do once your dairy animal becomes dry? Please rank 1, 2, 3 (rank 1 is the one you do most)
جب آپ کے دودھ بننے والے جانور خشک ہوجاتے ہیں تو آپ کیا کرتے ہیں؟ برائے مہربانی 1، 2، 3 کو رینک کریں۔ 1 (رینک وہ ہے جسے آپ زیادہ کرتے ہیں)	
Sell dry animal to middleman for meat	
(R1) خشک جانور فروخت کرتے ہیں درمیانی طبقے کے لوگوں کو گوشت کیلئے	(272-273)
Sell dry animals to middleman for recycle	
(R2) خشک جانور فروخت کرتے ہیں درمیانی طبقے کے لوگوں کو رسائیکل کیلئے	(274-275)

Keep dry animals until delivery and milking in the farm			(276-277)
(R3) خشک جانوروں کو فارم میں رکھتے ہیں ٹیوری اور دودھ کے عمل تک			
Ask someone at rural to keep animals until the animal starts milking			(278-279)
(R4) کسی علاقوں میں کسی سے پوچھنا چاہئے جانوروں کو رکھنا یا ان جانوروں کے دودھ شروع ہونے کے عمل تک			
Others			(280-313)
(R5) کوئی اور واضح کریں			

Q31	Note the number of Calves How many calves do you get per month from delivery of your dairy animals at your farm? بچڑوں کی تعداد نوٹ کریں آپ اپنے فارم پر ماہانہ دودھ بننے والے جانوروں کی دہلوری سے کتنے بچڑوں کو حاصل کرتے ہیں؟
Calves per month	بچڑے ماہانہ
(R1)	(314-316)

Q32	What will you do for calves born at your farm? Please rank 1, 2, 3 (rank 1 is the one you do most)		
آپ کے فارم میں کوئی بچڑا پیدا ہوجائے تو آپ کیا کریں گے؟ برائے مہربانی 1، 2، 3 کو رینک کریں۔ 1 (رینک وہ ہے جسے آپ زیادہ کرتے ہیں)			
Sell calves to middleman			(317-318)
(R1) بروکر کو بچڑا فروخت کریں گے			
Sell calves to farmers			(319-320)
(R2) کسان کو بچڑا فروخت کریں گے			
Keep calves at own farm			(321-322)
(R3) بچڑے کو اپنے فارم پر ہی رکھیں گے			
Others (specify)			(323-324)
(R4) کوئی اور واضح کریں			

Below questions are about dairy animals (calf, young, and adult female/male buffalo and cattle)
مندرجہ ذیل سوالات دودھ دینے والے مویشیوں کے بارے میں ہیں (بچڑے اور نر / مادہ بھینس اور گائے)

Farm Management / Marketing	فارم کے انتظامات / مارکیٹنگ
Are you recording the information on farm management?	Route
	Code (325)

[SA]	آپ کے پاس مویشیوں کے لیے چھان کا انتظام ہے؟ [SA]	
Yes	.....	1
No	.....	2

Q34	Ask if coded 1 in Error (Missing) What kinds of record are you keeping? [MA]	Code (326)	Route
	آپ کس قسم کا ریکارڈ رکھتے ہیں؟ [MA]		
	Purchase of agricultural materials	1	
	Purchase of livestock materials	2	
	Sales record of milk	3	
	Sales record of livestock	4	
	Others (Specify)	5	

Feeding Management	
غذا کے انتظامات	

Q35	How do you keep animals? [SA]	Code (327)	Route
	آپ مویشیوں کو کس طرح رکھتے ہیں؟ [SA]		
	Tether a leg of animals	1	
	Tether a neck of animals	2	
	Free in the paddock	3	
	Others (Specify)	4	

Q36	Do you have a shade for animals? [SA]	Code (328)	Route
		
	.....	1	
	.....	2	

	آپ کے پاس مویشیوں کے لیے چھان کا انتظام ہے؟ [SA]	
Yes	.....	1
No	.....	2

Q37	if coded 1 in Error (Missing) If yes, what is the material of the shed? [SA]	Code (329)	Route
	اگر ہاں تو چھان کے لیے کیا استعمال کیا گیا ہے؟ [SA]		
	Kacha roof	1	
	Pakka roof	2	
	Tree	3	
	Others (Specify)	4	

Q38	Before milking, do you wash your hands? [SA]	Code (330)	Route
	دودھ دہانے سے پہلے کیا آپ ہاتھ دھوتے ہیں؟ [SA]		
	Yes	1	
	No	2	

Q39	Ask if coded 1 in Error (Missing) If yes, do you wash your hands before you milk next cow/buffalos? [SA]	Code (331)	Route
	اگر ہاں تو کیا آپ بر گائے / بھینس کا دہانے سے پہلے اپنے ہاتھ دھوتے ہیں؟ [SA]		
	Yes	1	
	No	2	

No	Code	Route
Q40	Code (332)	Route
	Do you clean up animals' nipples before milking? [SA]	
	Yes	1
	No	2

No	Code	Route
Q41	Code (333)	Route
	Ask if coded 1 in Error (Missing)	
	Do you wipe all nipples of all milking animals? [SA]	
	Yes	1
	No	2

No	Code	Route
Q42	Code (334)	Route
	Do you use an antiseptic solution for your hands and/or nipples of animals? [SA]	
	Yes	1
	No	2
	Others (specify)	3
	Others (specify)	4

No	Code	Route
Q43	Code (335)	Route
	Do you manage your livestock in collaboration with other households? [SA]	
	Yes	1

No	Code	Route
Q44	Code (336)	Route
	Ask if coded 1 in Error (Missing)	
	What kinds of activities do you collaboratively work with other household? [MA]	
	Yes	1
	No	2
	Others (specify)	3
	Others (specify)	4
	Others (specify)	5
	Others (specify)	6
	Others (specify)	7

No	Code	Route
Q45	Code (337)	Route
	Did your animals receive cutting hoof? [SA]	
	Yes	1
	No	2

No	Code	Route
Q46	Code (338)	Route
	Do you purchase concentrate? [SA]	
	Yes	1

No	.....		2
Q47	ASK IF CODED 1 in Error (Missing)	Code (339)	Route
	What kinds of concentrate do you purchase? [SA]		
	آپ کس قسم کا کنٹریلیوٹا خرید کرتے ہیں؟ [SA]		
	Wheat bran	گندم چوکر	1
	Cotton seed cake	کپاس کے بیج کا بنا ہوا چارہ	2
	Rice polish	چاروں کا چارہ	3
	Mustard cake	سرسوں کا چارہ	4
	Others (Specify)	دیگر (وضاحت کریں.....)	5

Q48a	Do you use following roughages? [MA]	کیا آپ مندرجہ ذیل سخت قسم کے چارے استعمال کرتے ہیں؟ [MA]
Q48b	Only show responses coded as 'Yes' in Error (Missing) As you said you use certain Roughages, kindly tell us do you pay for it? [MA]	جیسا کہ آپ نے بتایا کہ آپ خاص سخت غذا استعمال کرتے ہیں، برائے مہربانی یہ بتائیے کہ کیا آپ اس کی قیمت ادا کرتے ہیں؟ [MA]

	Q48a		Q48b	
	Yes ہاں	No نہیں	Pay for it اس کی قیمت ادا کرتے ہیں	It is free وہ مفت ہے
Rice straw (R1).....	1 (340)	2	(345)	2
Wheat straw (R2).....	1 (341)	2	(346)	2
Sugar cane top (R3).....	1 (342)	2	(347)	2
(R4) Agricultural residue	1 (343)	2	(348)	2

.....		
Others (specify)		(344)		(349)	
(R5).....		دیگر (وضاحت کریں.....)		1 2 1 2	
Q49	Have you cultivated any green fodder? [SA]	Code (350)	Route		
	کیا آپ نے کوئی سبز چارہ کاشت کیا ہے؟ [SA]				
	Yes	1	ہاں		
	No	2	نہیں		

Q50	ASK ONLY IF CODED 1 IN Error (Missing)	Code (351)	Route
	If yes, which green fodder have you cultivated? [SA]		
	Berseem	1	برسیم
	Lucerne(Alfalfa)	2	لوسن
	Maize	3	مکی
	Sorghum	4	سرو
	Jawar	5	جور
	Others (Specify)	6	دیگر (وضاحت کریں.....)

Q51	Do you provide salt to animals? [SA]	Code (352)	Route
	کیا آپ مویشیوں کو نمک فراہم کرتے ہیں؟ [SA]		
	Yes	1	ہاں
	No	2	نہیں
Q52	Do you provide mineral mix to animals?	Code (353)	Route

[SA]	کیا آپ مویشیوں کو کوئی معدنیات مکس کر کے فراہم کرتے ہیں؟	1 ہاں	2 نہیں
Yes	.....	1	2
No	.....	1	2

Q53	Have you stored fodder? [SA]	Code (354)	Route
Yes	.....	1	2
No	.....	1	2

Q54	ASK ONLY IF CODED 1 in Error (Missing) How do you store fodder? [SA]	Code (355)	Route
Silage	.....	1	2
Hay	.....	2	3
Ammonia fermentative treatment	3	4
Others (specify)	4	

Reproduction		افزائش نسل	
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Q55	Are you keeping a record for reproduction? [SA]	Code (356)	Route
Yes	1	2
No	1	2

Yes	.....	1
No	.....	2

Q56	ASK ONLY IF CODED 1 in Error (Missing) What kinds of information are you keeping? [SA]	Code (357)	Route
Delivery date	.....	1	2
Mating date	.....	2	3
AI date	.....	3	4
Others (specify )	.....	4	

Q57	Have your cattle/buffalos received diagnosis of pregnancy by rectal palpation? [SA]	Code (358)	Route
Yes	.....	1	2
No	.....	1	2

Q58	Have you provide any treatment for un-pregnant female cattle/buffalos? [SA]	Code (359)	Route
Yes	.....	1	2
No	.....	1	2

Q59	Have your female cattle/buffalos received Artificial insemination? [SA]	Code (360)	Route
Yes	.....	1	2
No	.....	1	2

Yes	1
No	2

مویشیوں کی صحت	
Animal Health	

Q60	Code (361)	Route
Have your animals taken FMD vaccines in last 5 years? [SA]		
کیا آپ کے مویشیوں کو گزشتہ پانچ سال کے دوران FMD ویکسی نیشن ملی ہے؟ [SA]		
Yes, every year	1	جی ہاں، ہر سال
Yes, a few times	2	جی ہاں، بعض دفعہ
Yes, once	3	جی ہاں، ایک بار
No	4	نہیں

Q61	Code (362)	Route
Have your animals taken HS vaccines in last 5 years? [SA]		
کیا آپ کے مویشیوں کو گزشتہ پانچ سال کے دوران HS ویکسی نیشن ملی ہے؟ [SA]		
Yes, every year	1	جی ہاں، ہر سال
Yes, a few times	2	جی ہاں، بعض دفعہ
Yes, once	3	جی ہاں، ایک بار
No	4	نہیں

Q62	Code (363)	Route
Have you de-wormed your animals against endoparasite in last 2 years? [SA]		
deworm کے جانوروں کو گزشتہ 2 سالوں میں endoparasite کے خلاف اپنے جانوروں کو deworm کیا ہے؟ [SA]		
Yes	1	جی ہاں
No	2	نہیں

Yes, every year	1	جی ہاں، ہر سال
Yes, a few times	2	جی ہاں، بعض دفعہ
Yes, once	3	جی ہاں، ایک بار
No	4	نہیں

Q63	Code (364)	Route
Have you de-wormed your animals against ectoparasite in last 2 years? [SA]		
deworm کے جانوروں کو ectoparasite کے خلاف اپنے جانوروں کو deworm کیا ہے؟ [SA]		
Yes, every year	1	جی ہاں، ہر سال
Yes, a few times	2	جی ہاں، بعض دفعہ
Yes, once	3	جی ہاں، ایک بار
No	4	نہیں

Q64	Code (365)	Route
IF CODED 2 IN Error (Missing) go to Error (Missing)		
Have your animals tested for brucellosis within a year? [SA]		
کیا آپ نے مویشیوں کا ایک سال کے دوران بروسیلا کے ٹیسٹ کرایا ہے؟ [SA]		
Yes	1	جی ہاں
No	2	نہیں

Q65	Code (366)	Route
ASK IF CODED 1 IN Error (Missing)		
Were your animals diagnosed as positive of brucellosis? [SA]		
کیا آپ کے مویشیوں میں بروسیلا بیماری مثبت ہوئی؟ [SA]		
Yes	1	جی ہاں
No	2	نہیں

Q66	ASK IF CODED 1 IN Error (Missing) If your animals were diagnosed as positive, what did you do? [SA]	Code (367)	Route
	اگر آپ کے مویشیوں میں بروسیلا بیماری ثابت ہوئی تو آپ نے کیا کیا؟ [SA]		
	Did nothing and kept rearing them as same as before	1	
	Sold the animals	2	
	Slaughtered	3	
	Killed and buried the animals	4	
	Isolated the animals from other animals	5	
	Others (specify)	6	

Q67	ASK ALL IF CODED 2 IN Q67 GO TO Q70 Have your animals taken tuberculosis test within a year? [SA]	Code (368)	Route
	کیا آپ کے مویشیوں کا تپ دق کا ٹیسٹ کیا گیا تھا؟ [SA]		
	Yes	1	
	No	2	

Q68	ASK ONLY IF CODED 1 IN Q67 If yes, were your animals diagnosed as positive of tuberculosis? [SA]	Code (369)	Route
	اگر ہاں تو کیا آپ کے مویشیوں میں تپ دق ثابت ہوا؟ [SA]		
	Yes	1	
	No	2	

Q69	ASK ONLY IF CODED 1 IN Q67 If your animals were diagnosed as positive, what did you do? [SA]	Code (370)	Route
	جب آپ کے مویشیوں میں تپ دق ثابت ہوا تو آپ نے کیا کیا؟ [SA]		

	Did nothing and kept rearing them as same as before	1	[SA]
	Sold the animals	2	
	Slaughtered	3	
	Killed and buried the animals	4	
	Isolated the animals from other animals	5	
	Others (specify)	6	

Q70	ASK ALL Have your animals died within a year? [SA]	Code (371)	Route
	کیا ایک سال کے دوران آپ کا کوئی مویشی مر گیا ہے؟ [SA]		
	Yes	1	
	No	2	

Q71	ASK ONLY IF CODED 1 IN Q70 Calf means an animal up to 6 month old while young animal means an animal more than 6 month old How many animals died within a year?		
	(R1) Calf		
	(R2) Young		

فوزائیدہ کا مطلب چھ ماہ تک بڑے مویشی جبکہ جوان مویشی کا مطلب چھ ماہ سے زائد بڑے مویشی
ایک سال کے دوران کتنے مویشی مر گئے؟

چھوڑا

جوان

(R3) Adult																			
(R4) Total																			

(380-415)

(416-419)

بڑے

کوٹل

Q72	Have your animals get clinical mastitis within a year? [SA]	Code (420)	Route
	کیا ایک سال کے دوران آپ کے مویشیوں کو پستانوں کے ورم کے لیے کلینک کا علاج ملا؟ [SA]		
	Yes	1	
	No	2	

Q73	ASK ONLY IF CODED 1 IN Error (Missing) How many animals got clinical mastitis? کتنے مویشیوں کو کلینک کا علاج ملا؟	Code (421-424)	Route

Q74	IF CODED 2 IN Q74 GO TO Q77 Have your animals taken mastitis test within a year? [SA]	Code (425)	Route
	کیا ایک سال کے دوران آپ نے مویشیوں کے تھوں کے ورم/سوزش کا ٹیسٹ کرایا ہے؟		

	Yes	[SA]	
	No		1
			2

Q75	ASK ONLY IF CODED 1 IN Error (Missing) Were your animals diagnosed as positive subclinical mastitis? [SA]	Code (426)	Route
	کیا آپ کے مویشیوں میں پستانوں کا ورم ثابت ہوا؟ [SA]		
	Yes	1	
	No	2	

Q76	ASK ONLY IF CODED 1 IN Error (Missing) If yes, what did you do after the positive diagnosis? [SA]	Code (427)	Route
	اگر ہاں، تو مثبت ثابت ہونے پر آپ نے کیا کیا؟ [SA]		
	Did nothing	1	
	Treated and cured	2	
	Treated but not cured	3	
	Others (specify)	4	

Q77	ASK ALL Have your animals aborted within a year? [SA]	Code (428)	Route
	کیا ایک سال کے دوران آپ کے مویشیوں کا اسقاط حمل ہوا ہے؟ [SA]		
	Yes	1	
	No	2	

Q78	ASK IF CODED 1 IN Error (Missing) If yes, how many animals aborted?		
-----	--	--	--

اگر باہن تو کتنے حمل ساقط ہوئے؟

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

(429-432)

Q79 Have your animals got retained placenta within a year?
[SA]

Code (433)	Route
1	
2	

کیا ایک سال کے دوران آپ کے کسی بھی مویشی کی جبر رہ گئی؟
[SA]

Yes ہاں

No نہیں

Q80 ASK ONLY IF CODED 1 IN Error (Missing)
If yes, how many animals got retained placenta?
اگر ہاں، کتنے مویشیوں کی آنول کو برقرار رکھا گیا؟

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

(434-437)

Q81 Have you reared calves within a year?
[SA]

Code (438)	Route
1	
2	

کیا آپ نے ایک سال کے دوران چھوٹے بچڑوں کو پالا ہے؟
[SA]

Yes ہاں

No نہیں

Q82 ASK ONLY IF CODED 1 IN Error (Missing)
Note in Numbers
How many calves have you reared?

عدد میں نوٹ کریں
آپ نے کتنے چھوٹے بچڑے پالے ہیں؟

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

(439-442)

Q83 Answer in Q83 should not exceed answer in Q82
Note in Numbers
And how many calves among them got diarrhea?
ان چھوٹے بچڑوں میں سے کتنے بچڑوں کو دست ہوئے؟

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

(443-446)

Extension / Training
توسیع / ٹریننگ

Q84 How often does an agriculture extension worker come to you?
[SA]

Code (447)	Route
1	اپ کے پاس زرعی توسیعی ورکر کتنی باقاعدگی سے آتا ہے؟ [SA]
2	Never met them اس نے نہیں ملا
3	Less than once a year سال میں ایک بار سے بھی کم
4	Less than once per quarter سہ ماہی میں ایک بار سے بھی کم
5	More than once per quarter but less than once per month سہ ماہی میں ایک سے زائد جبکہ مہینے میں ایک بار سے کم
6	More than once per month مہینے میں ایک سے زائد

Q85	Code (448)	Route
How often does a livestock extension worker come to you? [SA]		
آپ کے پاس زرعی توسیعی ورکر کتنی باقاعدگی سے آتا ہے؟ [SA]		
Never met them	1	
Less than once a year	2	
Less than once per quarter	3	
More than once per quarter but less than once per month	4	
More than once per month	5	

Q86	Code (449)	Route
Have you received any technical assistant on livestock? [MA]		
کیا آپ نے مویشیوں کے سلسلے میں کوئی ٹیکنیکل اعانت وصول کی ہے؟ [MA]		
Farm management	01	
Marketing	02	
Processing	03	
Feeding management	04	
Fodder	05	
Reproduction	06	
Animal health	07	
Vaccination	08	
De-worming	09	
Mastitis	10	
Breeding	11	
Any other (Specify)	12	

Q87	Code (451)	Route
Which technical assistant do you want to receive? [MA]		

Q88	Code (452)	Route
How often do you visit the extension worker? [MA]		
کون سی ٹیکنیکل اعانت آپ وصول کرنا چاہتے ہیں؟ [MA]		
Farm management	01	
Marketing	02	
Processing	03	
Feeding management	04	
Fodder	05	
Reproduction	06	
Animal health	07	
Vaccination	08	
De-worming	09	
Mastitis	10	
Breeding	11	
Any other (Specify)	12	

THANK YOU!!
جو ایدہ کا شکریہ ادا کریں



-
- OBJECTIVES**
- To gauge the practices of handling, breeding and milking of animals in Cattle Colonies of Karachi and Hyderabad
 - The primary objective of this study was to create the base for the end line survey that will be conducted once the Livestock Development Program has been implemented.
 - The Data from the end line survey will be compared keeping this survey as the base.
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添付資料7.1.3 (2)

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PROJECT LIVESTOCK
CATTLE - OVERALL

Nielsen Pakistan
December, 2014

AN UNCOMMON SENSE OF THE CONSUMER™

OBJECTIVES

AN UNCOMMON SENSE OF THE CONSUMER™



RESEARCH DESIGN



SCOPE

- The Survey consist of Livestock's Farming in two cities:
 - Cattle Colonies in Karachi
 - Cattle Colonies in Hyderabad
- The Survey was conducted in four Cattle Colonies (2 each City)



METHODOLOGY

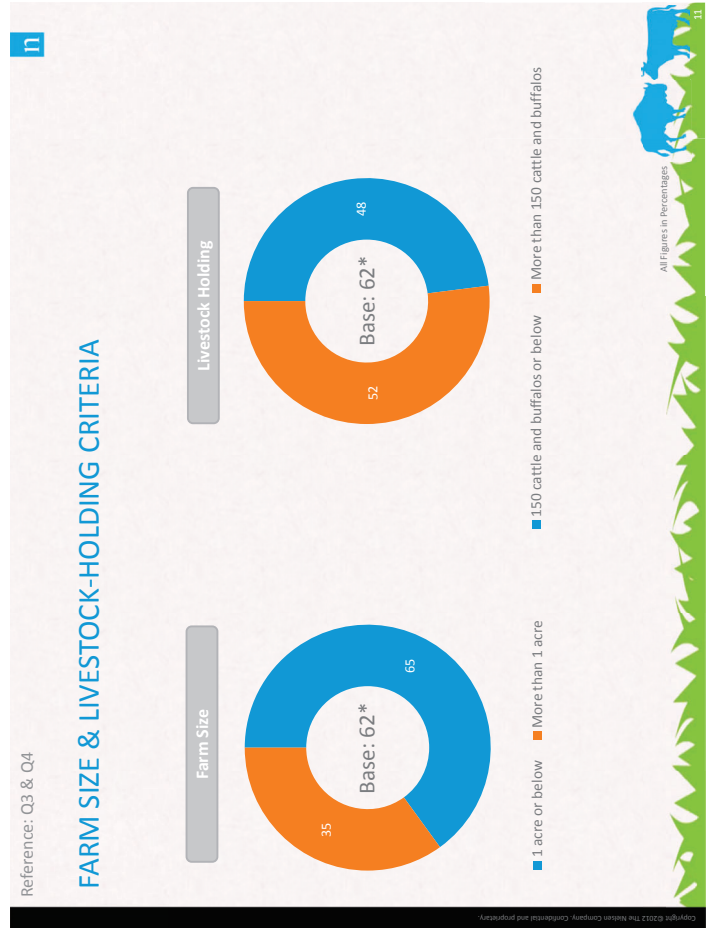
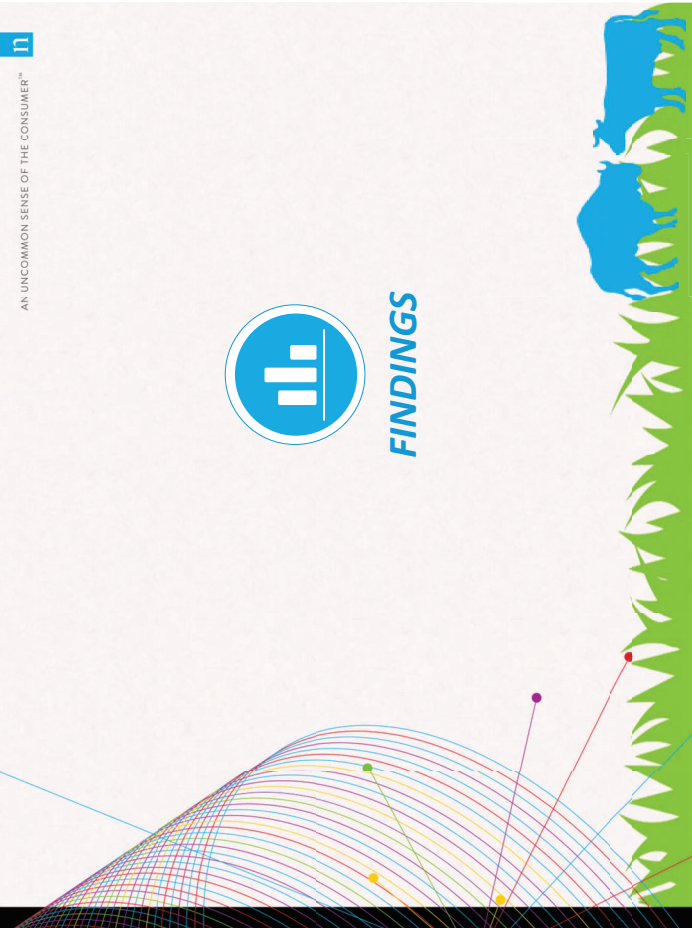
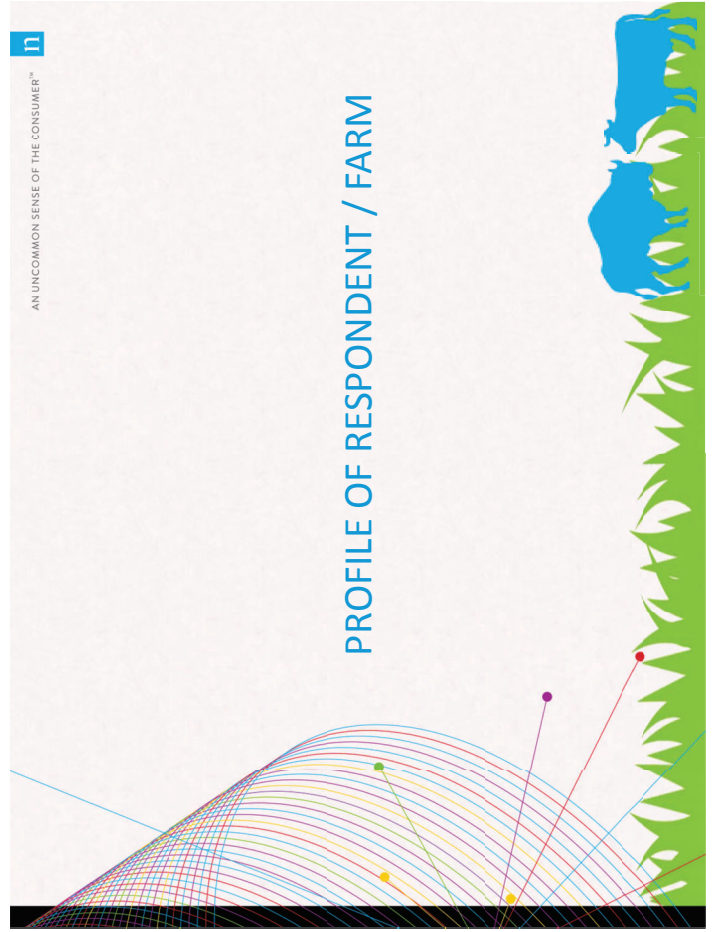
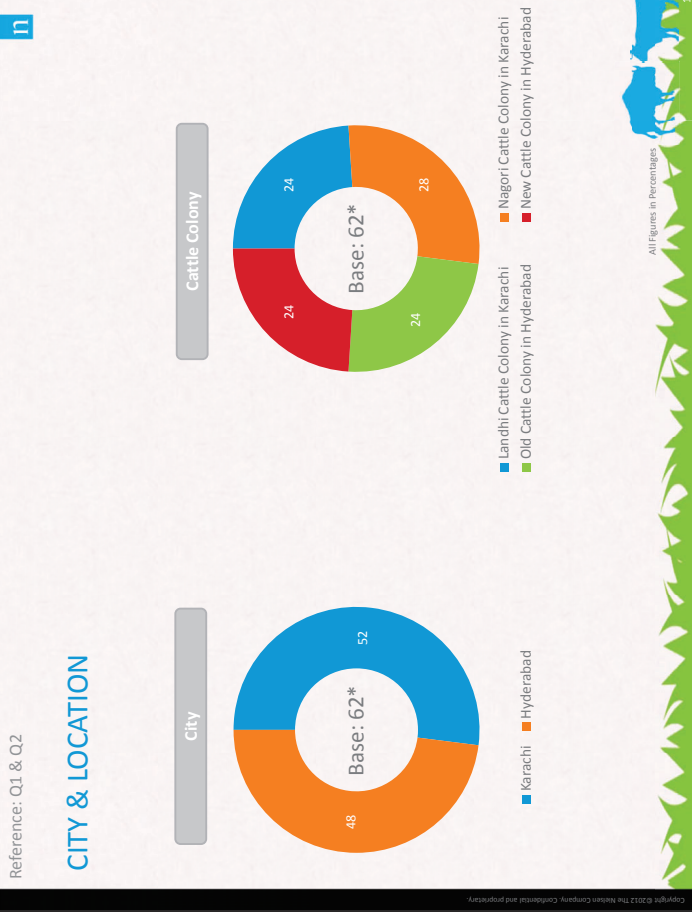
- The recruitment of respondents was done through Snowballing technique in the chosen Cattle Colonies
- Face to Face interviews were conducted using structured questionnaire
- The questionnaire was administered via CAPI technique



GEOGRAPHICAL COVERAGE

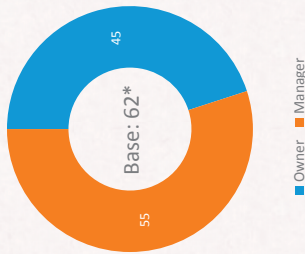
- The Study was conducted in two Cities of Sindh:
 - Karachi
 - Hyderabad
- 2 Cattle Colonies were chosen from each district:
 - Karachi:
 - Landhi Cattle Colony
 - Nagori Cattle Colony
 - Hyderabad:
 - Old Cattle Colony
 - New Cattle Colony





POSITION OF THE RESPONDENT

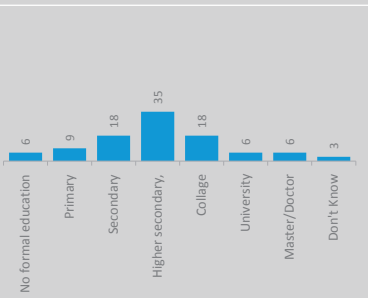
- About 55% of the interviews were conducted from the Managers who were working under the Owners
- 45% of the respondents were the owners themselves



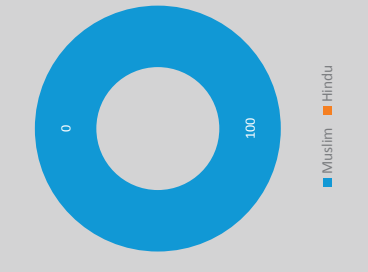
All Figures in Percentages

EDUCATIONAL LEVEL, RELIGION & CASTE OF THE OWNER

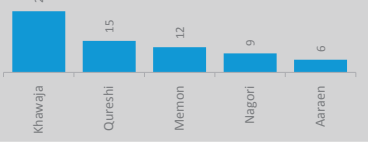
Educational Level of the Owner – (Base: 34*)



Religion of the Owner (Base: 34*)



Caste of the Owner (Base: 34*)



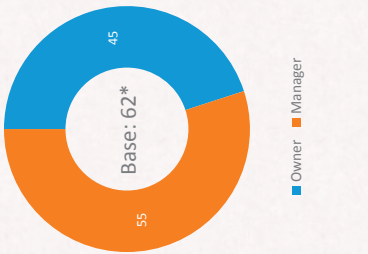
All Figures in Percentages

EDUCATIONAL LEVEL, RELIGION & CASTE OF THE RESPONDENT

Educational Level of the Respondent – (Base: 62*)



Religion of the Respondent (Base: 62*)



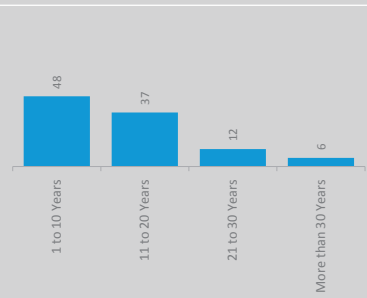
Caste of the Respondent (Base: 62*)



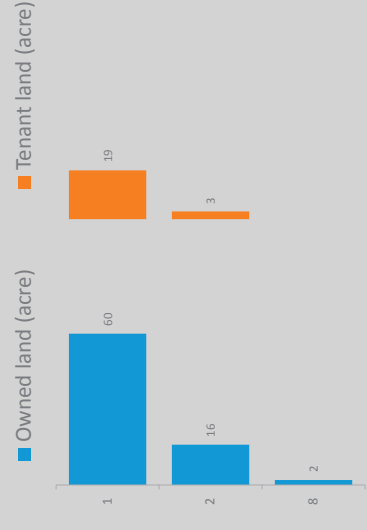
All Figures in Percentages

HISTORY OF THE FARM & LANDHOLDING OF THE FARM

History of the farm (Base: 62*)



Landholding of the farm (Base: 62*)



All Figures in Percentages

ANIMALS REARED

Animals	FEMALE					MALE	
	Milking	Dry (Just Before Delivery)	Dry (Just Before Dry)	Calif	Adult	Calif	Adult
Buffalo	1 to 10	40	46	41	41	51	51
	11 to 20	4	11	6	7	18	4
	21 to 30	4	8	-	-	5	-
	31 to 40	3	2	-	-	4	-
	More than 40	89	2	-	-	8	-
Cattle	None	37	48	53	27	47	47
	1 to 10	44	28	21	39	44	46
	11 to 20	21	2	-	8	3	2
	21 to 30	8	2	-	2	4	2
	31 to 40	5	-	-	2	-	-
More than 40	7	-	-	-	-	-	
None	16	69	79	52	50	52	

All Figures in Percentages

MILK PRODUCTION

- Majority of the Cattle Farms produce between the range of 301 to 600 Kgs per Day

Base: 62*	Milk production per day (highest amount in a last year)	Milk production per day (lowest amount in a last year)
1 to 300	16	31
301 to 600	40	35
601 to 900	26	21
More than 900	18	13

All Figures in Percentages

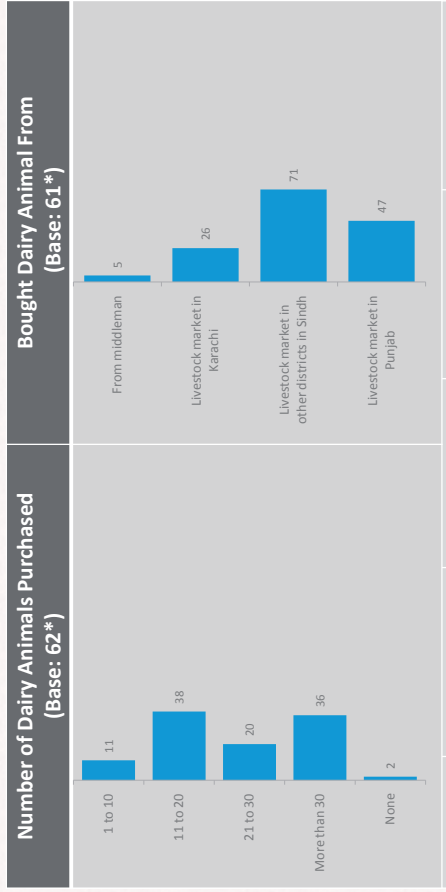
SOURCE MILK SOLD TO THE MOST



All Figures in Percentages

PURCHASING DAIRY ANIMALS

- About 38% of the Cattle Farms have bought 11 to 20 and about 36% have bought More than 30 animals
- Mostly the purchasing is being done from Livestock Markets in other Districts of Sindh



All Figures in Percentages

NUMBER OF ANIMALS BOUGHT

- Majority of the Cattle Farms who bought Animals from Livestock market in Punjab bought about 1 to 10 animals

	From middleman (Base: 3*)	Livestock market in Karachi – (Base: 16*)	Livestock market in other districts in Sindh (Base: 44*)	Livestock market in Punjab (Base: 29*)
1 to 10	67	50	37	37
11 to 20	33	31	22	33
21 to 30	-	6	14	9
More than 30	-	12	21	12
None	-	-	2	-



MODE OF PAYMENT & PREFERENCE FOR MODE OF PAYMENT

- Most used mode of payment is 'By Own Savings' and is also the most preferred
- The 2nd most preferred method is 'Borrowing Money from a Middle Man' however it is not that much used

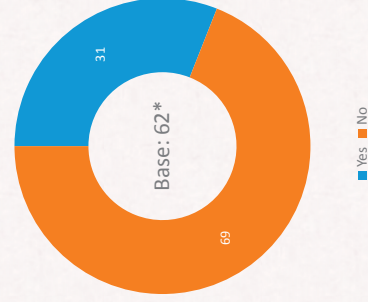


CONDITION OF ANIMALS THAT WERE BOUGHT



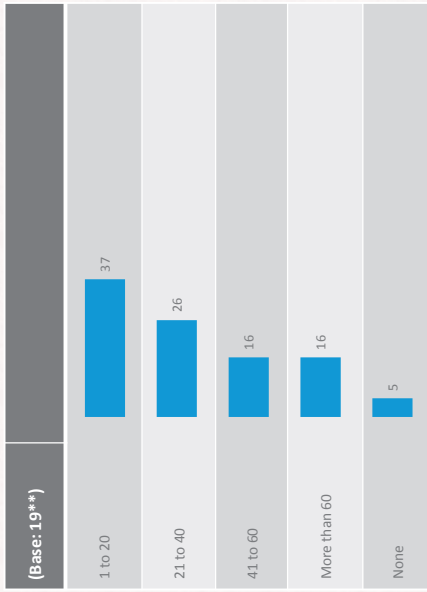
INCREASING OR DECREASING NUMBER OF ANIMALS

- About 31% of Cattle Farms are interested in starting or increasing the number of dry animals which they can ask someone at rural area to keep animals until the animals start milking



NUMBER OF ANIMALS WILLING TO KEEP IN RURAL

- Majority of the Cattle Farms are willing to keep 1 to 20 animals in rural



All Figures in Percentages



WHAT IS DONE WITH DRY ANIMALS

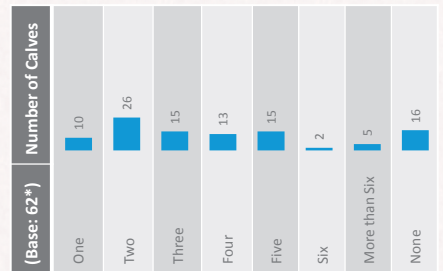


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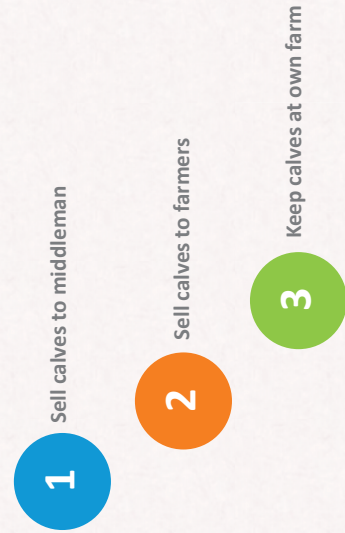


DELIVERY OF CALVES

- About 26% Cattle Farms say that about 2 calves are born on an average in a month
- Selling Calves to a middleman has been ranked 1 by majority of the Cattle Farms



Ranking for Action on Calves Born



All Figures in Percentages



FARM MANAGEMENT / MARKETING



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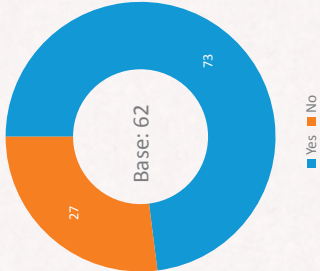
FEEDING MANAGEMENT



Reference: Q33 & Q34

RECORDING OF FARM MANAGEMENT INFORMATION & TYPE OF RECORD MAINTAINED

- About 7 out of 10 Farms maintain record
- It is evident that the ones who do maintain records do it appropriately with maximum information



■ Yes ■ No

Base: 45

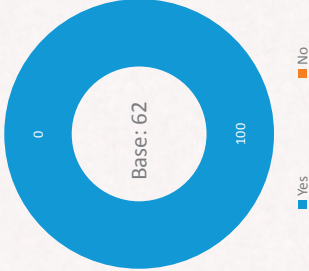
Purchase of agricultural materials	89
Purchase of livestock materials	98
Sales record of milk	96
Sales record of livestock	98
Salary record	18
Farm Record	2

All Figures in Percentages

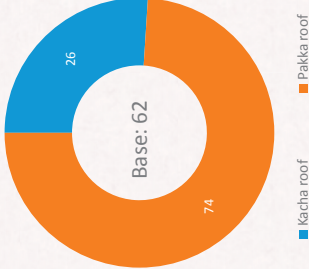
Reference: Q36 & Q37

SHED AND ITS MATERIAL

- All Farms have sheds for their Animals
- Majority of the sheds are pakka in nature



■ Yes ■ No



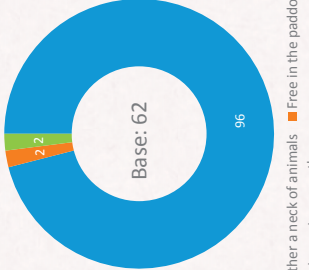
■ Kacha roof ■ Pakka roof

All Figures in Percentages

Reference: Q35

WAY OF KEEPING ANIMALS

- Majority of the Farms tether the neck of animals



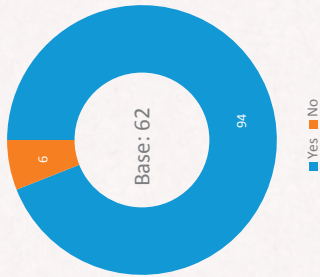
■ Tether a neck of animals ■ Free in the paddock ■ Fasten net on mouth

All Figures in Percentages

Reference: Q38

WASHING HANDS BEFORE MILKING

- Majority of the farms caretakers wash their hands
- Only a few are such who do not



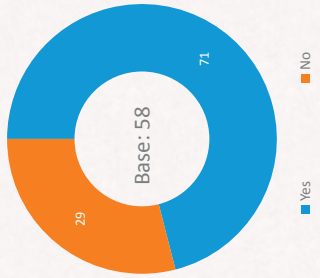
All Figures in Percentages

33

Reference: Q39 & Q40

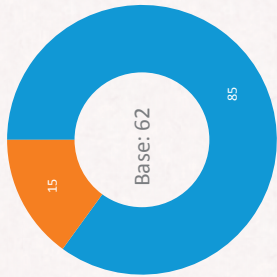
WASHING HANDS BEFORE MILKING ANOTHER COW/BUFFALO & CLEANING TEATS BEFORE MILKING

- Out of those who wash hands about 71% wash hands again before milking another animal
- About 8 out of 10 clean teats before milking



All Figures in Percentages

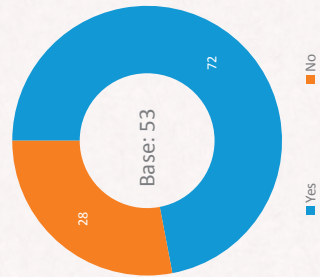
34



Reference: Q41 & Q42

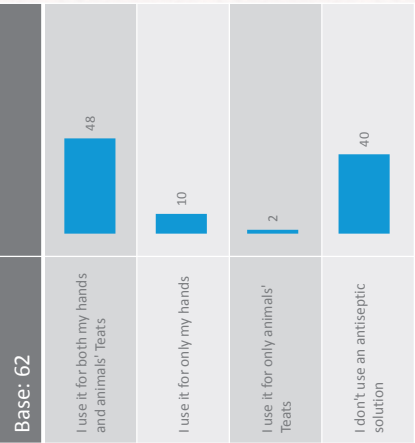
CLEANING ALL TEATS BEFORE MILKING & USE OF ANTISEPTIC SOLUTION

- The practice of cleaning of teats is only among 72% farms
- The usage of Antiseptic solution is high for Both Hands and Animals' teats, however about 40% donor use any antiseptic solution



All Figures in Percentages

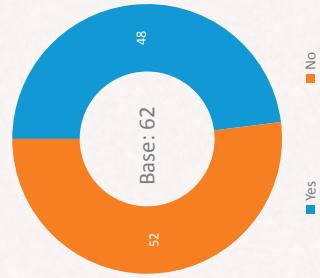
35



Reference: Q43 & Q44

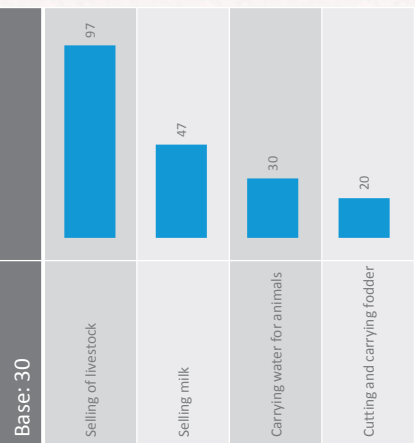
MANAGING LIVESTOCK IN COLLABORATION & ACTIVITIES WHILE MANAGING LIVESTOCK IN COLLABORATION

- Majority of the farms do not work in collaboration, however who do majority collaborate in selling of livestock



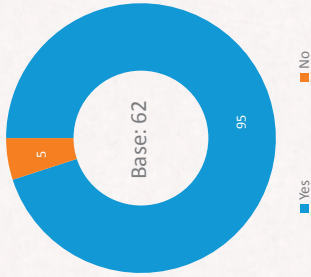
All Figures in Percentages

36



HOOF CUTTING

- Hoof Cutting has been received by more than 95% animals in Farms of Karachi and Hyderabad Cattle Colonies

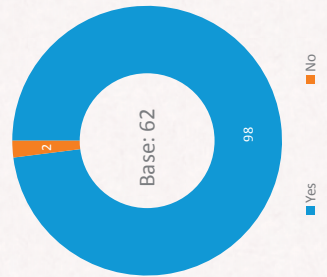


All Figures in Percentages



PURCHASING OF CONCENTRATE & KIND OF CONCENTRATES PURCHASED

- Majority of the farms purchase concentrate
- The main type purchased is Wheat Bran, followed by Rice Polish



All Figures in Percentages

ROUGHAGES USED (PAID OR FREE)

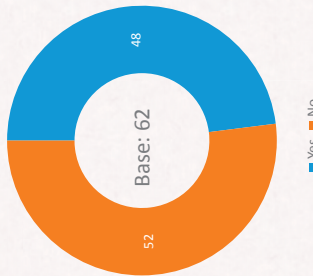
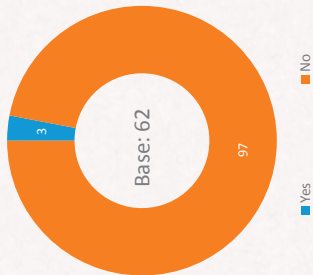
- The use of Roughages is high and majority of the farms purchase them

Base	Roughage Type	Pay for it	It is free
Base: 62	Rice straw	66	98
Base: 62	Wheat straw	100	98
Base: 26+	Sugar cane top	42	85
Base: 15+	Agricultural residue	24	80

All Figures in Percentages

CULTIVATION OF GREEN FODDER & STORAGE

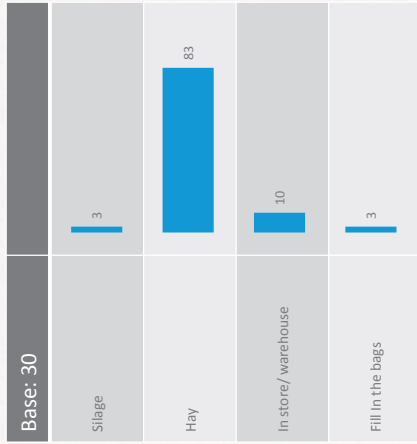
- Very few of the Farms cultivate Green Fodder
- About 48% store fodder for future usage



All Figures in Percentages

MODE OF STORING FODDER

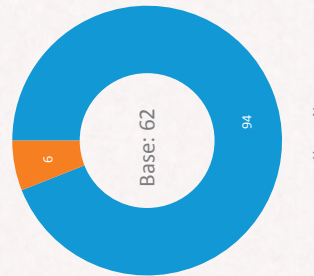
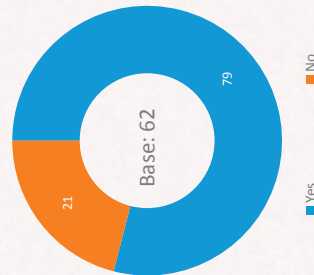
- The most preferred method of Storage is Hay among those who store fodder



All Figures in Percentages

MINERAL MIX & SALT GIVEN TO ANIMALS

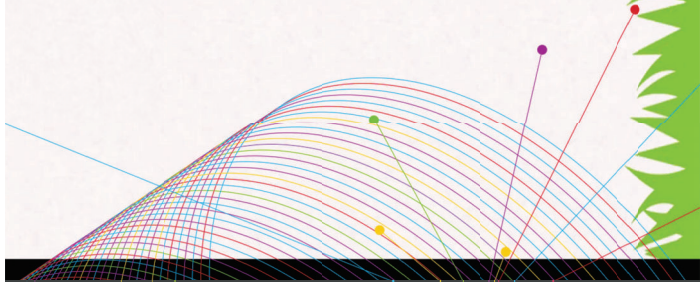
- The incidence of giving salt is significantly higher than Mineral Mix



All Figures in Percentages

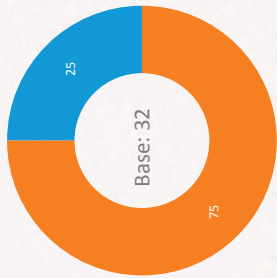
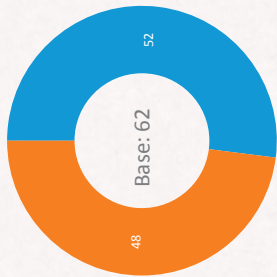


REPRODUCTION



MAINTAINING RECORD OF REPRODUCTION

- About 50% of the farms keep record of reproduction
- Majority of the farms keep record of matting date



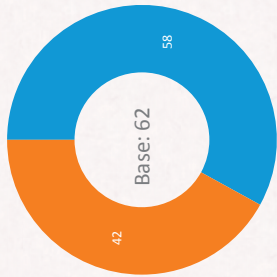
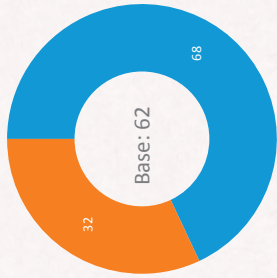
■ Yes ■ No

■ Delivery date ■ Matting date

All Figures in Percentages

DIAGNOSIS OF PREGNANCY THROUGH RECTAL PALPATION & TREATMENT FOR UN-PREGNANT COW/BUFFALO

- About 68% Farms are in the practice of diagnosing pregnancy of animals through rectal palpation method
- About 6 out of 10 farms get treatment for their un-pregnant animals



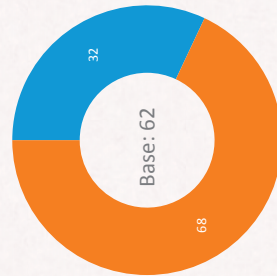
■ Yes ■ No

■ Yes ■ No

All Figures in Percentages

ARTIFICIAL INSEMINATION

- The incidence of Artificial Insemination is low in farms

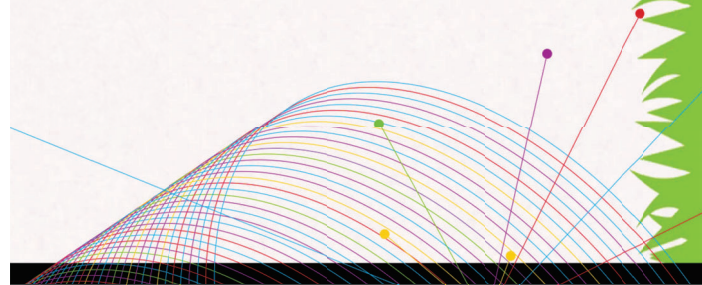


■ Yes ■ No

All Figures in Percentages



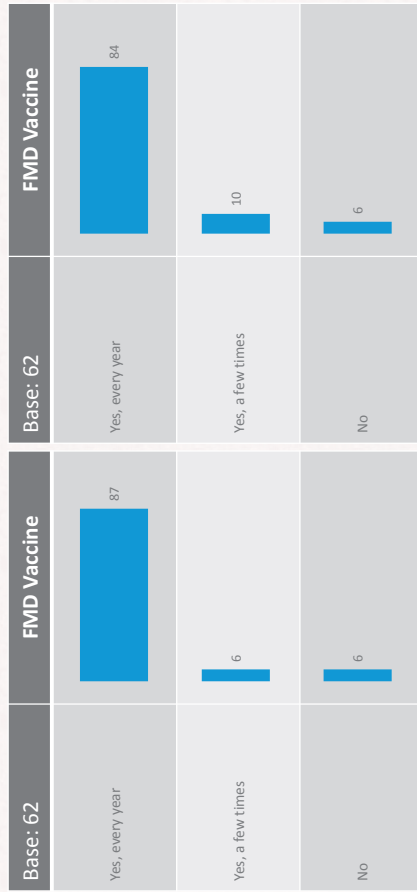
ANIMAL HEALTH



Reference: Q60 & Q61

FMD & HS VACCINES

- The usage of FMD and HS Vaccines is high in farms
- Mostly get it for their animals every year



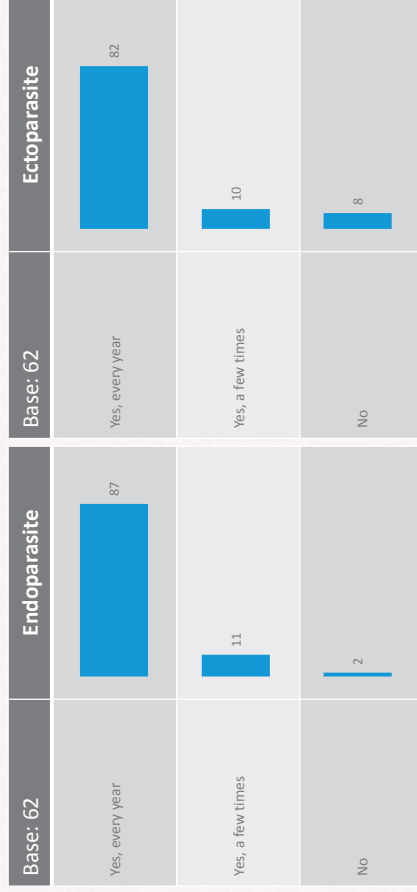
All Figures in Percentages

49

Reference: Q62 & Q63

DEWORM FOR ENDOPARASITE & DEWORMING ECTOPARASITE

- The practice of deworming animals is high in farms for both endo and ecto parasites
- Mostly get it for their animals every year



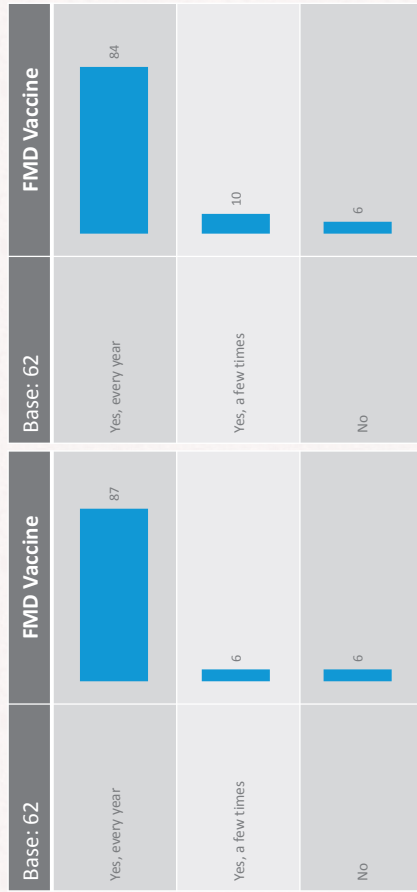
All Figures in Percentages

50

Reference: Q64 & Q65

TEST BRUCELLOSIS & ITS POSITIVE DIAGNOSIS

- The test for Brucellosis is got done by about 34%
- Out of which about 57% got positive diagnosis



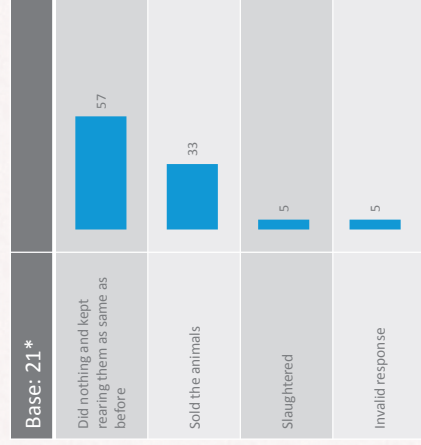
All Figures in Percentages

51

Reference: 66 & Q67

DIAGNOSIS OF BRUCELLOSIS & TEST TUBERCULOSIS

- Majority of the farms did nothing once the animals were diagnosed with Brucellosis
- The Tests for tuberculosis were conducted by about 35% of the farms

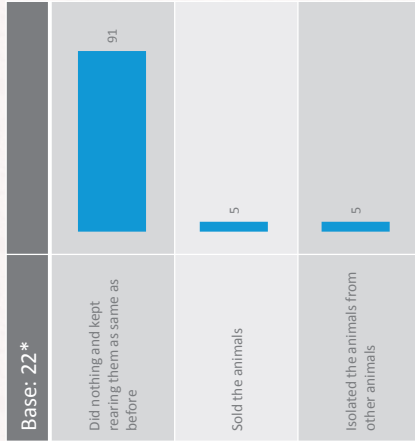
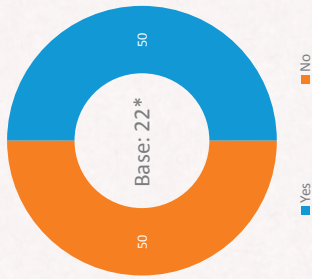


All Figures in Percentages

52

DIAGNOSIS OF TUBERCULOSIS & ACTION ON DIAGNOSIS WITH POSITIVE

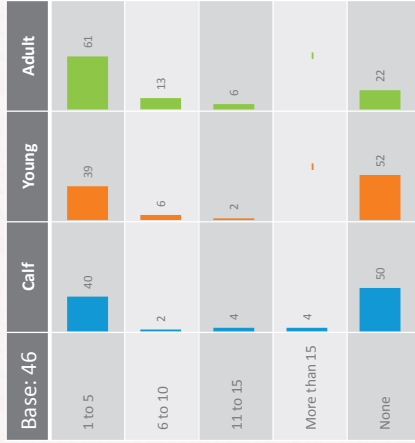
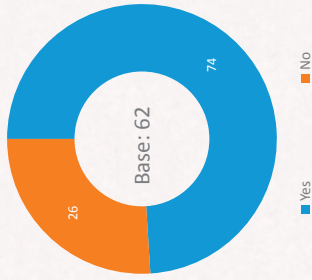
- About 50% say their animals were found positive with Tuberculosis after the test and majority out of them did nothing and kept rearing the animals



All Figures in Percentages

ANIMALS DIED IN AN YEAR & NUMBER OF ANIMALS DIED IN AN YEAR

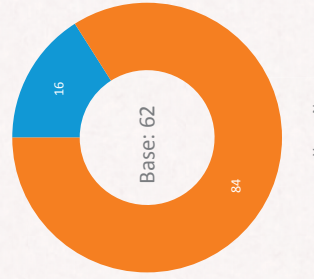
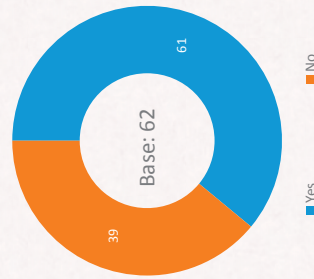
- About 74% farms are such where animals have died within an year
- Majority of the farms are such where 1 to 5 animals have died



All Figures in Percentages

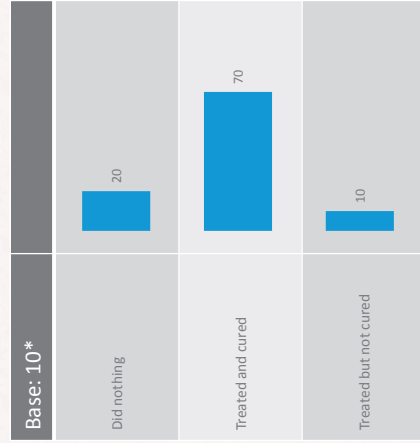
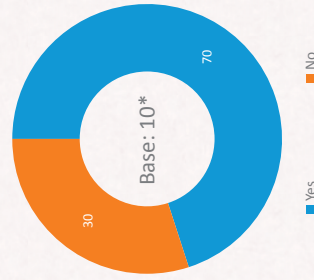
CLINICAL MASTITIS & MASTITIS TEST

- About 6 out of 10 farms are such where animals have been observed with Clinical Mastitis
- However the testing for Mastitis is very low



All Figures in Percentages

SUBCLINICAL MASTITIS & ACTION ON DIAGNOSIS WITH POSITIVE

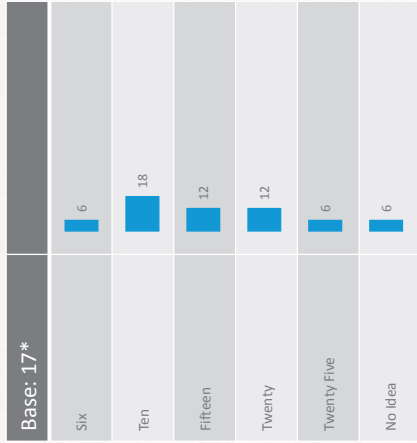
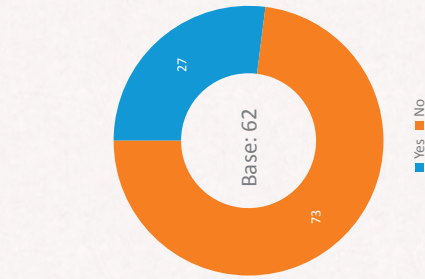


All Figures in Percentages

Reference: Q77 & Q78

ANIMALS ABORTED & NUMBER OF ANIMALS ABORTED

- About 27% farms are such who have animals which have been aborted within an year



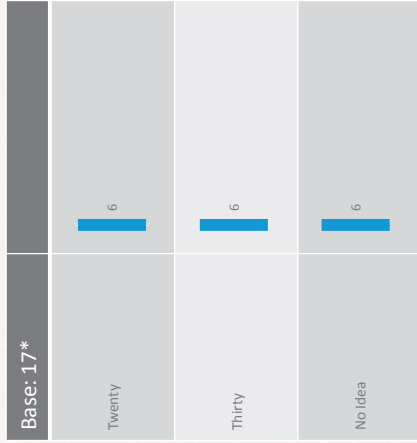
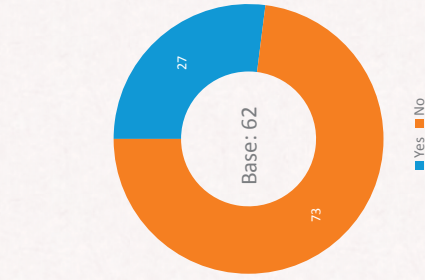
All Figures in Percentages

57

Reference: Q79 & Q80

RETAINED PLACENTA & NUMBER OF RETAINED PLACENTA

- About 27% farms have observed Retained Placenta in their animals



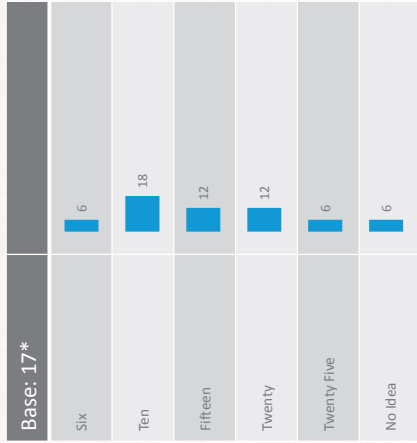
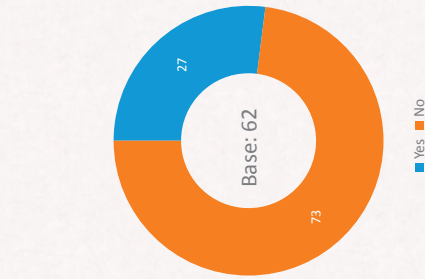
All Figures in Percentages

58

Reference: Q81 & Q82

CALVES REARING & NUMBER OF CALVES REARED

- About 55% of the farms have reared calves within and year majority have reared more than 12 calves

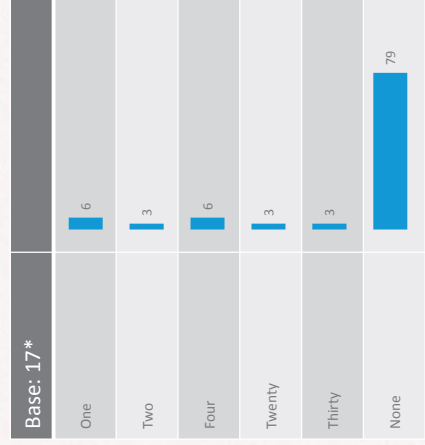


All Figures in Percentages

59

Reference: Q83

NUMBER OF CALVES GOT DIARRHEA



All Figures in Percentages

60

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EXTENSION / TRAINING



62

Reference: Q84 & Q85

AGRICULTURE EXTENSION WORKERS VISIT & LIVESTOCK EXTENSION WORKERS VISITS

- Majority of the farms haven't met any Agricultural or Livestock Worker

Base: 62	Agricultural Extension Worker	Livestock Extension Worker
Never met them	89	85
Less than once a year	5	3
Less than once per quarter	5	10
More than once per month	2	2

All Figures in Percentages



62

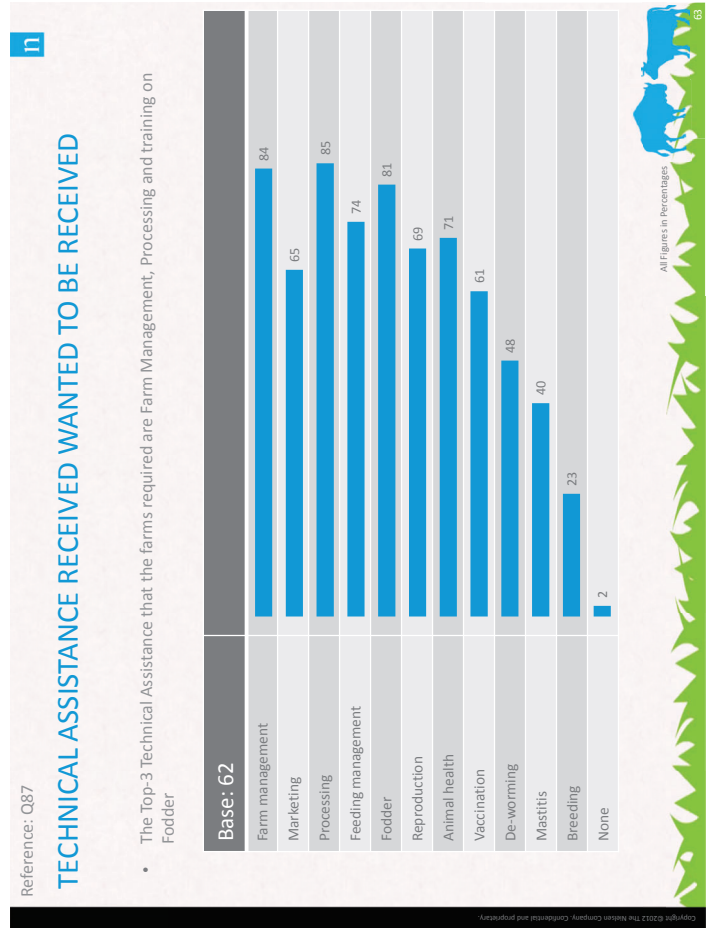
AN UNCOMMON SENSE OF THE CONSUMER™

TECHNICAL ASSISTANCE RECEIVED WANTED TO BE RECEIVED

- The Top-3 Technical Assistance that the farms required are Farm Management, Processing and training on Fodder


Base: 62	Technical Assistance	Percentage
	Farm management	84
	Marketing	65
	Processing	85
	Feeding management	74
	Fodder	81
	Reproduction	69
	Animal health	71
	Vaccination	61
	De-worming	48
	Mastitis	40
	Breeding	23
	None	2

All Figures in Percentages

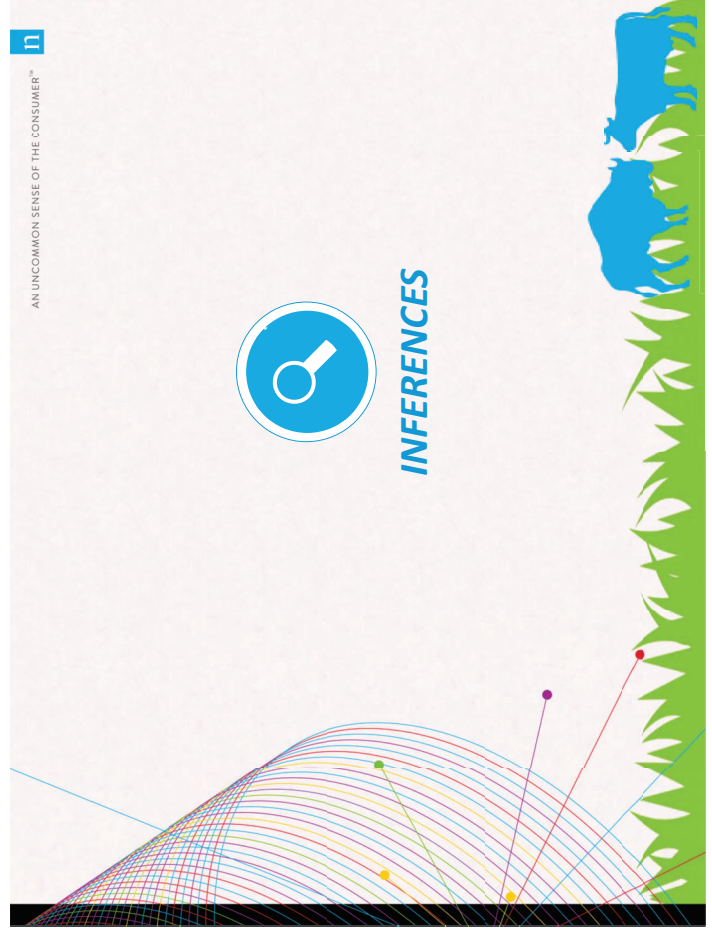


63

AN UNCOMMON SENSE OF THE CONSUMER™



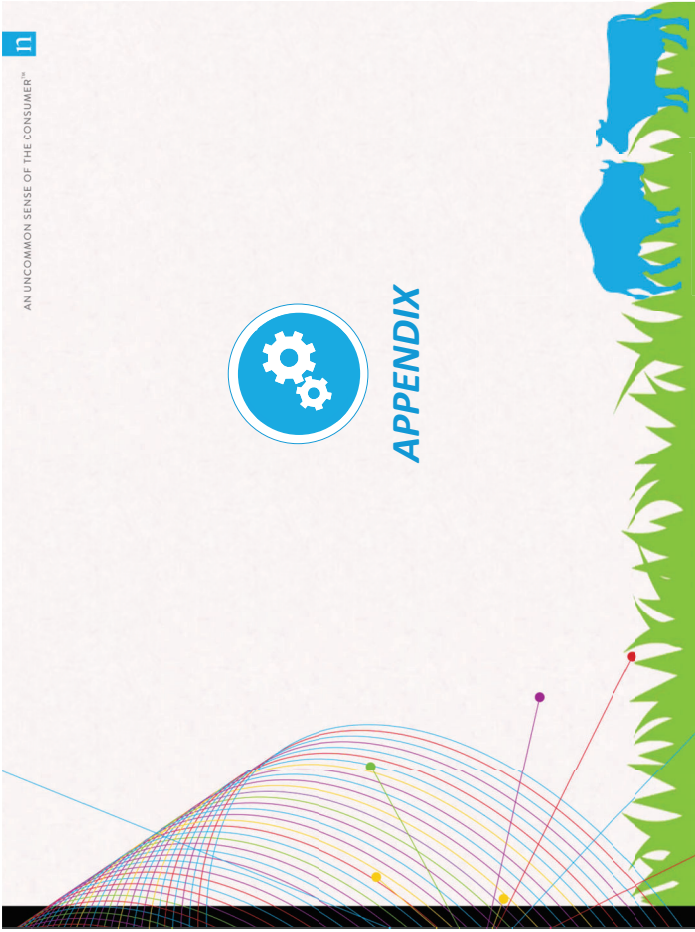
INFERENCES



63

INFERENCES

Sections	Inferences
Farm Management	<ul style="list-style-type: none"> 3 out of 10 Farms do not maintain information of the farm
Feeding Management	<ul style="list-style-type: none"> Majority of the Farms Tether the neck of their animals and keep them in shades Majority of the Farms do keep care of hygiene by washing their hands before milking animals
Fodder	<ul style="list-style-type: none"> Concentrates and Roughages are mainly purchased whereas Salt is given more to animals as compared to Mineral Mix at Cattle Colonies
Reproduction	<ul style="list-style-type: none"> 5 out of 10 Farms keep record of reproduction of animals in Cattle Colonies
Animal Health	<ul style="list-style-type: none"> The usage of FMD and HS Vaccines is high The incidence of testing animals for different diseases is also high
Extension/ Training	<ul style="list-style-type: none"> Visit of Agricultural and Livestock Extension workers is relatively low in cattle colonies Technical Assistance on Animal Health, Farm Management, Processing and Marketing are the most demanded ones

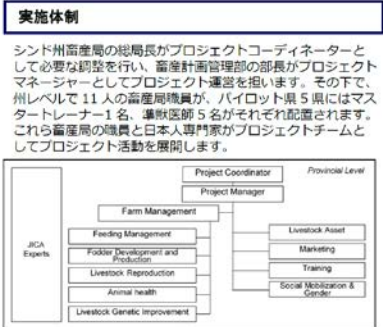


Thank you

nielsen
AN UNCOMMON SENSE OF THE CONSUMER™



別添資料 Z0-1 プロジェクト紹介パンフレット (和文)

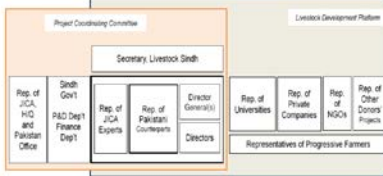


ステアリングコミティ及び畜産開発プラットフォーム

ステアリングコミティと畜産開発プラットフォームがプロジェクト運営を支援します。

ステアリングコミティ (Steering Committee)
ステアリングコミティは畜産局次官を議長とし、畜産局各ディレクター、日本人専門家、JICA パキスタン事務所などによって構成されます。ステアリングコミティは年に1回以上開催され、プロジェクトの進捗を確認するほか、活動計画のレビューや承認、必要なアドバイスを提供します。

畜産開発プラットフォーム
シンド州の畜産開発のため畜産関係者と連携や情報共有をする場として、大学、NGO、民間企業、他トナー、畜産農家など畜産業にかかわる様々なステークホルダーを招待して開催します。



パキスタン国 シンド州持続的畜産開発プロジェクト

パキスタンの畜産分野は、農業総生産の約5割、総GDPの約1割を占める主要なセクターです。家畜頭数も世界有数で、牛が世界第8位(約3,400万頭)、水牛が第2位(約3,100万頭)、山羊が第3位(約6,000万頭)、羊が第9位(約2,800万頭)と多いほか、乳生産量も世界第4位(約3,550万トン)です。

本プロジェクトの対象地域であるシンド州は、約1,400万頭の牛及び水牛を有し、その数は日本の総保有牛総数である約440万頭の3.2倍に相当します。また、シンド州は、世界的に有名な熱帯性家畜資源であるレッド・シンディアクンディの起源地でもあります。パキスタン最大都市のカラチと中近東やアジアなどへの輸出ハブとなる国際港を有するなど、他州に比べ多くの優位性があります。

また、シンド州では伝統的に複合農業が営まれ、畜産農家の8割以上が1-6頭の家畜を保有する小規模農家です。畜産は、女性を含む農村労働者の重要な収入源となっているだけでなく、資産及び農村住民への貴重な動物性たんぱく質の供給源となっています。農家にとってソーシャルセーフティネットの機能も果たしていることから、小規模農家を対象としたシンド州の畜産開発は、経済的・社会的な格差の是正、地域の安定化と発展に大きな貢献をすると期待されています。



本事業の受益者
プロジェクトサイト内において5頭以下の家畜を飼育する小規模農家(小作、非農家を含む)

プロジェクト期間
5年間(2014年2月~2019年1月)

実施機関
シンド州畜産局



連絡先

プロジェクト事務所
The office of the Director General Livestock, Sindh, Animal Science Complex, Main Auto Bhan Road, Hussainabad Hyderabad -71000 Pakistan
Phone: (92-22) 3402715

JICA パキスタン事務所
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電話: (92-51) 9244508~7
e-mail: pt_oso_rep@jica.go.jp

JICA 農村開発部
住所: 東京都千代田区二番町5-25 二番町センタービル
電話: 03-5226-8450

(株) かいほつマネジメント・コンサルティング
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電話: 03-5791-5083 <http://www.kmcinc.co.jp>

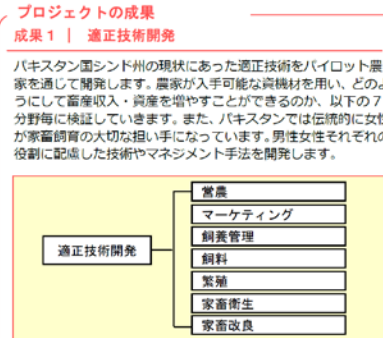
パキスタンイスラム共和国 シンド州畜産局

(独) 国際協力機構 (JICA)
パキスタン国
シンド州持続的畜産開発プロジェクト

The Project on Sustainable Livestock Development for Rural Sindh

プロジェクト目標

プロジェクトは「畜産に携わる農家の収入と資産の増大のための基礎をパイロット県において構築する」ことを目標に掲げています。基礎とは、適正技術、人材、組織の3つを指します。その目標を達成するために、以下の4つの成果を掲げています。



成果2 | 家畜資源の有効活用

カラチやハイデラバードといったシンド州の都市部には、そこで消費される牛乳を供給するために、大規模畜産農家が集まったキャトル・コロニーという場所があります。限られた土地より効率的に牛乳を生産するため、キャトル・コロニーで生まれた子牛や牛乳が出なくなった牛・水牛(乾乳牛)の多くは食肉用に屠畜されています。それら子牛や乾乳牛を救済し、牛乳として活用できる仕組みを実証します。



成果3 | 普及

成果1と2で開発・実証された適正技術やマネジメント手法がパイロット県内の農家に効率的・効果的に普及される仕組み作りを目指します。

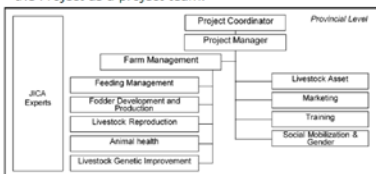
成果4 | 組織強化

組織面からの基礎づくりを目指して、プロジェクトの計画・モニタリング・評価、リーダシップ、コミュニケーション、農村での普及手法、女性配慮といった様々な研修や議論の場を通じて、畜産局のプロジェクト運営、管理、調整能力を強化します。

別添資料 Z0-2 プロジェクト紹介パンフレット (英文)

Project Organization

The Director General Livestock Department, Sindh performs the duties of the Project Coordinator to be responsible for overall administration and coordination for the implementation of the Project. The Director, Directorate of Monitoring and Evaluation is assigned as the Project Manager who has responsibility for regular-basis managerial and technical matters of the project. Under the Project Manager, 11 officers at provincial level and a master trainer and 5 stock assistants at each 5 district are assigned. These project staff of the Livestock Department and Japanese Experts implement the Project as a project team.



The Steering Committee and The Livestock Development Platform

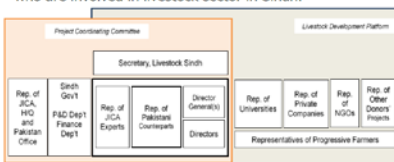
In addition to the Project Team mentioned above, the Steering Committee and the Livestock Development Platform support the Project.

The Steering Committee

The Steering Committee supervises and provides technical and other necessary guidance to the Project, and coordinates and interacts with various implementation agencies for smooth operation of the Project. The meeting is held at least once a year.

The Livestock Development Platform

The Livestock Development Platform is established for coordination and information sharing among stakeholders who are involved in livestock sector in Sindh.



The Project on Sustainable Livestock Development for rural Sindh

The Livestock sector in Pakistan is a backbone of Pakistan's economy, and it contributes about half of Agricultural GDP and about 10% of total GDP. Pakistan is one of the world prominent countries in terms of the livestock population and production of milk; there are about 34 million cattle (8th largest in the world), about 31 million buffaloes (2nd largest), about 60 million goats (3rd largest), and 28 million sheep (4th largest). The production of milk in Pakistan ranks 4th in the world with about 35.5 million tons of annual production.

Sindh Province, the target province of the Project, holds about 14 million of cattle and buffaloes which is the second biggest number in Pakistan following Punjab Province. In addition to huge numbers of livestock, Sindh Province has competitive advantage in livestock sector because of genetic resources of indigenous breeds such as Red Sindh cattle breed, and Kundi Buffalo breed, Karachi that has the largest population in Pakistan; and international port as gateway to middle eastern and Asian countries.

In Sindh Province, the mixed farming has been practiced traditionally, and more than 80 % of livestock holders are categorized as small livestock holders who own 1 to 6 animals. Livestock sector is not only important income source for rural people including women, but also valuable asset and a source of protein supply for them. It also works as social safety net.

Livestock sector development for rural Sindh is expected to contribute to alleviation of economic and social disparity and to provide stability of the area.

Major Target Group

Small holders who regularly raise 5 or less than 5 heads of livestock

Duration

5 years (February 2014 to January 2019)

Implementing Agency

Livestock and Fisheries Department, Government of Sindh

Project Site

The Project targets Sindh Province located in the lower reaches of the Indus River. Sindh Province is Pakistan's second largest province in terms of human population. The capital and largest city of the province is Karachi, which is also Pakistan's largest city. The Project selected five districts among 23 districts as pilot districts.



The selected five pilot districts are following.

- Badin
- Hyderabad
- Matiari
- Tando Allahyar
- Tando Muhammad Khan

Contact

The Project Office

The office of the Director General Livestock, Sindh, Animal Science Complex, Main Auto Bhan Road, Hussainabad Hyderabad -71000 Pakistan
Phone:022-340-2715

JICA Pakistan Office

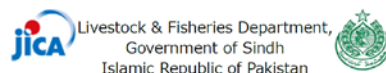
4th Floor, Serena Office Complex, Plot No. 17, Ramna 5, Khayaban-e-Suhrawardy, G-5/1, Islamabad
Phone: 051-9244508~7
e-mail : pt_oso_rep@jica.go.jp

JICA Rural Development Department, Headquarters

Nibancho Center Building 5-25, Niban-cho, Chiyoda-ku, Tokyo, Japan
Phone: 81-3-5226-8450

Kaihatsu Management Consulting, Inc.

10th Floor, Asahi Seimei Ebisu Bldg., 1-3-1Ebisu, Shibuya-ku, Tokyo, 150-0013, Japan
Phone 81-3-5791-5083 <http://www.kmcinc.co.jp>



The Project on Sustainable Livestock Development for Rural Sindh in Islamic Republic of Pakistan
in collaboration with Japan International Cooperation Agency

Development of the foundation for livestock development



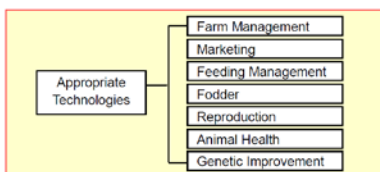
The Project Purpose

The Project aims that "the foundation for increasing incomes and assets of livestock farmers is built up in the pilot district". In order to achieve the objective, the Project has set up following 4 outputs.

Project Components/Outputs

Output 1 | Appropriate Technology Development

The Project will develop and verify appropriate technologies, which fit to current situation of rural Sindh through activities with pilot farmers. The Project will verify livestock technologies, which enable rural farmers to increase livestock income and assets by using affordable materials for rural farmers in each 7 of the technical fields. In Pakistan, women traditionally take important roles to rear animals. The Project will develop technologies and management methods considering both male and female roles.



Output 2 | Salvation of Calves and Dry Animals

In metropolis such as Karachi city and Hyderabad city, there are cattle colonies where large livestock holders accumulate at particular area and produce milk to supply to consumers in cities. In order to produce milk efficiently in the limited space, majority of new born calves and dry animals which have stopped milking are slaughtered for meat purpose. The Project aims to develop and verify system, which saves and utilizes those calves and dry animals.



Output 3 | Extension

The Project aims to establish extension structure to disseminate appropriate livestock technologies and management methods which developed and verified by Output 1 in pilot districts.



Output 4 | Institutional Development

In order to establish the foundation for livestock development, the Project aims to strengthen capacity of the project staff and the Livestock Department to manage and coordinate projects. The Project aims to strengthen structure and organization of the Livestock Department through various trainings such as monitoring/evaluation of project, leadership, communication, social mobilization, gender, etc.



別添資料 Z0-3 プロジェクト紹介パンフレット (シンド語)

لايو اسٽاڪ اينڊ فشريز ڊپارٽمينٽ
گورنمينٽ آف سنڌ
اسلامڪ جمهوريت پاڪستان





سنڌ جي بهراڙي لاءِ چوپائي مال جي پائيدار ترقي وارو منصوبو
 اسلامي جمهوريت پاڪستان
 سهڪار
 جاپان جو بين الاقوامي تعاون جو ادارو

منصوبي جو هنڌ

هي منصوبو سنڌ صوبي ۾ سنڌ دريا جي هيٺين علائقن کي منصوبي جي توجه جو مرڪز ڪندو. سنڌ صوبي آدر شماري جي لحاظ کان ٻيو وڏو صوبي آهي. ڪراچي صوبي جي گادي جو هنڌ ۽ وڏو شهر هئڻ سان گڏوگڏ پاڪستان جو وڏي ۾ وڏو شهر آهي. منصوبي لاءِ سنڌ جي 23 ضلعن منجهان 5 اڳواڻ ضلعا چونڊيا ويا آهن.



هن منصوبي جي لاءِ هيٺيان پنج ضلعا چونڊيا ويا آهن:

- بدين
- حيدرآباد
- مٽياري
- ٽنڊو الھيار
- ٽنڊو محمد خان

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 Phone: 81-3-5791-5083 http://www.kmcinc.jp

منصوبي جي تنظيم

ڊائريڪٽر جنرل لايو اسٽاڪ سنڌ منصوبي جي ڪوآرڊينيٽر جون اضافي ذميداريون نڀائيندو ۽ منصوبي جي انتظار ۾ تعاون ۽ عمل درآمد لاءِ زميندار هوندو. ڊائريڪٽر، ڊائريڪٽر مائٽرينگ اينڊ ايڊوائزنگ مستقل بنيادن تي مئنيجر طور ڪم ڪندو ۽ منصوبي جي انتظامي ۽ فني معامن جو زميندار هوندو. پراجيڪٽ مئنيجر جي ماتحتي ۾ صوبائي سطح تي 11 آفيسر ۽ ضلعي سطح تي هڪ ماسٽر ٽرينر ۽ 5 اسٽاڪ اسٽنٽ ڪوآرڊينيٽر منصوبي جو هي عملو ۽ جاپاني ماهر گڏجي ٿيندو طور منصوبي کي هلائيندا.



منصوبي جي رهڻا ڪاميٽي ۽ چوپائي مال جي ترقي لاءِ پليٽ فارم

مٿي ڄاڻايل منصوبي جي ٿيندڙ سان گڏوگڏ منصوبي جي رهڻا ڪميٽي ڪندڙ ڪاميٽي ۽ چوپائي مال جي ترقي لاءِ پليٽ فارم پڻ منصوبي جي مدد ڪندا.

منصوبي جي رهڻا ڪاميٽي

منصوبي جي رهڻا ڪاميٽي منصوبي جي نگراني ڪندي ۽ گهربل فني ۽ ٻيون ضروري رهڻا ڪميٽي ڏيندي ۽ مختلف عمل درآمد ڪندڙ ادارن جي وچ ۾ هموار عمل ۽ تعاون مهيا ڪندي رهڻا ڪاميٽي جي گڏجاڻي سال ۾ هڪ ڀيرو ٿيندي.

چوپائي مال جي ترقي لاءِ پليٽ فارم

سنڌ ۾ چوپائي مال جي شمي سان لاڳاپيل ادارن جي وچ ۾ گڏيل تعاون ۽ معلومات جي ذريعي لاءِ چوپائي مال جي ترقي لاءِ پليٽ فارم قائم ڪيو ويندو.

رهڻا ڪاميٽي

جانورن جي ترقي لاءِ فورم



ترقي جو بنياد چوپائي مال جي ترقي سان



نتيجهو 3: توسيع

منصوبي تحت اهڙو توسيع نظار قائم ڪيو ويندو جنهن سان نتيجي نمبر 1 جي وسيلي سان چڪاس ٿيل چوپائي مال سان لاڳاپيل مهارتون ۽ سارڻيال جي طريقن کي منصوبي سان لاڳاپيل ضلعن ۾ پکيڙجي.



نتيجهو 4: ادارن جي ترقي

منصوبي تحت چوپائي مال جي ترقي جي بنياد قائم ڪرڻ لاءِ منصوبي سان لاڳاپيل عملي ۽ چوپائي مال جي پالنا واري کاتي جي منصوبن کي هلائڻ ۽ تعاون ڪرڻ جي مهارت کي مضبوط ڪرڻ.



منصوبي جو مقصد

هن منصوبي جو مقصد آهي ته منصوبي سان لاڳاپيل اڳواڻ ضلعن ۾ مالوند جي آمدني ۽ چوپائي مال جي ملڪيت ۾ اضافي جو بنياد رکڻ آهي. جيئن هن منصوبي جي مقصد حاصل ڪرڻ لاءِ، منصوبي جا هيٺيان 4 نتيجا حاصل ڪيا ويا آهن.

منصوبي جا حڪم / نتيجا

هي منصوبي چئن حصن ۾ نتيجن تي مشتمل آهي.

نتيجو 1: مناسب فني مهارت جي ترقي

هن منصوبي تحت چونڊيل فارمرن سان گڏجي مناسب فني مهارت، ترقي ۽ چڪاس ڪئي جيڪي سنڌ جي بهراڙي وارن علائقن جي موجودا صورتحال لاءِ مناسب هوندي. منصوبي تحت چوپائي مال سان لاڳاپيل اهڙي فني مهارت جي چڪاس ڪئي ويندي جيڪي بهراڙي جي مالوند کي انهن جي سگهه آهر مواد کي استعمال ڪري چونڊيل اهڙي مهارتن جي وسيلي ان لائق ٿيندا جو پنهنجي چوپائي مال منجهان حاصل ٿيندڙ آمدني ۽ ملڪيت وڌائڻ.

روايتي طرح پاڪستان ۾ چوپائي مال کي پالڻ ۾ عورتن جو اهم ڪردار آهي. هي منصوبو عورتن ۽ مردن جي ڪردار کي نظر ۾ رکندي فني مهارتن ۽ سارڻيال جي طريقن کي ترقي ڏيندو.



نتيجو 2: ڦرڻ ۽ پاڪڙين مينهن جو پيداوار

وڏن شهرن جهڙوڪ ڪراچي ۽ حيدرآباد جتي مينهن جون ڪالورينون آهن جتي گهڻا جانور رکندڙ خاص علائقي ۾ گڏجي شهري ماڻهن جي استعمال لاءِ کير پيدا ڪري مهيا ڪيا ويا.

ڪير کي گهٽ جڳهه تي مهارت سان پيدا ڪرڻ لاءِ گهڻي تعداد ۾ نوان چاول ڦر ۽ پاڪڙيون مينهن جيڪي کير ڏيڻ بند ڪري چئڻ نئون انهن کي گوشت حاصل ڪرڻ لاءِ فتح ڪيو ويندو آهي. انهي منصوبي جو مقصد آهي تہ نون چاول ڦر ۽ پاڪڙيون مينهن کي بچائي ٻيهر پيداوار ۾ آڻڻ جي طريقن جي چڪاس ڪرڻ آهي.



سنڌ جي بهراڙي لاءِ چوپائي مال جي پائيدار ترقي وارو منصوبو

چوپائي مال جو شعبو پاڪستان جي معيشت ۾ برڪتگهه واري هڏي جو ڪردار ادا ڪري ٿو ۽ زراعت جي GDP ۾ آڌار ڀاءُ رکن ٿو جيڪو ڪل GDP جو 10 سيڪڙو حصو آهي. پاڪستان دنيا جي انهن ملڪن ۾ هڪ آهي جيڪي جانورن جي تعداد ۽ کير جي پيداوار ۾ نمايان آهن. هتي 34 ملين ڳئون (دنيا ٻرائين نمبر تي)، 31 ملين مينهنون (دنيا ۾ ٻئي نمبر تي)، 60 ملين بڪريون (دنيا ۾ ٽئين نمبر تي)، 28 ملين روڙون (دنيا ۾ چوٿين نمبر تي) آهي. پاڪستان کير جي پيداوار ۾ چوٿين نمبر تي آهي ۽ ساليانو 35.5 ملين ٽنسن کير پيدا ڪري ٿو.

صوبي سنڌ جيڪو منصوبي جي توجه جو مرڪز آهي هن ۾ 14 ملين ڳئون ۽ مينهنون آهن ۽ پاڪستان ۾ بهترين نسلي خاصيتون رکندڙ ڳاڙهي مليري ڳئون ۽ ڪنڊي نسل جون مينهنون هتي آهن. انهي کان سواءِ، ڪراچي پاڪستان جو وڏي آبادي رکندڙ شهر آهي جنهن جي بين الاقوامي بندرگاهه ايشيا جي وچ اوڀر جي ملڪن جي گذرگاهه آهي.

سنڌ صوبي ۾ گڏيل فارمنگ ڪئي وڃي ٿي، پاڳين جي 80 سيڪڙو کان وڌيڪ تعداد ننڍي مالوندن ۾ شمار ٿئي ٿي جيڪي 1 کان 6 جانور پالين ٿا. جانورن جو شعبو نہ صرف بهراڙي جي ماڻهن ۽ عورتن جي لاءِ روزگار جو ذريعو آهي پر انهن سان گڏوگڏ لمحيات (Protein) مهيا ڪرڻ جو ذريعو آهي. اهو سمجهيو وڃي ٿو تہ چوپائي مال جي ترقي سنڌ جي بهراڙي ۾ معاشي ترقي ۽ سماجي نامواري کي ختم ڪرڻ لاءِ ۽ علائقن ۾ پائيداري قائم ڪرڻ ۾ مددگار ٿيندي.

منصوبي جي توجه واري مرڪز جو گروپ

اهڙا ننڍا مالوند جيڪي پائيداري سان 5 کان گهٽ جانور رکندا هجن

عرصو

پنج سال (فيبروري 2014 کان جنوري 2019)

عملدرآمد ڪندڙ عملو

چوپائي مال ۽ مڇي جي پالنا وارو کاتو، حڪومت سنڌ



**GOVERNMENT OF SINDH
LIVESTOCK & FISHERIES
DEPARTMENT**

**RESULTS OF SURVEY ON
COVID-19's IMPACT TO THE PROJECT GOALS AND
RECOMMENDATIONS TO ENSURE THE SUSTAINABILITY OF THE PROJECT
2021**

**The Project on Sustainable Livestock Development for
Rural Sindh
(JICA Technical Cooperation)**



PROJECT MANAGEMENT UNIT HYDERABAD

Contents

- 01 | RESEARCH OBJECTIVES**
- 02 | METHODOLOGY**
- 03 | EXECUTIVE SUMMARY**
- 04 | DETAILED INSIGHTS**
- 05 | CONCLUSION**
- 06 | RECOMMENDATIONS**

01 | Objectives

What did the research look to achieve?

The Objectives

Over the coming weeks and months we are going to see the veterinary services impacted more and more by COVID-19. We are therefore running this tracker to understand how things are changing for veterinarians and to advise on how we can all adapt to these new challenges.

Impact of COVID-19 pandemic on:

- 1. Public Veterinary Services/Veterinary Institutes in Sindh**
- 2. Veterinarians working in public sector in Sindh**
- 3. Livestock Department Sindh**
- 4. The goals of the project on “Sustainable Livestock Development for Rural Sindh” (PSLD)**

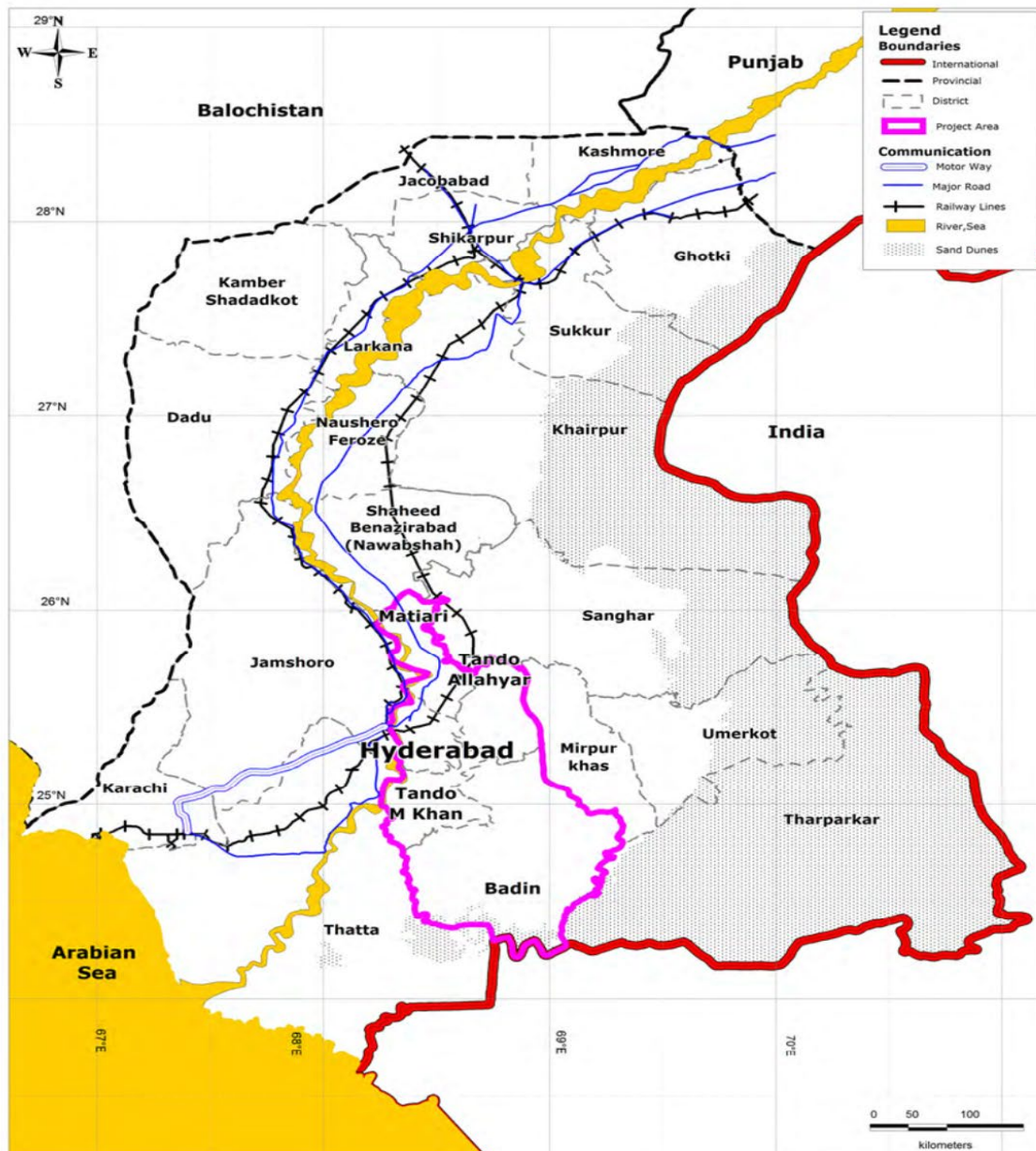
02 | Methodology

What did we do?

Methodology

Online and face to face survey run among Field Veterinarians, Extension workers, Supervisors of the Veterinary Services and others between the 2nd March and 28th May 2021, across the Project districts.

06	05	06	05	06
Hyderabad	Tando Allahyar	Matiari	Tando M Khan	Badin



03 | Executive summary

What did the survey findings tell us?

Executive Summary

COVID-19 has had a substantial impact on many sectors at Provincial and National levels, including the livestock sector. The actions taken, such as lockdown, travel restrictions and border controls, have resulted in unintended or negative consequences for the livestock sector, including but not limited to:

- (i) Difficulty moving live animals and animal products like milk, meat and eggs to markets,
- (ii) Restrictions potentially limiting seasonal provincial border crossings (transhumance) with ruminants,
- (iii) Restricted capacity to purchase necessary production inputs,
- (iv) Restricted access to labor and professional services. These difficulties have led to a decrease in processing capacity for animal products, as well as loss of sales and slowdown of market activity. Additionally, COVID-19 could undermine the capacities of Livestock Department/veterinary institutes to prevent and control animal diseases – as governments and households reallocate resources to respond to the pandemic and reduce its socio-economic impact.

In Sindh Province of Pakistan lockdown was imposed during mid of March 2020, resulting restrictions on movements and closure of all business and services except essential business and services like Pharmacies, Medical stores, Grocery stores, fruit and vegetable markets, meat shops and Health services. The cattle markets, animal feed stores and veterinary/extension services were not allowed to operate resulting serious financial impact on the income of farmers and veterinarians.

The veterinary institutes were closed and it was difficult to provide services to the farmers. On the other hand the farmers were not able to sale milk and live animals, as the markets were not functioning. Thus the paying capacity of the farmers was affected.

The Project on “Sustainable Livestock Development for Rural Sindh” is being implemented since 2014 in collaboration with Livestock Department, Government of Sindh under Japan International Cooperation Agency (JICA) Technical Cooperation.

The project has been making an effort to establish the Development Foundations to increase incomes and assets of the Livestock farmers in regard to: -

- a) Development of appropriate technologies and extension
- b) Human resource development
- c) Institutional development (technical & management)

The catalytic role of the project has developed interaction between the rural farmers, feed manufacturers, urban farmers, milk processors and micro-financing institutes in the project area, which has led to strong social linkages among these stakeholders. The

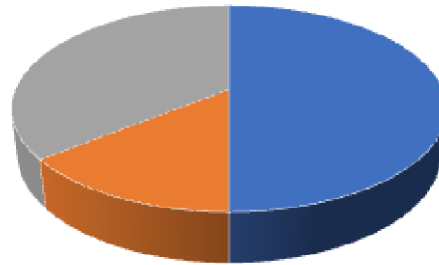
establishment of Kundhi Buffalo Breeders Association is a landmark in the history of the livestock sector; this will educate the farmers about breeding practices.

The Project will complete its life on 30th June 2021. The COVID-19 might have considerably affected the life of livestock farmers as well as the being of the Livestock Department. The project will conduct the survey on COVID-19's impact to project goals, and make recommendations for ensuring the sustainability of the project.

04 | Detailed insights

A more in-depth view of the survey findings

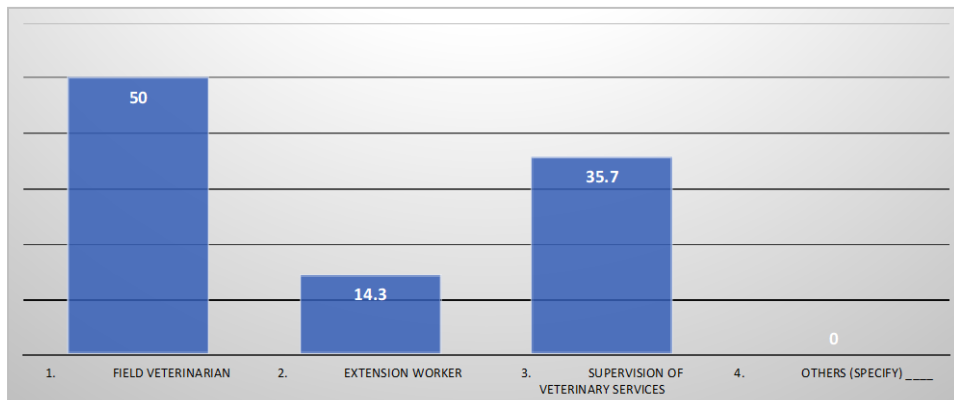
Professional Responsibilities:



- 1. Field Veterinarian
- 2. Extension worker
- 3. Supervision of Veterinary services
- 4. Others (specify) _____

1.	Field Veterinarian	50
2.	Extension worker	14.3
3.	Supervision of Veterinary services	35.7
4.	Others (specify)	0

Professional responsibilities

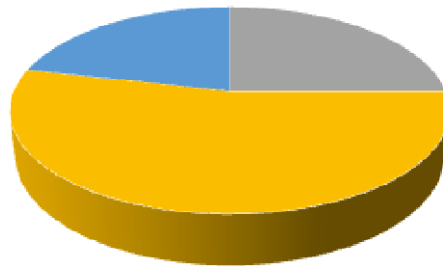


In total 28 individuals including Field Veterinarians, Extension Workers and Supervisors of Veterinary Services were interviewed as under:

1. Field Veterinarians	14	50%
2. Extension Workers	04	14.3%
3. Supervisors of Veterinary Services	12	35.7%

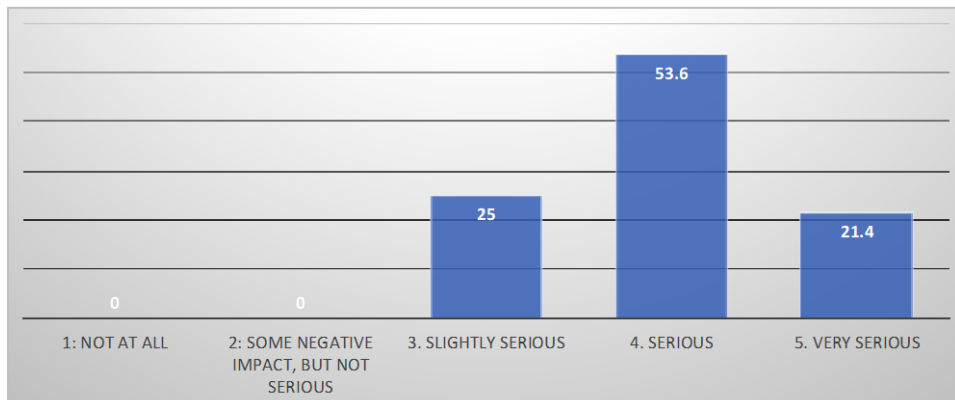
This has been reflected in the above Pie and Bar charts.

Q:1) Sudden human confinement and inactivity due to restrictions on movements during the pandemic might have affected veterinary services capacities. How do you rank the impact brought by the restrictions on movement as the providers of veterinary services or as the extension workers (including routine checkups/visits to the farmers)



1: Not at all	0
2: Some negative impact, but not serious	0
3: Slightly serious	25
4: Serious	53.6
5: Very serious	21.4

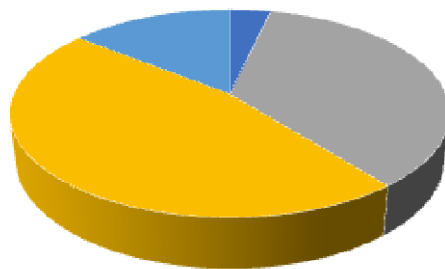
■ 1: Not at all
 ■ 2: Some negative impact, but not serious
 ■ 3: Slightly serious
 ■ 4: Serious
 ■ 5: Very serious



The majority of the vets (53.6) surveyed are of the opinion that the impact of the restrictions on movements was serious on the capacities of the veterinary services while 21.4% vets explained that the impact was very serious. Remaining 25% of the participants of the survey think that the impact was slightly serious.

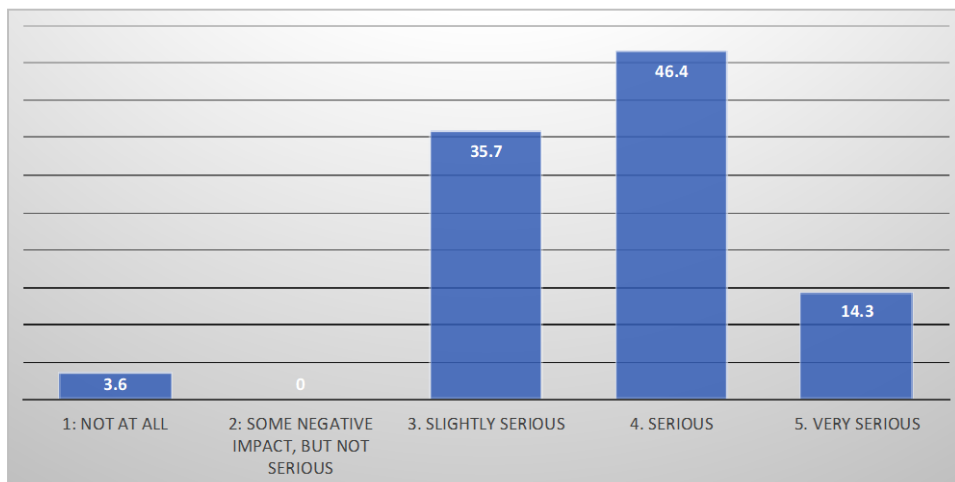
During the survey it was mentioned by some of the participants that in rural areas the restrictions on movements were not seriously taken by the public resulting slight impact on capacities of veterinary services.

Q: 2) Working with reduced number of staff at the veterinary hospitals/dispensaries or with reduced number of members in the extension teams might have affected the quality of services. How do you think the impact on the quality of the veterinary services or extension services is?



1: Not at all	3.6
2: Some negative impact, but not serious	0
3: Slightly serious	35.7
4: Serious	46.4
5: Very serious	14.3

- 1: Not at all
- 2: Some negative impact, but not serious
- 3: Slightly serious
- 4: Serious
- 5: Very serious

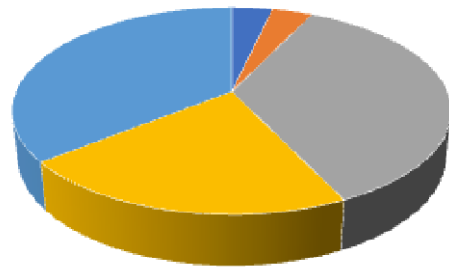


Most of the participants (46.4) reported that working with reduced staff seriously affected the quality of veterinary services, whilst 35.7% of the participants responded that the impact was slightly serious. Serious impact was reported by 14.3% of the participants of the survey. Only 3.6 % reported no any impact on the quality of veterinary services.

The argument put forward by the participants for slight serious and no any impact was that the most the veterinary institutes in the rural areas are being run by staff posted from local area and single handed.

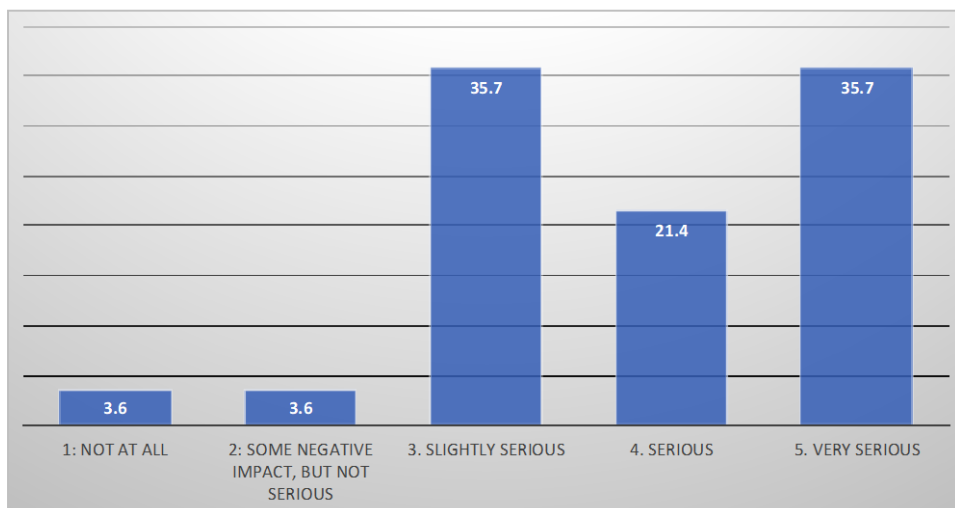
However, it is clear that veterinary/extension services have been impacted by staff availability.

Q: 3) COVID-19 outbreak affected the supplies/availability of veterinary medicines/vaccines and other essential items at the veterinary hospitals/dispensaries What was the level of impact on the supply/availability of these essentials?



- 1: Not at all
- 2: Some negative impact, but not serious
- 3: Slightly serious
- 4: Serious
- 5: Very serious

1: Not at all	3.6
2: Some negative impact, but not serious	3.6
3: Slightly serious	35.7
4: Serious	21.4
5: Very serious	35.7

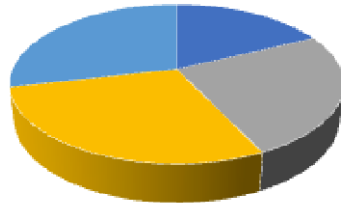


The viewpoint given by the participants during the survey was very interesting, equal percentage 35.7% of the participants explained that there was acute shortage of supplies/veterinary medicines/vaccines and other essential items and the impact was very serious whilst others were of the opinion that the supplies were available in good quantity at the veterinary institutes and the number of cases was very low resulting in a slightly serious impact on the supplies.

The 21.4% participants noticed serious impact, and again equal percentage 3.6% of the interviewers reported not at all and some negative impact but not serious impact on supplies. This might be due to serious restrictions on movements in the area.

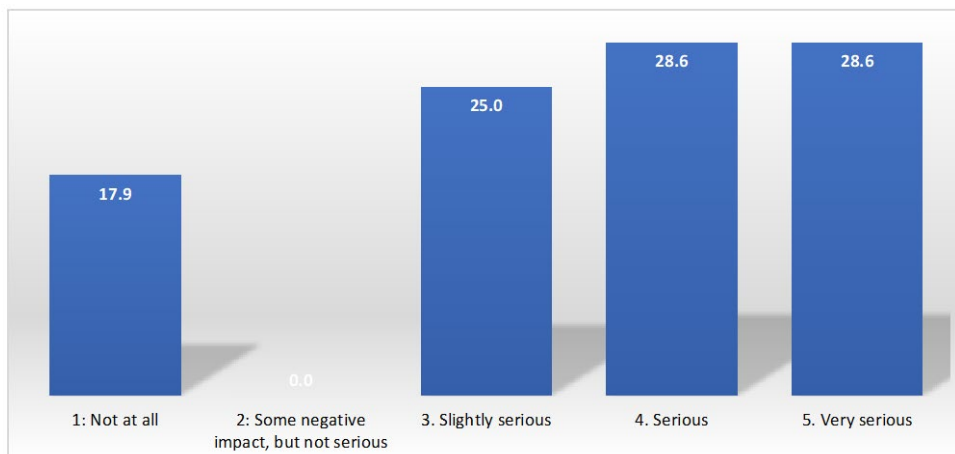
Overall in terms of supplies the veterinary institutes have been negatively impacted during lockdown.

Q: 4 Diverting most of the financial resources by the Provincial Government towards the control of the COVID-19 outbreak affected the budgetary provisions for veterinary services or for the extension teams. How you rank the impact on the budgetary provisions to your services?



- 1: Not at all
- 2: Some negative impact, but not serious
- 3: Slightly serious
- 4: Serious
- 5: Very serious

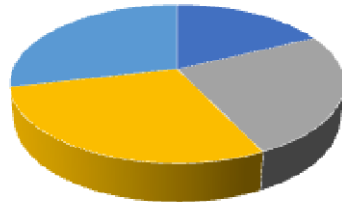
1: Not at all	17.9
2: Some negative impact, but not serious	0
3: Slightly serious	25
4: Serious	28.6
5: Very serious	28.6



Equal percentage of the participants 28.6% reported serious and very serious impact of the diversion of financial resources towards the control of COVID-19 on the veterinary services. by the Provincial Government.

The 28.0% reported slight and 17.9 % reported no impact on the veterinary services. The discussions with the participants of the survey reveals that the threshold of diversion of funds was different in different districts in few it was highest whilst in other it was zero. The difference of opinion might be due to this reason.

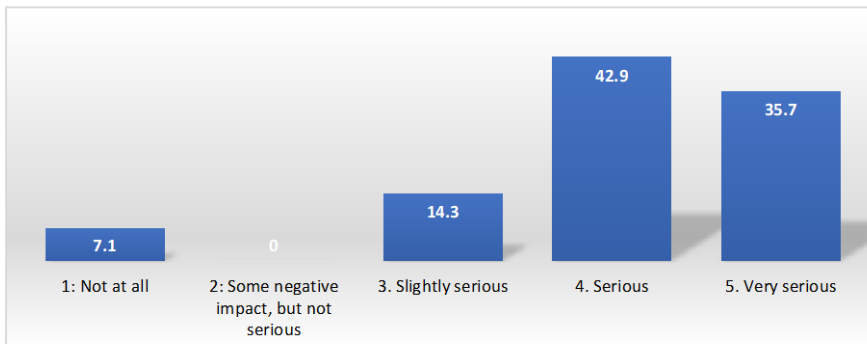
Q: 5) Disease surveillance activities such as outbreak investigation and disease reporting might have been disrupted due to access to farms, transport of samples, etc. What was the level of such impact brought by the restrictions on movement as the investigator?



- 1: Not at all
- 2: Some negative impact, but not serious
- 3: Slightly serious
- 4: Serious
- 5: Very serious

1: Not at all	7.1
2: Some negative impact, but not serious	0
3: Slightly serious	14.3
4: Serious	42.9
5: Very serious	35.7

Q: 5) Disease surveillance activities such as outbreak investigation and disease reporting might have been disrupted due to access to farms, transport of samples, etc. What was the level of such impact brought by the restrictions on movement as the investigator?



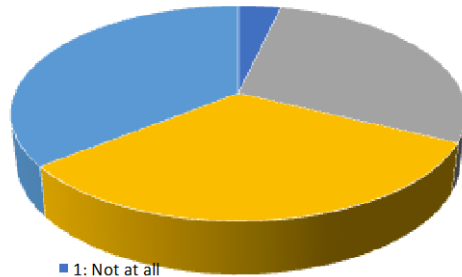
The 42.9% of the respondents reported serious impact of restrictions on movement on disease reporting whilst 35.7% of the respondents are of the opinion that the impact was very serious.

The 14.35 of the survey participants explained slightly serious and 7.1% reported no any impact.

It is evident that disease surveillance and reporting activities were affected at a significant level because of access to farmers and transport of samples basically this was the impact of lockdown.

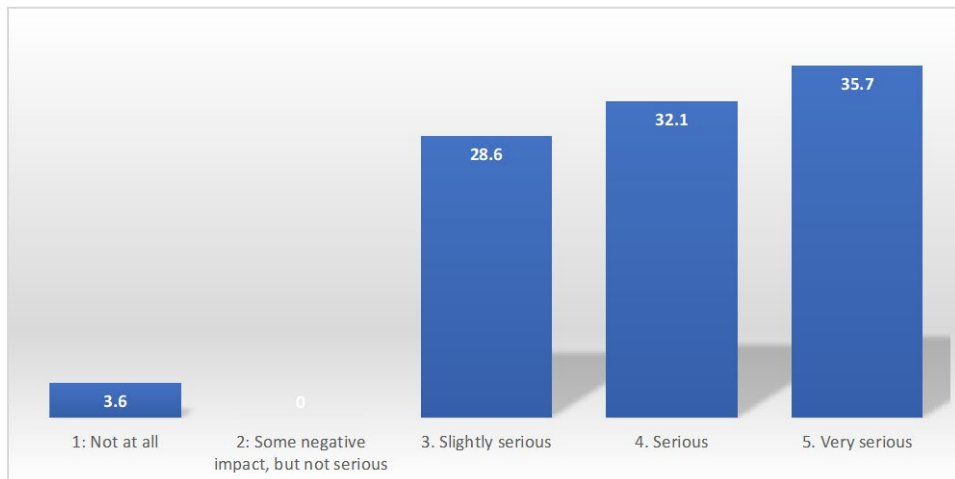
Slightly serious and no any impact might be due the reason as the contact between farmers and service providers was zero hence no any disease outbreak was reported.

Q: 6) Restrictions during the COVID-19 outbreak deprived the farmer's access to veterinary services/extension teams. How do you think the impact on the access of the farmers to the veterinary services or the extension services you are providing?



- 1: Not at all
- 2: Some negative impact, but not serious
- 3: Slightly serious
- 4: Serious
- 5: Very serious

1: Not at all	3.6
2: Some negative impact, but not serious	0
3: Slightly serious	28.6
4: Serious	32.1
5: Very serious	35.7

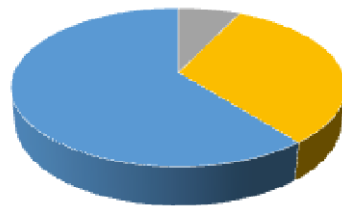


The 35.7 % of the Vets and Ext. workers reported very serious impact on the access of farmers to the services whilst 32.1% reported serious impact.

The 28.6% reported slightly serious and 3.6% reported no any impact. In total majority of the respondents are of the opinion that farmers were not able to access the veterinary services due to restrictions on movements.

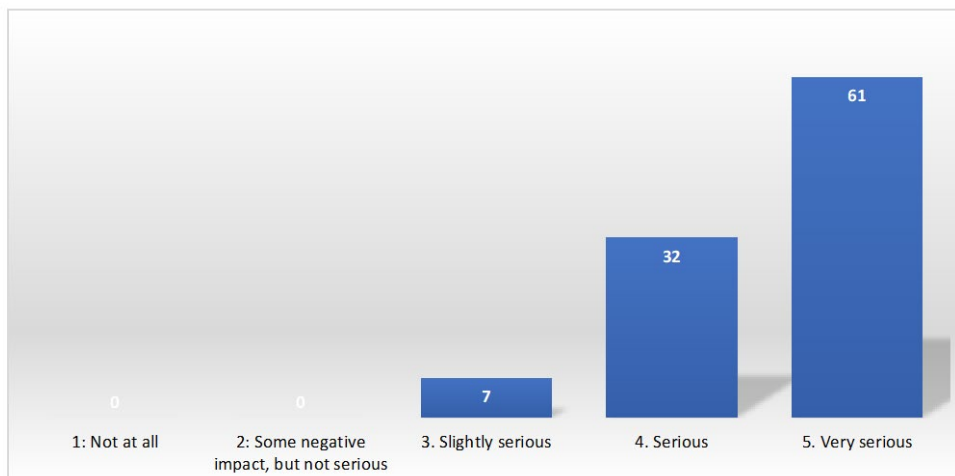
The slight impact as explained by the participants of the survey is the result of non-serious behavior of the public towards restrictions specially in rural areas.

Q: 7) The PSLD has been making an effort to strengthen the institutional capacity of the Livestock Department as a veterinary service provider to the livestock farmers. How do you think the impact of COVID-19 outbreak on the capacity building efforts?



- 1: Not at all
- 2: Some negative impact, but not serious
- 3: Slightly serious
- 4: Serious
- 5: Very serious

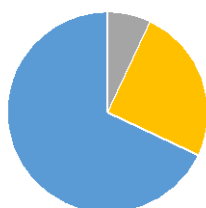
1: Not at all	0
2: Some negative impact, but not serious	0
3: Slightly serious	7
4: Serious	32
5: Very serious	61



A significant number (61%) of the participants of the survey explained very serious impact on the institutional capacity building of the Department under PSLD whilst 32% reported serious impact. Only 7% reported slightly serious impact.

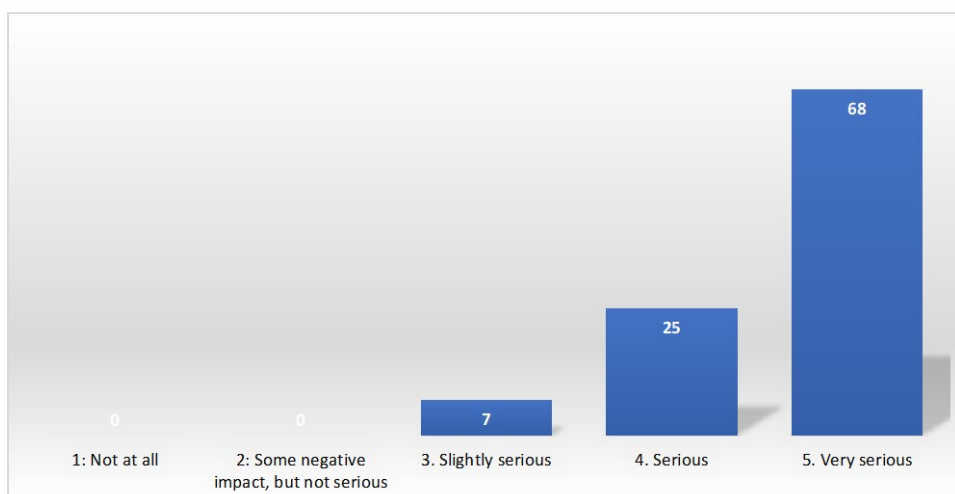
This shows that the process of Institutional capacity building in the Livestock Department initiated under the umbrella of PSLD was very significantly affected by the restrictions on movements.

Q: 8) How much do you remain concerned about yourself about the risks of being affected by COVID-19 in provision of Veterinary/extension services?



- 1: Not at all
- 2: Some negative impact, but not serious
- 3: Slightly serious
- 4: Serious
- 5: Very serious

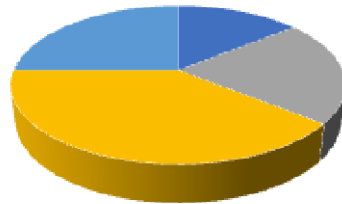
1: Not at all	0
2: Some negative impact, but not serious	0
3: Slightly serious	7
4: Serious	25
5: Very serious	68



The large majority (68%) of the participants of the survey reported very high risk of being affected personally by COVID-19 during the provision veterinary/extension services whilst 25% reported serious risk. Only 7% reported slightly serious risk.

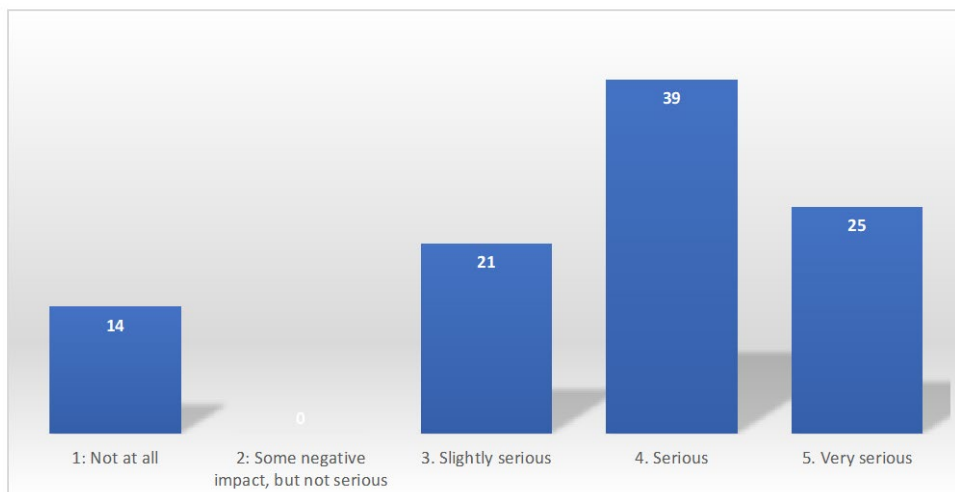
The participants explained that they were scared with the pandemic as a threat to personal and family lives.

Q: 9) How do you assess the financial impact of COVID-19 on your private practice for provision of veterinary services?



- 1: Not at all
- 2: Some negative impact, but not serious
- 3: Slightly serious
- 4: Serious
- 5: Very serious

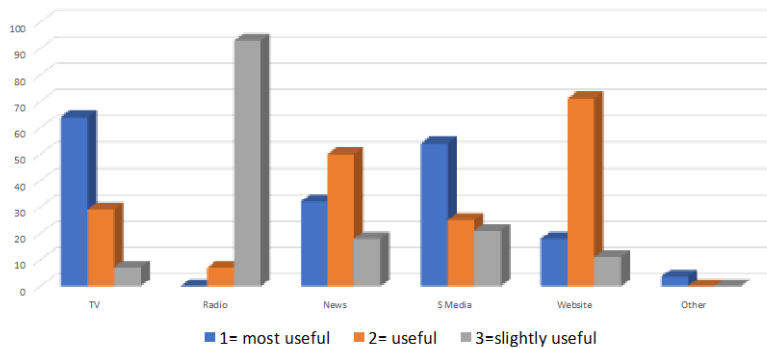
1: Not at all	14
2: Some negative impact, but not serious	0
3: Slightly serious	21
4: Serious	39
5: Very serious	25



The majority of the participants (39%) reported serious financial impact of COVID-19 on the private practice of the Vets whilst 25% reported very serious impact. Only 14% reported no any impact.

The participants explained during the survey that the private practice was not possible because of the restrictions on movements and the vets were financially affected by the COVID-19 pandemic.

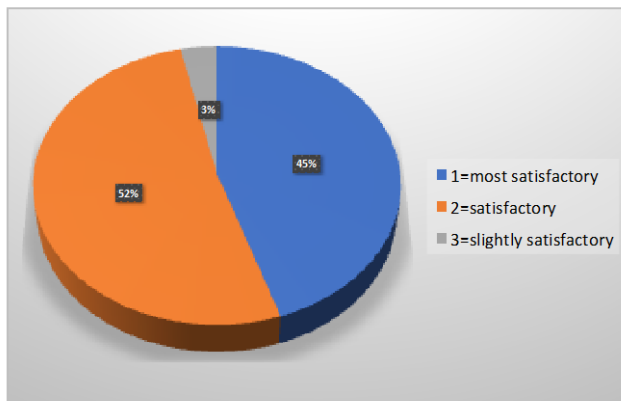
Q: 10) When looking for the latest updates and advice on the coronavirus outbreak, which sources of information do you think useful? Please select all that are useful and rank them from 1 to 3 (1= most useful, 2= useful, 3= slightly useful)



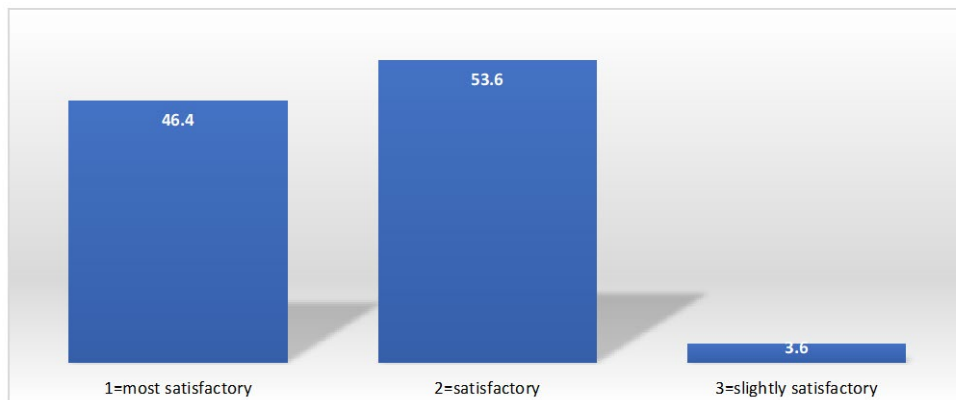
	TV	Radio	News	S Media	Website	Other
1= most useful	64	0	32	54	18	3.6
2= useful	29	7	50	25	71	0
3=slightly useful	7	93	18	21	11	0

The participants ranked the TV most useful source of information in regard to COVID-19 pandemic followed by websites (Useful) and newspapers slightly useful. Social media was also ranked most useful after TV. However, during the survey it was explained by the participants that quite often news at social media were not reliable, moreover the radio is not commonly used nowadays as source of information.

Q: 11) To what extent are you satisfied with the advice and guidance provided by the above sources on the corona virus outbreak? Any suggestion for improvement? Please rank them from 1 to 3 (1= most satisfactory, 2= satisfactory, 3= slightly satisfactory).



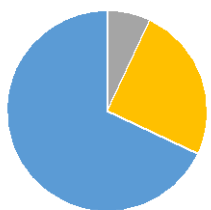
1=most satisfactory	46.4
2=satisfactory	53.6
3=slightly satisfactory	3.6



Overall 53.6% of the participants reported that information provided by TV, Radio, Newspapers, Social media and websites on COVID-19 pandemic was satisfactory whilst 46.4% explained the information was most satisfactory. Only 3.6 reported that the information was slightly satisfactory.

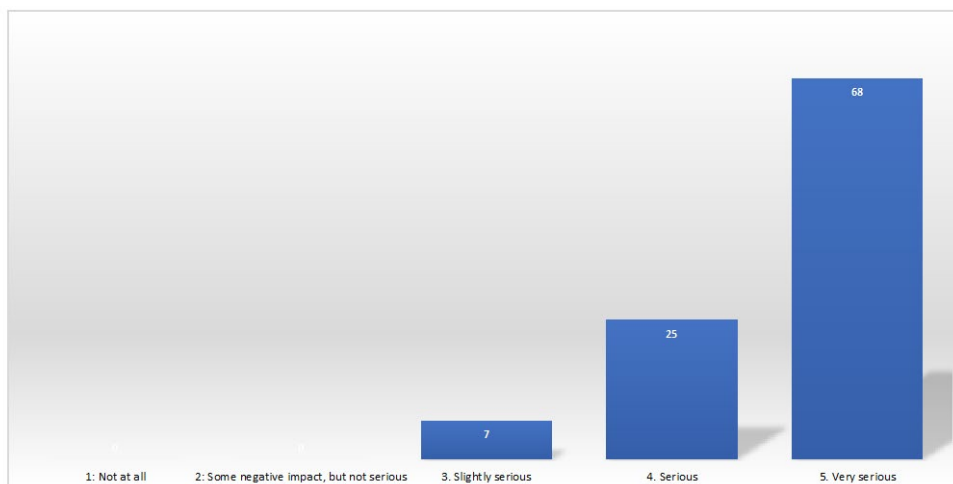
It was observed during the survey that the participants found the information delivered on official websites like NCOC more reliable and also the role of TV was appreciated. Vets/Extension workers used a broad range of sources to keep up with the latest news and update on the COVID-19 outbreak.

Q: 12) Overall, how do you rank the impact of COVID-19 outbreak on the Livestock Department as well as the PSLD? And please state your countermeasures or suggestions how the Department and the PSLD should cope with this situation for performing as expected



- 1: Not at all
- 2: Some negative impact, but not serious
- 3: Slightly serious
- 4: Serious
- 5: Very serious

1: Not at all	0
2: Some negative impact, but not serious	0
3: Slightly serious	7
4: Serious	25
5: Very serious	68



The significant majority of the survey participants ranked the very serious impact of the COVID-19 outbreak on the activities of the Livestock Department and PSLD whilst 25% reported serious impact. Only 7% reported slightly serious impact.

Some of the participants suggested providing Personal Protection Equipment (PPE) to Vets and Extension Workers to provide veterinary/extension services under such situations.

Conclusion

The findings of the survey on COVID-19 reveal that the pandemic directly or indirectly disrupted activities of the livestock Department and PSLD, including the prevention and control of animal diseases and extension services.

Working with reduced staff, there is reduced capacity to work on animal health activities such as maintaining good biosecurity, vaccination, treatment of sick animals and prophylactic measures.

Shortage of common supplies such as veterinary medicines, vaccine, diagnostic kits and specimen collection material restricted the ability to provide veterinary services.

Diversion of financial resources by the Provincial Government to control COVID-19 has limited the capacity of veterinary institutions to provide veterinary/extension services.

Disease surveillance activities such as outbreak investigation and disease reporting have been disrupted due to logistic issues including restrictions and constraints on: access to farms and transport of samples.

Movement restrictions have seriously limited farmer's ability to access basic veterinary/extension services and also posed challenges for veterinary and veterinary professionals to visit farms.

The capacity building efforts of the PSLD in regard to veterinary institutions were affected seriously and most of the Vets/Ext. workers expressed that learning process was discontinued.

Overall, veterinarians remained very much concerned about the risks of the outbreak to their personal lives in the course of provision of veterinary services.

Financially vets have been seriously affected because private practice was not possible due to restrictions on movements.

Vets are relying almost equally on TV and official websites like National Control & Command Center (NCOC) and newspapers/social media for guidance and advice on the outbreak.

Satisfaction with the advice and guidance vets have received from the TV and Federal Government website (NCOC) is high, but it could be better by pooling joint efforts of all the electronic and print media.

Overall the pandemic has seriously affected the reputation of Livestock Department as service provider. Most of the veterinary institutes lose the confidence of the farmers. In case of PSLD the activities were stopped and farmers were thinking that the project is over that affected the project goals very seriously.

RECOMMENDATIONS/GUIDELINES
for animal health professionals
(Veterinarians, extension workers and veterinary technicians)
to mitigate the impact of the COVID-19 pandemic
On veterinary/extension services

Farmers view veterinarians as leaders, they need to perform during difficult situations to protect the farm animals. However, the current pandemic of COVID-19 urged the Veterinarians and Extension workers to take extra ordinary measures to continue the services.

Under the PSLD, survey on the impacts of COVID-19 on Livestock Department and veterinary institutes were conducted. The results indicated serious impacts of the pandemic on both of these. How these impacts can be reduced, mitigated? Following are the recommendations:

1. Have a contingency plan:
 - a. Maintain an inventory of medicines, drugs, disinfectants, and diagnostic test kits, supplies and equipment.
2. Secure supplies, inputs and services:
 - a. Contact District Officers to ensure sufficient stock of veterinary drugs and consumables
 - b. Where lockdown is in place, request higher authorities apply for the exemption for veterinary/extension services
3. Keep up to date with reliable information and sensitize farmers regarding changes in schedule of provision of veterinary/extension services.
4. Help farmers to identify the most relevant priorities and functions regarding prevention of diseases that can be performed with minimum personnel.
5. Implement personal biosafety and biosecurity measures (along with general hygiene practices for COVID-19 recommended by appropriate authorities)
6. Do not visit farms, herds, markets or animal product processing facilities if you have any symptoms of COVID-19, or if you are confirmed positive and have not yet recovered/been cleared by medical providers following the isolation period.
7. Advise farmers on good livestock husbandry practices to mitigate the risk of disease outbreaks on farms.
8. Ensure information and communication technology (ICT) is in place for giving animal health advice: e.g. telephone and messaging services.
9. Request farmers and markets to continue reporting disease outbreaks and animal deaths of unknown reason to veterinary offices even when lockdown is in place.
10. Maintain physical distancing with farmers and workers when you interact with them and follow other hygiene recommendations
11. Reallocate staff and resources to crisis relief activities, including the provision of movement permits.

別添資料 Z0-5 コロナ禍影響調査（技術面）

コロナ禍影響調査（技術面）

2021年6月30日

調査実施者

Dr. Ali Akhtar Shahani、Dr. Anisa Soomro、Dr. Ghulam Muhammad Jiskani、Dr. Iqtadar Ali Memon
Dr. Muhammad Arif Khan、Dr. Muhammad Mubarak Jatoy、Dr. Naeem Siddique Ansari、Dr. Rukhsana Vighio、
Dr. Safdar Ali Faziani、Dr. Zulfiqar Ali Pathan（アルファベット順）

I. 目的

下記2課題について、新型コロナウイルス感染予防のためのロックダウンの影響について調査

1. プロジェクトの成果（PDM 第4版に記載されている）にどのような影響があるのかを調査
2. その結果を踏まえてプロジェクトの持続性を高めるために必要な対応策について提言

II. 方法

調査期間：2021年2月24日～6月30日

プロジェクトサイトの5つのパイロット県の農家（キャトルコロニーを含む）、肉屋、牛乳販売店を対象に全C/Pにより聞き取りを行い、その結果を分析・評価した。

アンケート内容はロックダウン下の状況把握に焦点を絞った。収集データはC/Pによりデータベースに入力、富永が分析しC/Pの意見を反映してまとめた。

III. 調査結果

1. 調査概要

1.1. 聞き取り調査

C/Pによる聞き取り調査は2月24日～4月2日に実施された（実際の聞き取り日数は15日間）。

農家の聞き取り対象者数はパイロット農家と周辺

農家の5県96戸、キャトルコロニー7戸で、合計103戸、また牛乳販売店22店、肉屋25戸で総数は150戸となった。

District	Rural Farmer	Cattle colony	Butcher	Milk shop	Total
Matlari	20	0	5	5	30
Hyderabad	16	7	5	5	33
TA	20	0	5	4	29
TMK	20	0	5	3	28
Badin	20	0	5	5	30
Total	96	7	25	22	150

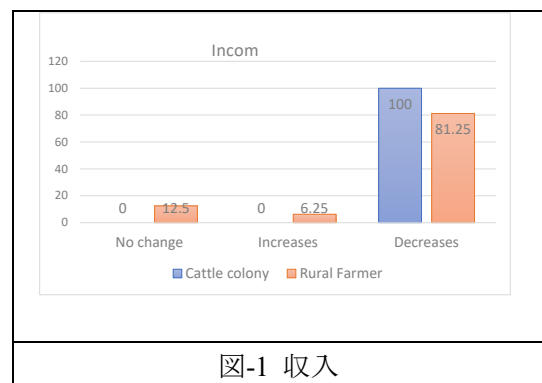
1.2. 分析方法

キャトルコロニーと地方の農家を比較して分析した。キャトルコロニーの農家は地方農家と比べ立地条件、飼養と営農規模が異なり、これを比較することで地方農家に役立つ教訓が示される。

2. 分析結果

2.1. 収入

収入はCattle Colony100%、地方農家81.3%が「減少した」と答えた。



2.2. 牛乳の販売先

Cattle Colony (以下、コロニー) からの主な販売先は牛乳店、その多くは所有店、親戚、友人であった。地方農家の主な販売先は中間業者で50%を占め、その他、多くの出荷先があり、ロックダウン下でも通常どおりの流通パターンが継続された。

%	Cattle colony	Rural Farmer
Middleman	14.3	47.4
Friend		
Relatives		10.5
Shop	85.7	28.9
Market		2.6
Individual house		10.5
Milk company		
Total	100	100

2.3. 牛乳販売価格の変化なし、下降、上昇の比較

牛乳価格は地方農家60.6%、コロニー85.7%が「下降」と答えた。TMK 県の農家は「変更なし」と答えたが農家数が異常に高くその理由は不明である。

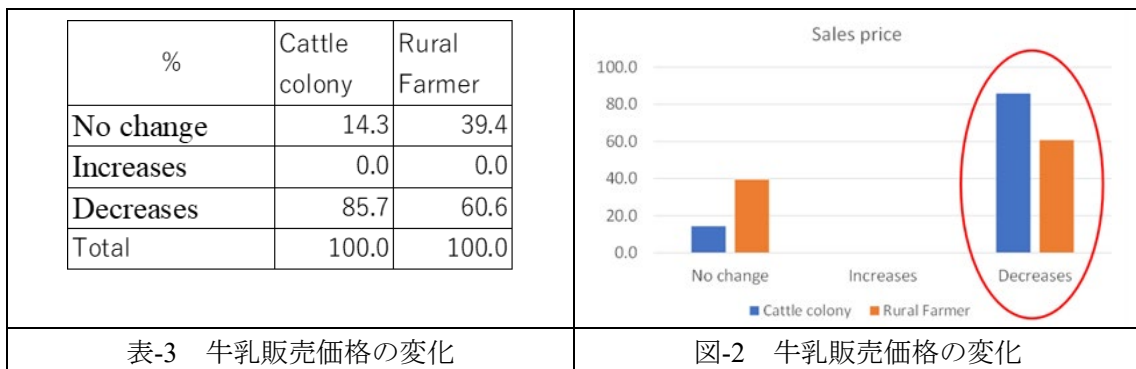


表-3 牛乳販売価格の変化

図-2 牛乳販売価格の変化

2.4. 牛乳のマーケティング

コロニーの主な牛乳販売先である牛乳店は、自己所有、親戚、友人など信頼関係があることから、販売状況は「通常通り」が40%と多くを占めた。地方農家の「通常通り」は22.4%と低く、「時々販売できず」が38%と高かった。

「ロックダウン期間中は売れない」とした地方農家は21%いたが、この理由は、ロックダウンが原因なのか、乾乳あるいは乳量が少なく販売する牛乳がなかったのか不明である。

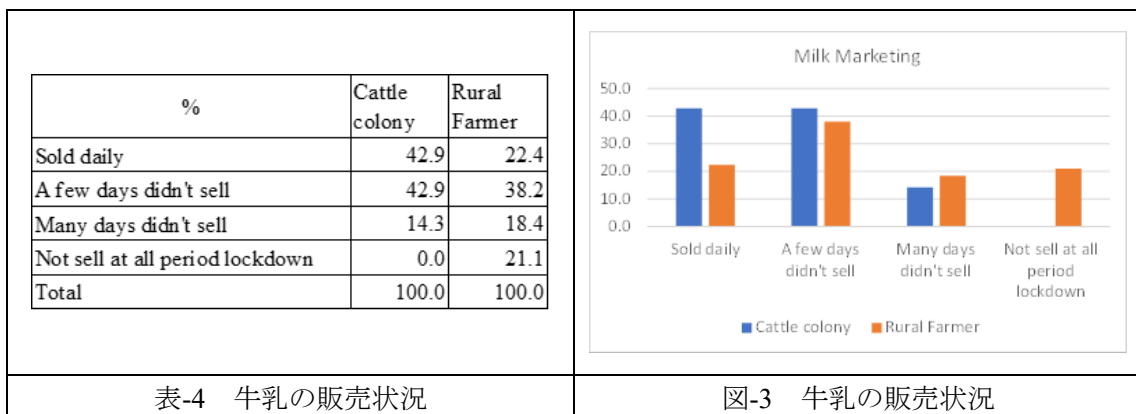


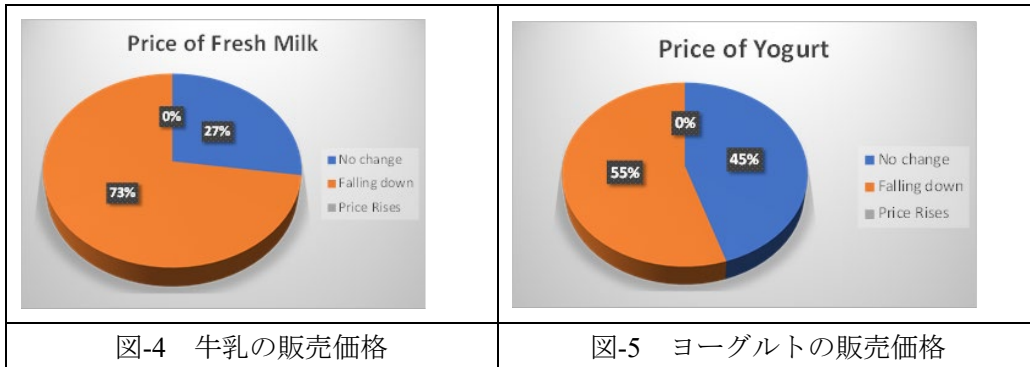
表-4 牛乳の販売状況

図-3 牛乳の販売状況

2.4. 牛乳店

牛乳店22戸中の21戸は「収入が減少した」と答え、21戸は「牛乳の供給が減少した」と答えた。また販売価格は、牛乳は73%、ヨーグルトは55%の店で減少した。このような背景から「収入が減っ

た」と答えた牛乳店が多いことが推察された。

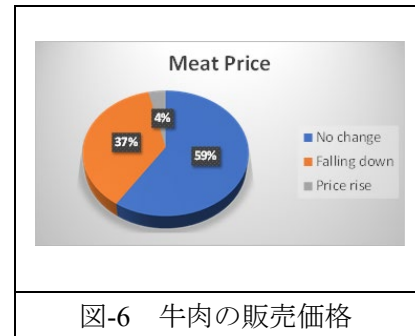


2.5. 成雌牛または成雌水牛の販売

生体の主な販売先として、コロニーでは肉屋が 50%、マーケットが 50%、地方農家は中間業者が 86%を占め、ロックダウン下でも通常の販売パターンと変わらなかった。一方、成雌牛の販売価格はコロニーの 100%、地方農家の 84.2%が「下降した」と答えた。

2.6. 肉屋

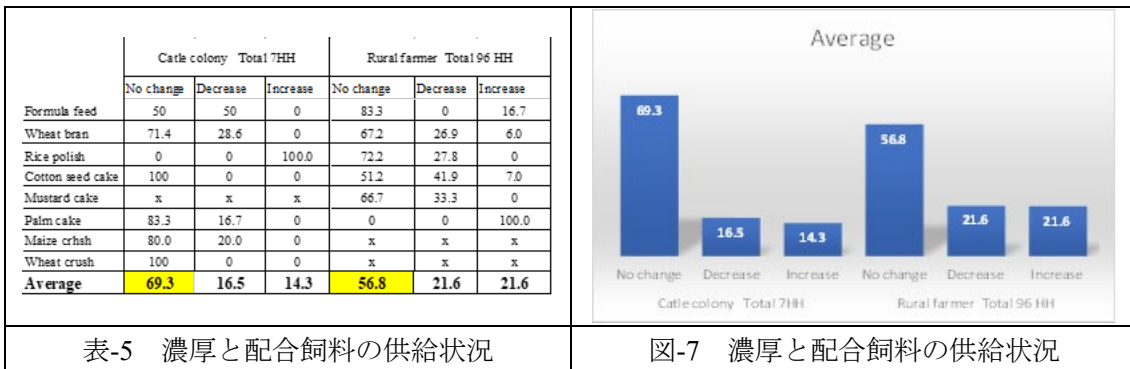
肉屋の 92%が「収入が減少した」と答え、また肉の供給は 93%が「減少した」と答えた。牛肉の販売価格が「下降した」と答えた肉屋は 37%と少なく、「変化なし」が 59%と多かった。牛肉は公定価格で保証されていることが理由と推察された。



2.7. 濃厚飼料と配合飼料

a. 供給

濃厚飼料と配合飼料の供給は「変化なし」と答えた農家が多く、コロニーの 69.3%、地方農家の 56.8%を占めた。



b. 濃厚飼料と配合飼料の購入頻度

コロニーでよく使われている飼料は Wheat bran、Palm cake、Maize crush、地方農家は Wheat bran、Rice polis、Cotton seed cake とロックダウン下でも通常と変わりなかった。

c. 飼料価格

価格は全飼料の平均で、コロニーでは 100%、地方農家で 73.9%が「上昇した」と回答した。

2.8. 繁殖と交配

交配は種雄牛による自然交配が多く、その割合はコロニー7/7戸（100%）、地方農家の 92/96戸（96%）であった。農家4戸は人工授精をした。交配についてはロックダウンの影響は受けなかったと推察された。自然交配の価格は無料が 82.8%と高かった。

2.9. ロックダウン下の治療実施者

コロニーでの治療は民間の獣医師 38.5%、農家自身 38.5%と大勢を占めた。この場合の農家はコロニーに雇用され家畜管理に慣れたワーカーを意味する。一方の地方農家は畜産局職員が 40.8%、民間獣医師が 40.8%と外部技術者による割合が高く、自ら治療する農家は 14戸（18.4%）と少なかった。

表-6 濃厚飼料と配合飼料の購入頻度

	Cattle colony Total 7HH	Rural farmer Total 96 HH
Formula feed	5	12
Wheat bran	7	66
Rice polish	1	17
Cotton seed cake	1	33
Mustard cake	0	8
Palun cake	6	0
Maize crsh	5	0
Wheat crush	2	0

表-7 濃厚飼料と配合飼料の価格

	Cattle colony Total 7HH			Rural farmer Total 96 HH		
	No change	Decrease	Increase	No change	Decrease	Increase
Wheat bran	0	0	100.0	41.7	0.0	58.3
Wheat bran	0	0	100.0	12.1	0.0	87.9
Rice polish	0	0	100.0	17.6	0.0	82.4
Cotton seed cake	0	0	100.0	14.3	7.1	78.6
Mustard cake	x	x	x	25.0	12.5	62.5
Palun cake	0	0	100.0	x	x	x
Maize crsh	0	0	100.0	x	x	x
Wheat crush	0	0	100.0	x	x	x
Average	0	0	100.0	22.1	3.9	73.9

表-8 治療実施者の内訳

	Cattle colony		Rural Farmer	
	HH	%	HH	%
Livestock Officer	3	23.1	31	40.8
Private Technician	5	38.5	31	40.8
Farmer	5	38.5	14	18.4
Total	13	100	76	100

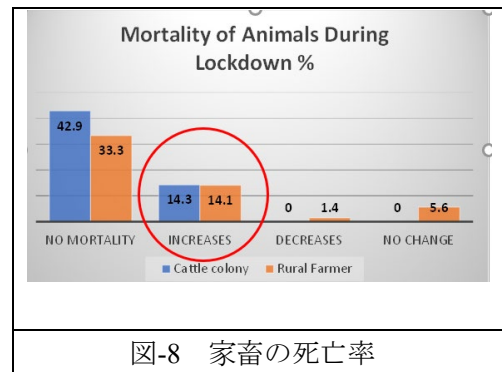


図-8 家畜の死亡率

2.10. 死亡率

ロックダウンは限られた短期間であったため、死亡頭数は少なかった。ただしコロニーと地方農家ではともに 14.1%となっていることから、ロックダウン下でも獣医師による継続したサービスが必要であることが示された。

2.11. コロナ感染予防の指導

コロナ感染予防の指導はコロニー100%、地方農家 99%とほぼ全員が「必要」と答えた。研修、セミナーそしてワークショップなど集合しての指導は感染のリスクが高まるためゼロに近かったが、NGO、Soap Company、Social Worker による指導がわずかに認められた。指導と啓蒙の主流は TV、Radio、Cell phone、SMS、Newspaper であった。

2.22. 生活必需品

a. 購入頻度

コロニー7戸、地方農家96戸、計103戸の調査結果であるが、牛乳は自家生産され、山羊肉は高価なので購入頻度は低かった。その他の品目の購入頻度は高く、ロックダウン下でも通常時とあまり変わらなかったと考えられる。

b. 生活必需品の購入価格

購入時の価格は、53.3%で牛乳が「減少」し、牛肉は57.1%で「変更なし」であったが、その他のすべての品目で「上昇」した。

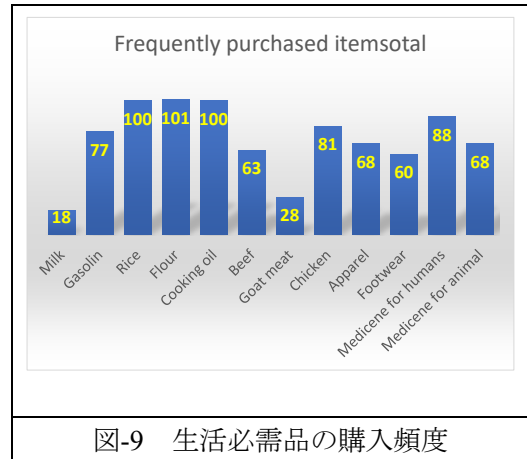


図-9 生活必需品の購入頻度

%	No change	Decrease	Increase
Milk	13.3	53.3	33.3
Gasolin	32.9	13.2	53.9
Rice	24.5	1.1	74.5
Flour	8.3	1.0	90.6
Cooking oil	5.3	1.1	93.7
Beef	57.1	3.6	39.3
Goat meat	26.1	4.3	69.6
Chicken	24.3	8.1	67.6
Apparel	31.9	0.0	68.1
Footwear	14.5	0.0	85.5
Medicene for humans	0.0	1.2	98.8
Medicene for animal	0.0	0.0	100.0

表-9 生活必需品の価格

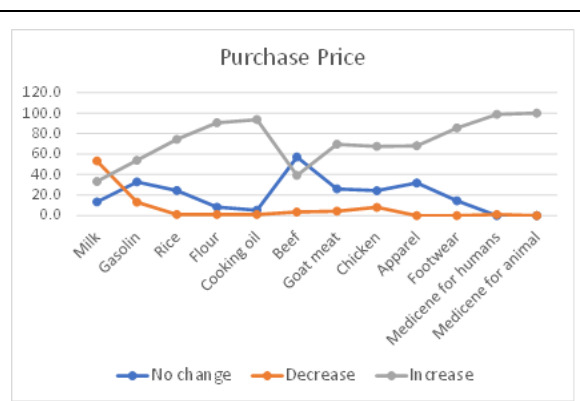


図-10 生活必需品の価格の平均、Max、Min

III. 結論と提言

下に調査の結果をまとめた。

- ✓ 調査を通じて、コロナ感染によるロックダウンは、コロニーと地方農家に大きな被害を与えたことが明らかになった。
- ✓ 収入が減少したと答えた農家数は多く、コロニー100%、地方農家81.2%であった。
- ✓ 収入減少の主な理由は牛乳と生体牛の販売価格の下落であった。また牛乳の販売状況については「通常通り」と答えたコロニーは42.9%であった一方、地方農家は22.4%と低かった。
- ✓ 配合飼料、濃厚飼料、生活必需品（牛乳と牛肉は除く）の購入価格は上昇した。
- ✓ PDMのOutputの外部条件として「パイロット農家やその周辺農家が、洪水または旱魃によって深刻な損害を受けない。」と記載されている。コロナによるロックダウンは洪水あるいは旱魃ではないが、それに匹敵するほど大きな負の影響を農家に与えたことが推察される。一方PDMに掲げられているプロジェクトの技術面での成果はすでに5年間のうちに達成されていたため、コロナ禍によるプロジェクト成果への影響はほとんどなかったといえる。移動制限下にあっても濃厚飼料や配合飼料の価格は上昇し遅れたが供給自体は継続され、また繁殖もほとんどは種雄牛の自然交配なので技術レベルは維持されたと推察される。コロナ禍がなくとも、元々厳しい環境の中で長い年月を生きてきた農民と家畜たちであり、逆境への抵抗力が備わっているといえるのかもしれない。
- ✓ ただしプロジェクトの普及活動については移動制限などによる影響を受けていた。これについて

は制度面の調査を参照されたい。

本調査結果を踏まえて、プロジェクトの持続可能性を向上するための方策として、以下を提案したい。畜産局による実施が期待される。

貧しい農家への子水牛救済計画の継続

家畜資産の所有は、緊急時の生活に大きく役立つことが理解できた。ロックダウン下で販売価格は下がったが、牛乳と生体牛の販売は継続され収入の確保につながった。子水牛救済計画は貧しい農家へ家畜資産を付与することで貧困削減対策としても極めて重要であり、畜産局の目玉活動として継続することを提案する。

ロックダウン下での農家への治療サービスの継続

調査の結果、少ないながら家畜の死亡を認めた。畜産局職員 V/O と S/A へのコロナワクチン接種を優先し、できる限り円滑な農家サービス（治療、家畜へのワクチン接種、駆虫）を安定かつ継続して行えるよう対策強化を提案する。

農家のグループ化の推進

ロックダウン下でもコロニーは地方農家と比較して、安定して高い価格で牛乳を販売できた。地方農家はコロナのような影響に対しての抵抗力が低いいため、可能なところではグループ化を図りまとまった量の牛乳を安定的に供給できるようにすると良い。畜産局が農家を指導し、合わせて牛乳の流通を改善すべく指導を継続するよう提案したい。



**The Project on Sustainable Livestock Development
for Rural SINDH “PSLD”
(JICA Technical Cooperation)**

**Textbook for Appropriate Technology of Dairy
Farming for Livestock Technician**



March 2020

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This textbook has been developed for the use of livestock professionals. The Livestock and Fisheries Department, Government of Sindh welcomes your comments and suggestion to improve this material.

Developed by The Project on Sustainable Livestock Development for Rural Sindh

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Preface

Livestock is the largest sub-sector in agriculture of Pakistan, contributing 11.4 percent to overall GDP of the country. Livestock plays vital role in rural economy and livelihood of rural poor, so as in rural Sindh. It is a source of cash income, nutrition and sometimes only asset for the rural and marginalized people.

The Project on Sustainable Livestock Development for Rural Sindh (The Project) is the 5 year technical cooperation project implemented in collaboration with the Livestock and Fisheries Department, Government of Sindh and Japan International Cooperation Agency (JICA), Government of Japan, aiming for creating foundations of sustainable livestock sector development in Sindh province, which benefit small scale dairy farmers who comprises more than 80 percent of the sector. The Project was initiated in February 2014 and implemented in 5 pilot districts, namely Matiari, Hyderabad, Tando Muhammad Khan, Tando Allahyar and Badin. The Project focused on development of appropriate technologies for dairy farming. Throughout five years of implementation, appropriate technologies were developed, piloted and verified for the use of small scale formers in Sindh province. Along with the appropriate technologies, useful basic technologies for livestock professional technicians were developed. The technologies range over 8 areas, namely, farm management, marketing, feeding management, fodder, animal health, animal reproduction and genetic improvement, Livestock assets. The Project worked on effective utilization of livestock resources, i.e. calves and dry buffaloes in the commercial cattle colony as well. Method for salvation of calves and dry buffaloes were verified.

Technologies developed by the Project are compiled as textbooks, guidelines and booklets for wider application and dissemination to professional technicians, and ultimately to farmers. The Livestock and Fishery Department hope that these series of publications will widely be used by livestock professional technicians both public and private and dairy farmers in Sindh province for uplifting their livelihood.

Director General / Project Coordinator
The Livestock and Fisheries Department
Government of Sindh

Foreword

The Project on Sustainable Livestock Development for Rural Sindh has been implemented in Southern parts of Sindh Province, Pakistan in collaboration with Livestock and Fisheries Department, Government of Sindh and Japan International Cooperation Agency (JICA). The Project was supported by the team of Japanese experts headed by Mr. Hiroshi Okabe.

The long-term objectives of the Project are improvement of productivity of milk and increase of income of small scale dairy farmers. The number of cattle/buffalo reared by one small scale dairy farm is small, generally within 5 heads, which includes both adult cattle/buffalo, heifers and calves. Most of small scale dairy farmers do not possess their own land. Under such conditions it is difficult to run sound dairy farming. Towards the long-term objectives, 50 appropriate technologies have been verified by the Project. The technologies are ranked A, B and C. The number of each technology is 20, 22 and 8, respectively.

The definition of each rank is as follows:

Rank A: Technology ranked as 'A' is defined as highly effective and easy to apply at farms.

Rank B: Technology ranked as 'B' is defined as highly effective but not easy to apply at farms.

Rank C: Technology ranked as 'C' is defined as middle level effective and not easy to give guidance and apply at farms during the project period.

Livestock technicians are expected to provide technical guidance on rank A technologies to farmers as an initial step. Rank B and C technologies are also essential for sound dairy farming management. Livestock technicians therefore are encouraged to continue technical guidance on those technologies.

Besides, 32 useful technologies which are effective for increasing milk production in the long term have been identified by the Project. The useful technologies include reproductive disorder diagnosis and treatment, milk test and pedigree registration for genetic improvement, animal sheds and so on.

In this textbook, 50 appropriate technologies and 9 useful technologies are explained.

The Project activities have been carried out by 9 Pakistani Veterinary Officers of Sindh Livestock and Fisheries Department as the counterparts of the Project along with 13 Japanese experts and a Bolivian expert on Andrology. This textbook was compiled based on these Project activities. Logistic support from the project national staff were indispensable for compilation of the textbook as well.

We would like to take this opportunity to thank all those involved in development of this textbook. We hope this textbook is useful for technicians who shall give technical guidance to small scale dairy farmers in Sindh province.

Editor in Charge Dr. Hideo Tominaga

Along with Support of the Technical Counterparts of Sindh Livestock and Fisheries Department
and the Japanese Expert team

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Ms. Noriko Hara, Expert on Livestock Technology Development
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Bolivian Expert (3rd county Expert)

Dr. Jose Nazario Videz, Expert on Andrology

List of Appropriate technology

Technical field	No		Appropriate technology	Rank
1. Farm Management	1	1	Sound dairy farm management	C
	2	2	Reduce Labor Cost	B
	3	3	Reduce Expenditure of Dairy Farm	C
2. Marketing	1	4	Deliver sizable milk regularly	C
	2	5	Trial to Introduced the milk company to some of P/F	C
	3	6	Do not adulterate milk with water	A
3. Feeding Management	1	7	To supply sufficient water	A
	2	8	Clean water	A
	3	9	Improving Tie Method	A
	4	10	Shade	B
	5	11	Good Ventilation	A
	6	12	Keeping dry floor	A
	7	13	Right calf management after its birth	A
	8	14	Right milking colostrum	A
	9	15	Health management of suckling calf	B
	10	16	Prevention measurement against heat for calf	A
	11	17	Improvement of roof and floor at place milking	B
	12	18	Management cow at time of parturition	A
	13	19	Appropriate feeding cow after parturition	B
	14	20	Management dry cow	B
	15	21	Appropriate feeding cow before parturition	B
	16	22	Bathing	A
	17	23	Shower	A
	18	24	Hoof- cutting	A
	19	25	BCS for milking animal	A
	20	26	Degree of nutrition for calves	A
	21	27	Using Retainer	C
	22	28	Drinking sufficient water (Freedom drinking water)	B
	23	29	Correct Milking Techniques	B
	24	30	Co Management of Livestock	C
4. Fodder	1	31	Trail Formula Feed Plan	C
	2	32	Feed a good quality roughage	B
	3	33	Clean up trough of Feed	A
	4	34	Making hay for calve	A
	5	35	Concentrate for calves	B
5. Reproduction	1	36	Recording of reproduction	B

Technical field	No		Appropriate technology	Rank
	2	37	Detection heat	A
	3	38	Diagnostic of reproduction	B
6. Animal Health	1	39	Management diarrhea for calf	B
	2	40	Prevention FMD	B
	3	41	Prevention HS	B
	4	42	De-worming & Cleaning strictly shed /paddock	B
	5	43	De-worming of appropriate age of calves	B
	6	44	Rotation of chemicals with different component	B
	7	45	Prevention of Ecto Parasite	B
	8	46	Blood parasite	B
	9	47	Prevention & treatment of Mastitis	C
7. Genetic Improvement	1	48	Try to identify good buffalo bull	A
	2	49	Awareness of Genetic Improvement	A
	3	50	Using guaranty bull	B

List of Basic Technology

Full-scale trial : ○ Semi-trial : △ Not implemented : X

Technical field	No		Basic technology	Degree of Application during the project period
1. Farm Management	1	1	Classification dairy farmers	○
	2	2	Analysis Dairy Economy	○
	3	3	Recording on farm management information	○
2. Marketing	1	4	Collection the marketing information of milk and livestock animal	△
3. Feeding Management	1	5	To improve quality water	X
	2	6	Grazing	X
	3	7	Milking Shed	○
	4	8	Simple Shed	○
	5	9	Paddock	○
	6	10	Cold Counter Measure	△
	7	11	Feeding Trough	○
	8	12	Water Trough	○
4. Fodder	1	13	Cutting Roughages	△
	2	14	Roughages production	○

Technical field	No		Basic technology	Degree of Application during the project period
	3	15	Analysis of Feed	○
	4	16	Analysis of soil	△
	5	17	Provide salt to Cattle/Buffalo	△
5. Reproduction	1	18	Abortion	△
	2	19	Retention of Placenta	X
	3	20	Prolapse	X
	4	21	Reproductive disorder	○
	5	22	Andrology	○
	6	23	Physiological survey for buffalo	○
	7	24	Artificial Insemination	X
6. Animal Health	1	25	Hygienic treatment technology	○
	2	26	Brucellosis	○
	3	27	Tuberculosis	○
7. Genetic Improvement	1	28	Milk test	○
	2	29	Pedigree registration	○
8. Livestock Assets	1	30	Guideline of Monitoring calves system	○
	2	31	Guideline of Calves distribution system	○
	3	32	Guideline of Recycling of dry buffalo system	○

(Remarks)

The unit, kilo gram (KG) is used for milk yield in this textbook.

The weight of 1,000 ml (1 liter) of milk at a temperature of 15 ° C is calculated as 1,030 g (1.3 kg).

Calculating formula:

$$1,000\text{ml} \times 1.03 \text{ (specific gravity of milk)} = 1,030\text{g}$$

This textbook is using unit of milk production in kilogram except field of marketing.

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Chapter 1 Basics for improving dairy farm management

Let's increase the milk production through improving your dairy farm management techniques so that your living standard can be improved.

It is not easy task but can be realized and improved through farmer's efforts.

1.1 Trial for increasing milk production

In first step, try to understand what kind of technologies and how they are related to increase milk production, milk production is related with many factors.

The increase of milk production can be achieved by improvement of multiple technologies.

Objectives of the Project:

Increase of milk production

Increase of milk production will be achieved only through collaborative efforts by all fields. As the figure shows below, feeding management, fodder development, animal health, animal reproduction, and capacity of animal (genetics) must be improved comprehensively. The fields which can be improved comparatively in short time of period are feeding management, fodder development, and animal health, whereas it takes 4 to 5 years for animal reproduction and genetic improvement to achieve outcomes. Increasing number of animals by utilizing livestock resources such as calves salvation and dry buffalo recycling will also contribute for increase of milk production. it will also requires long periods of time to see any outcome of the intervention.

Our Focus of Project:

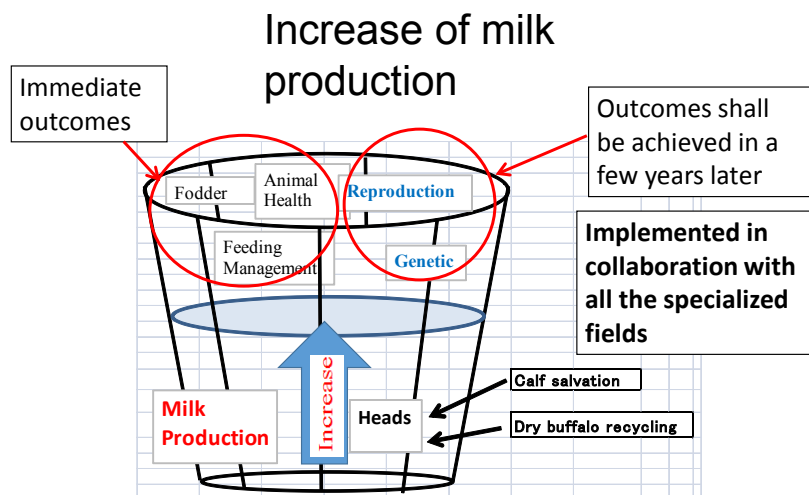


Figure 1-1 Increase of milk production by collective efforts of all fields

1.2 Trial for increasing income

Though milk production increases, it does not mean anything if feed cost exceeds income of milk. Having loss from selling milk does not lead to achievement of our targets.

To avoid this situation, bring profit and increase your farm income you should know following figures.

- 1) Income: Selling price of milk and live animal



What is the current selling price of milk at your farm?

What is the selling price of milk of your neighbors, surrounding town and villages?

Is your milk selling price satisfactory?

2) Expenditure: Inputs related to dairy business

Cost of feed

Labor cost

Other expenses

At the same time, you should improve selling price of your milk as mentioned in the Chapter 2 Sound dairy farm management and 2.3 Marketing.

1.3 The current milk production of buffaloes in rural Sindh and target milk production

Milk curve of buffaloes reared in the rural Sindh and ideal milk curve are plotted on the graph in figure 1-2.

Take a look at the graph below.

* Blue colored line: Ideal milk production curve

* Green colored line: Milk curve of buffaloes reared in rural Sindh, showing less milk production due to improper feeding management.

* Red colored line: Second best milk curve of buffaloes reared with comparatively better feeding.

Green colored milk curve indicates the buffalo which usually Pakistani farmers are rearing. Milk production decreases after parturition due to following factors.

Availability of roughage is not usually stable in its quantity and quality at ordinary farms.

High temperature and shortage of drinking water also adversely affect milk production. Milk production curves indicates ups and down and the yield gradually decrease after that, animal become dry.

Estimated milk production is 1,260kg (4kg/day) in one lactation.

Blue colored milk curve is ideal milk curve, if the animals are fed properly after parturition, this milk production curve can be expected. Milk production increases after parturition and show its peak² to 3 months after the parturition. The milk production gradually decreases after its peak period and become dry at the end. The total milk production of one lactation period for this case is 2,250kg (7.4kg/day).

How do you understand the vertical line between green and blue lines?

This vertical line indicates the loss of milk you could have had. This loss can be estimated as much as 1,000kg per lactation of buffaloes in rural Sindh. The buffaloes in rural Sindh are currently producing 44% less than ideal milk production.

Red curve shows second best milk curve. This curve indicates feeding management of buffaloes in this case is comparatively good curve. Milk production of one lactation of this case is 1,902kg, however, is still 14% less than the ideal milk curve.



Try to improve your buffalo capacity into full scale so that their milk curve shows ideal one.

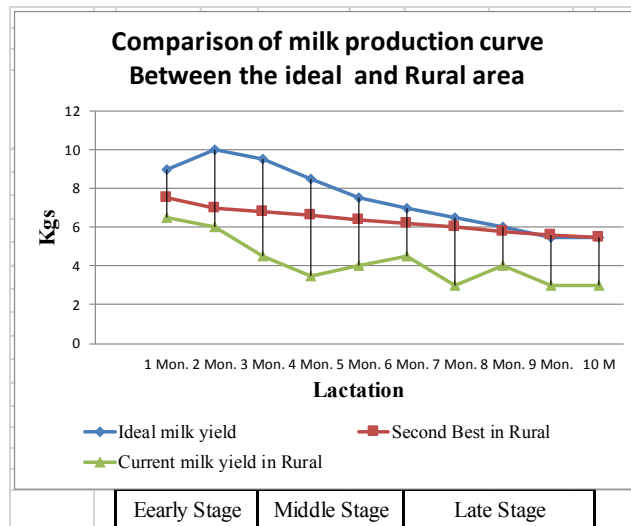


Figure 1-2 Comparison of milk production curve between the ideal and rural area

Below table shows the comparison of 3 milk curves, namely, 1) ideal milk curve, 2) second best milk curve, and 3) milk curve of buffaloes are currently reared in rural Sindh. The milk price is supposed to 60Rs per Kg. The difference of income is huge. The right column in the table 1-1 shows the ratio of each milk curve against ideal milk curve. Second best milk curve is 84% of ideal production whereas current milk yield in rural Sindh is 56% of ideal production.

Table 1-1 Comparison of milk yield and income of 3 milk curves and ideal production ratio

	Milk Yield (Kg)	Income (Milk price Rs.60)	Ideal production ratio
Ideal Milk Yield	2,250	Rs.135,000	100%
Second Best Yield in Rural Area	2,112	Rs.114,120	84%
Current milk Yield in Rural Area	1,470	Rs. 75,600	56%

Figure 1-3 shows the graph of Table 1-1. You can clear see the difference among 3 milk curves. Try to achieve ideal milk curve together with us.

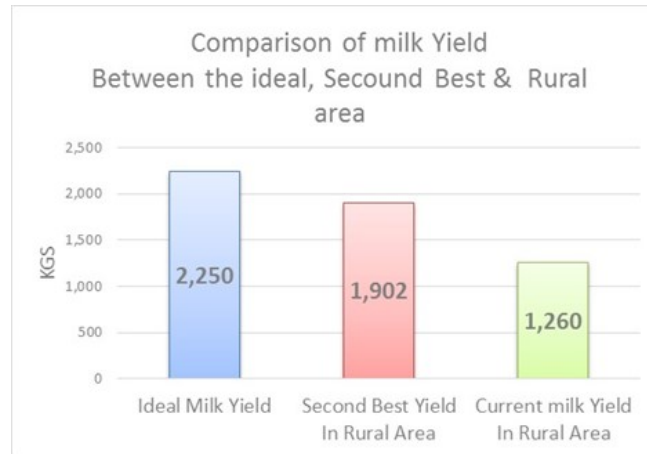


Figure 1-3 Comparison of milk yield between the ideal and rural area



Chapter 2 Sound dairy farm management

2.1 Principles of sound dairy farm management

Let's try for stable dairy farm management.

Stable farm management is not easy task to achieve but try to improve your farm management step by step. Sound dairy farm management is comprised on following steps and factors.

- 1) Increase of production
- 2) Maintaining production yield
- 3) Lowest possible cost of inputs

Sound farm management can be materialized through management of above steps and factors in a stable manner.

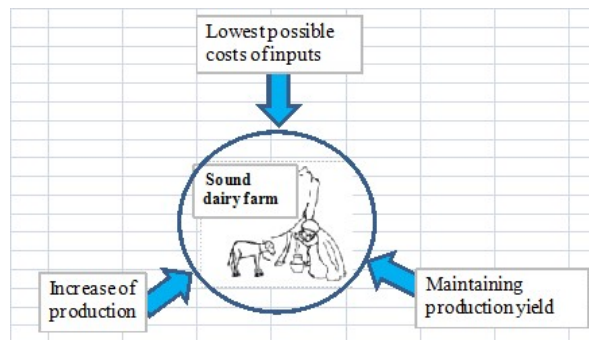


Figure 2-1 Conceptual diagram of sound dairy farm management

2.2 Points to be checked prior to start improving dairy farming

Understand your current dairy farming situation in the first place.

- 1) List up your available assets to understand how much assets you have.
- 2) Know production capacity of your milking cow and buffaloes.
- 3) Fix appropriate number of cattle / buffaloes reared at your farm as well as target milk production of your farm.

2.2.1 Assets of dairy farm

Assets are, land, livestock, facilities and available equipment.

List up all those assets and make their effective use.

Equipment means such as chopper, cattle/ donkey cart for carriage of fodder / water and iron sickle which requires sufficient investment.



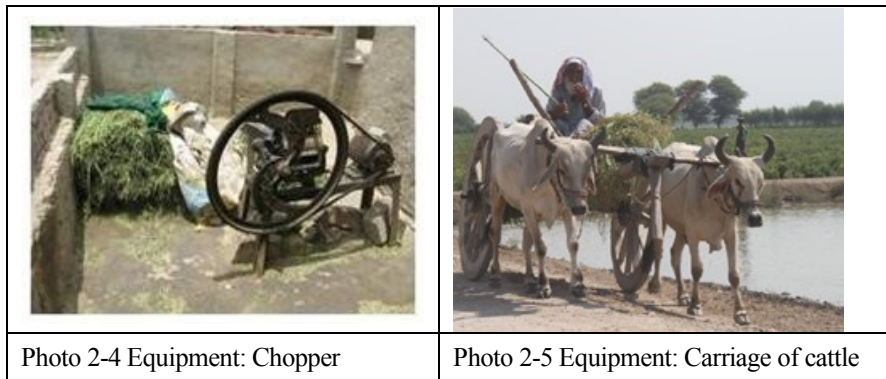
Photo 2-1 Livestock



Photo 2-2 Facilities: Milking shed



Photo 2-3 Facilities: Paddock



2.2.2 Land (Assets)

Check availability of land for fodder cultivation.

a. In case that land is available;

Check if you own land or not, if you have tenant land or not, any other accessible land. Following points need to be checked.

* Total area of land and area used for cultivation of fodder.

* Varieties of fodder cultivated and cultivated area.

b. In case that land is not available;

*Pattern of fodder provision in a year such as quantity and period of green fodder, grazing pattern and period (including possibility).

*For tenant farmers; utilization of natural grass in their tenant lands and possibility of grazing cattle after harvesting of crops in their tenant land.

* Kinds of roughage and quantity purchased from outside

2.2.3 Livestock (Assets)

(1) Knowing production capacity of your milking cow of cattle / buffaloes to develop future plan

Cattle/ buffaloes are considered as assets of the farmer. Check how much income you are getting from livestock assets at your farm. 1) Know production capacity of each buffalo / cow, 2) know how much income each cow / buffalo is bringing to you and 3) fix annual milk production target. To increase number of cow / buffalo just simply imagining increase of income will not bring you successful results.

Before fixing milk production target consider availability of labor force, quantity and quality of roughage daily available at your farm with free of cost as well as possible quantity of concentrates or formula feed can be purchased by your own financial resources should be carefully examined. If you increase number of your cattle / buffaloes without examining these points, milk production per head and reproductivity will be decreased as well. At the end this will result in failure of your dairy business.

1)To know milk production capacity of cow / buffalo

Grasp milk production capacity of your cow / buffalo. Milk production of normal rural cow / buffalo in one lactation is 1,200 Kgs, whereas cow / buffalo in the cattle colony at Hyderabad is 2,400 Kgs. Let's estimate milk production of your cow / buffalo and compare with them.



3 calculation methods are introduced in this text book.

a) 2 points' method

The program developed in Japan for calculating milk production in one lactation. Input following 4 data onto the program and software automatically calculate estimated milk production of each cow / buffalo. One lactation is consists as 305 days.

- a. Milk quantity at its peak period (Kg)
- b. Number of days after the parturition at its peak lactation period (Days)
- c. Milk production during late lactation period (Kg)
- d. Number of days after parturition at its late lactation period (Days)

If you know a capacity / volume of bucket used for daily milking, you can estimate milk production volume. Normally, peak lactation period is considered 2 to 3 months after parturition. After it reaches its peak, milk production gradually decreases and then become dry. Check milk quantity of each cow / buffalo at its peak lactation point, i.e. how many kg you milked. Check how many days after its parturition reaches at peak lactation point. Then, check quantity of milk production in one day between 200 to 250 days after parturition when milk production gradually decreases. With these 2 milking production data, you can estimate milk production of each cow / buffalo in one lactation period.

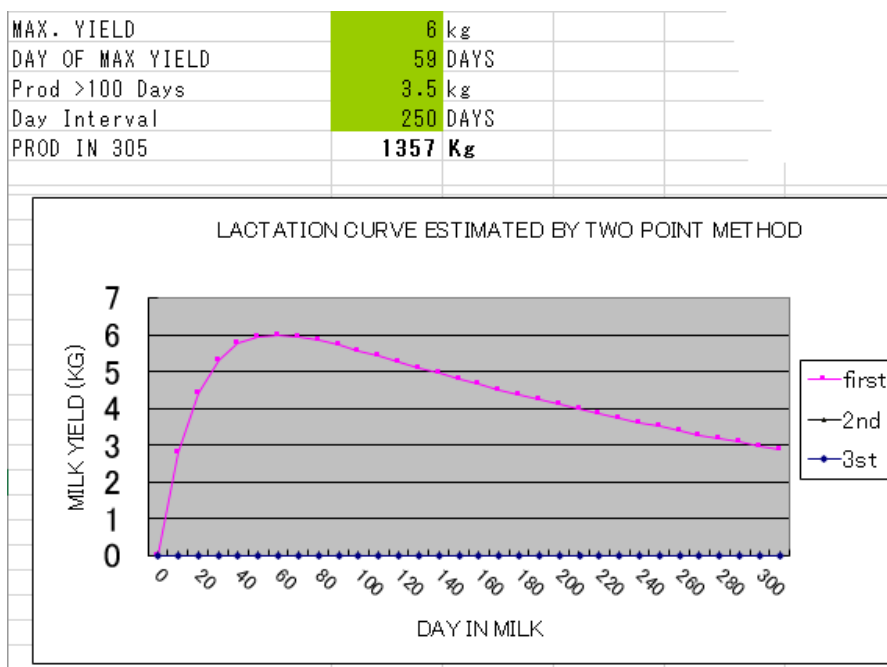


Figure 2-2 Graph using 2 points method

b) In case monthly milk data is available

In case milk test is conducted at your farm and monthly milk data is available, total milk production in one lactation can be calculated with these data. Total milk production is sum of monthly milk production multiplied by number of days.

Suppose a buffalo delivered a calf on 16 April 2015. Milking days for the month of April will be 15 days. Each days of a month will be multiplied by monthly milk data May onwards. For the month of February, i.e. last month, number of days which makes total 305 days will be multiplied by monthly milk data.



Month	Milk (Kg)	Days	Milk(Kg) x day
April	5	15	75
May	6	31	186
June	6.5	30	195
July	5	31	155
Aug.	4	31	124
Sep.	4	30	120
Oct.	3	31	93
Nov.	3	31	93
Dec.	3	31	93
Jan.	2	31	62
Feb.	2	13	26
Total		305	1222

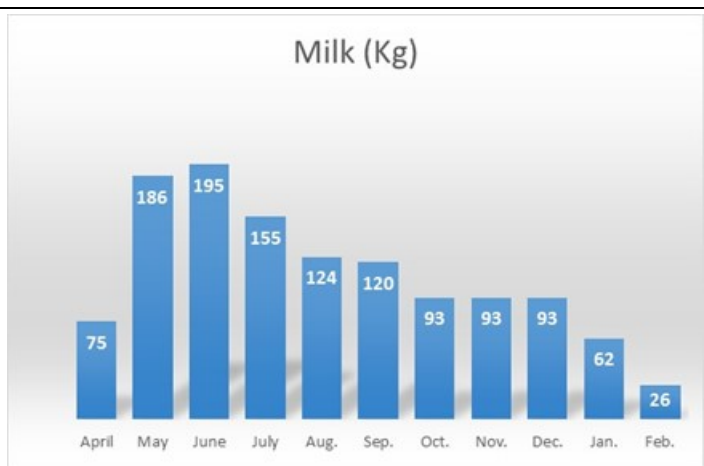


Table2-1 Monthly milk data

Figure2-3: Monthly milk data graph

c) In case of no data and low milk production of cow/buffalo

This method is used for estimating milk production by simple interview, in case of no data and low milk production of cow/buffalo. This is very rough estimation but can grasp approximate milk production of that cow/buffalo.

Check the date of interview comes under the lactation period. Calculate total daily milk production by summing up evening milk production and morning production.

- i) Interviews daily milk production of each cow/buffalo: e.g.) evening milk production of one day before the interview 2 Kg + morning milk production of a day of interview 2 Kg = Total 4 Kg.
- ii) Lactation period is regarded as 305 days. Set a milk test day in any of lactation period. Calculate milk production of whole lactation period as per following method.

*In case milk measurement is carried out in middle lactation period: Interviews milk production 4 Kg x 305 days = 1,220 Kg

*In case milk measurement is carried out at the peak lactation period:(Interviews milk production 5Kg – 1 Kg) x 305 days =1,220Kg

In case milk measurement is carried out in post lactation period: (Interviews milk production 2Kg + 2 Kg) x 305 days =1,220Kgs

*Now you know the milk production of your cow/buffalo.

According to the survey results by the Project, most of cow/buffalo are not producing milk up to their real milking capacity, resulting from insufficient provision of fodder, malnutrition and poor feeding environment.

2) Identifying appropriate number of cattle reared at your farm and setting target milk production of your farm

a) Appropriate number of cattle/buffaloes for rearing

Increasing number of cattle/buffaloes reared at your farm does not always result in increase of total milk production. For example, increase 3 heads of cattle/buffaloes which produce 4kg milk daily on average will not necessarily bring you 12 Kg of milk daily.

It is not easy to identify an appropriate number of cattle/buffaloes for each farm. Appropriate number will



be identified in consideration with availability of labor forces, availability of fodder (both own cultivation and purchase from outside) and financial resources of each farm. If you increase number of cattle/buffaloes without considering these factors, you will not be able to manage your cattle/buffaloes properly, resulting in decrease of milk production yield of each cow/buffalo as well as total milk production at your farm.

b) Setting target for milk production at your farm

You have grasped your income from milk. Let's set target for milk production at your farm. Target is better to set either to maintain current income or to increase it to double or triple.

In case you set your target to increase milk production yield, various technical improvement needs to be done so that your cattle can produce milk at their full capacity. Various technical improvement described in the following section need to be applied at your farm.

Let's study how to identify good capacity of cattle here.

This technology will help you when you introduce new cows/buffaloes to your farm and eliminate low productive cows/buffaloes.

(2) Improvement of milk production capacity of your herd

To improve milk production capacity of your herd, high capacity cows/buffaloes need to be remained and low capacity cows/buffaloes to be eliminated. Low capacity cows/buffaloes should be replaced with high capacity ones. To further improve the capacity of replaced cows/buffaloes, high capacity bull should be used for breeding to produce good capacity offspring.

You must learn how to identify high capacity cows/buffaloes as well as bulls in the first phase.

Let's learn how to identify high capacity cows/buffaloes and bulls.

1) How to identify cows/buffaloes with high milk production capacity

In any case Cow/buffaloes must be healthy. Let's learn how to know about genetic characteristics of those high capacity cows/buffaloes. Having enough volume of udder is one of the most important feature of potential cow/buffalo. If udder is hard, it means that cow/buffalo does not produce good quantity of milk in spite of having good volume of udder. Good udder is one that has elasticity. In case of good elastic udder, tightness will be reduced after milking. Based on the statistics record, cows/buffaloes having thick milk vein and well-developed udder produce good milk yield.

Photo2-6 Good volume udder (side view)	Photo 2-7 Good volume udder (rear view)	Photo 2-8 Thick and well-developed milk vein



* Points to be considered at the time of purchasing cows/buffaloes.

In addition to check udder characteristics which are mentioned above, further ask from the owner / a trader about milk production yield of those dam or sister cow.
Check reproductive condition of a cow well at the time of purchase. Ask skilled veterinary doctor to perform the pregnancy diagnosis of those cows/buffaloes before purchasing for check if they are pregnant or not. In case a cow is not pregnant, check duration after last parturition. .

2) How to identify good capacity bulls

In case of bulls for beef cattle, capacity of bull can be judged from state of flesh and daily weight gain during growing period. Whereas capacity of bull for dairy cow/buffalo cannot be judged from daily weight gain and outer appearance. Instead, progeny test is conducted for identifying good capacity bull which can ensure good milk production offspring. Progeny test examines the milk production capacity of the daughter of that bull.

The bull selected through progeny test is called ‘proven bull’. Use frozen semen of ‘proven bull’ when you opt for artificial insemination.

In most cases, small scale farmers in the project area do not have own breeding bull. Bull of land owners or neighbors are used for breeding and cannot choose a bull as per farmer’s preference.

Artificial insemination for buffaloes are yet not well developed and established in Sindh province. It is ideal that farmers can choose frozen semen of good capacity ‘proven bull’ from bull buffalo catalog and using artificial insemination, which however, takes much time to happen.

Let’s check your breeding bull as much as possible as per following procedure.





- a) Check milk production capacity through interview
 - i) Milk production of dam and sister cow/buffalo.
 - ii) Milk production of daughter cow/buffalo, if any
- b) Check reproduction capacity
 - i) Having desire for mounting (Libido)
 - ii) Having strong legs (easy for mounting)
 - iii) Having healthy eyes
 - iv) Having enough size of testis and equally on both side

[Good bull]

			
Photo 2-9 Testicle equal on both side (Symmetrical)	Photo 2-10 Testicle equal on both side(Symmetrical)	Photo 2-11 Scrotum circumference	Photo 2-12 Strong legs



[Bad bull]

			
Photo 2-13 Testicle is not equal (Asymmetrical)	Photo 2-14 Teared scrotum, Right scrotum was not fully developed.	Photo 2-15 Twisted testicles, left scrotum is inside.	Photo 2-16 Abnormal front leg

2.2.4 Facilities and equipment

Check what kind of facilities and equipment you have, the year and month of acquisition, price and duration of use. Fill that information in the form of table shown below. Then, examine effectiveness of those equipment and facilities to identify issues and come up with necessary measures to be taken. If you have equipment such as chopper and carriage of cattle, fill the year and month of acquisition and price.

Table 2-2 format for facilities and equipment

Name	Square	Quantity	The use number of houses	The time of acquisition			Service life (year)
				Year	Month	Price (Ps.)	
Shed 5 x 4m	20	1	100	2010	November		1
Chopper		1	100	2008			10
Sickle		4	100				

2.2.5 Labour forces

Check how many hours your family member spent on livestock work. Fill it in the following form.

Next, describe work and time by each family member in the table below.

Table 2-3 Family labor

	Main Occupation	Tenant Land, Own Farm work	Livestock work	Hour
Household heads	Management of Land Owner's farm	cultivation	Management	1
Wife Spouse?	House work	7~11 am 2~18 pm	Milking & cleaning	2
1 st son 12 years	Student	4 hours in the morning	Watching on grazing & cutting grass	4
2 nd son 6 years	Student	Helping in agriculture work	Watching on grazing	4



Let's convert labor into money using the data in the above table.

- a. Amount of farm work daily salary in this area: Daily salary divided by 8 hours, wage per hour calculated
- b. Labor per hour: Wages per hour x hour and grasp the amount of the day
- c. For children: Half price of adult's wages (50%)

For example;

- Management of grazing
- Bathing of buffaloes
- Cutting green fodder, Transportation of fodder by cattle carriage or donkey cart, collection of roughage; transportation of roughage and water by cattle carriage or donkey cart
- Vaccination
- Deworming

If you do any of above works together with your neighbors or do it in turn, you can reduce your labor force input and improve your working efficiency.



Table 2-4 Calendar of management animal 24 hours

Calendar of management animal 24 hours (Dairy adult animal)			
Name of Farmer :		Date :	
District :			
Taluka:			
U/C :			
Deh:			
Village:			
Time	An interview of Farmer		Main work In charge, Family member
	Minute	Main Activities	
AM	4	0~	
		30~	
	5	0~	
		30~	
	6	0~	
		30~	
	7	0~	
		30~	
8	0~		
	30~		
9	0~		
	30~		
10	0~		
	30~		
11	0~		
	30~		
PM	12	0~	
		30~	
	13	0~	
		30~	
	14	0~	
		30~	
	15	0~	
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	16	0~	
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	30~		
20	0~		
	30~		
21	0~		
	30~		
22	0~		
	30~		
23	0~		
	30~		
AM	24	0~	
		30~	
	1	0~	
		30~	
	2	0~	
30~			
3	0~		
	30~		

[Format 24 hours' calendar]



2.2.6 Production cost

It might be difficult for you to check cost of your farm production by yourself at this stage. Seek assistance of technician when you check your farm production cost. Once you find unnecessary input at your farm, try to reduce that cost.

2.3 Marketing

2.3.1 Purpose of Livestock Marketing

- The purposes of livestock marketing are to increase farmers' income and improve farmers' livelihood by understanding markets and producing/selling the livestock products which fulfill the market needs with better prices and conditions.
- It is aimed that farmers who don't have knowledge that how and how much their livestock products were sold and are enabled to recognize the market, understand necessary producing techniques and marketing channel as resulting to maximize farmers' benefit/income from their livestock products.

For the purpose, it is important for farmers to have a mind of “produce to consume/sale” instead of “produce then consume/sell”

2.3.2 Basics of Livestock Marketing

Firstly, Veterinary Officers (V/Os) and Stock Assistants (S/As) themselves need to understand basics of livestock marketing. The basics of livestock marketing can be studied as referring the Appropriate Technology Guideline “Guideline for Basics of Marketing and Livestock Marketing”.

2.3.3 Marketing of Milk

(1) To understand the market

1) V/Os and S/As needs to understand the market

V/Os and S/As needs to know the market information such as milk purchasing / selling price at tea shops / milk shops at the nearest village / town/ city from their target villages. The below table has been used as a monthly data collection by the JICA project named “The Project on Sustainable Livestock Development for Rural Sindh”. The market information at major towns should be confirmed by V/Os and S/As themselves before they start extension activities for marketing.

Table 2-5 The market information collected through the monthly data collection

Shop name (location)	Milk purchasing volume	Milk purchasing price	Major purchasing channel	Sales volume	Selling price	Possibility to buy milk
xxx dairy shop (Kali Mori, Hyderabad) 0315-xxxx-xxx	80L	Rs.67.5/L	M/M from xx village	Milk: 40L Yogurt: 25L	Milk: Rs.80/L Yogurt: Rs.100/kg	Possible if quality is good



2) Let farmer understand the market

Although a few farmers understand the market information indicated in the above table, majority of farmers don't know it. Therefore, it is important to support farmers to let themselves understand the current market situation, identify marketing possibility, and start to take an action. For the purpose, let's implement the marketing workshop for farmers. The basic procedure of the marketing workshop is summarized as the Appropriate Technology Guideline "Guideline for How to Conduct Marketing Workshop for Milk and Bi-products".

V/Os and S/As discuss with farmers how farmers can improve their milk marketing channels by implementing the marketing workshop as referred in the guideline and sharing marketing success stories of P/F and others. The success stories of marketing are summarized as the Appropriate Technology Guideline "Guideline for Case Study and Potential Marketing Model".

(2) To produce milk according to needs of market

Finding better milk purchasers such as middlemen, shops, nearby households and dairy companies for better price is not the only way for marketing. For finding better purchasers, farmers have to take few steps. Farmers have two following challenges which can be overcome by themselves.

1) To produce good quality milk

* "Good quality milk" includes a) no adulteration and b) hygienic milk with high fat %

2) To produce and deliver sizable quantity of milk

* It can be realized by not working individually but joint group collection and delivery with farmers' neighbors or villagers

Milk buyers are usually looking for those conditions mentioned above 1) and 2).

If you can produce milk matches with 1) and 2), buyers will definitely approach farmers and farmers can sell their milk with higher price to buyers.

* Start thinking this option

* "Think" what you have to do to fulfill the above conditions

1) To produce good quality milk

a) No adulteration

Suppose you are consumers of milk.

Which milk you prefer to drink, i.e. either pure milk or adulterated milk with water?

Let's try to produce good quality milk you and your villager can be proud of it!

If you do not adulterate milk, trust of consumer / buyer will be increased. At the end you will get good milk price.

b) Hygienic milk




For hygienic milk production, milking shed facilities needs to be prepared so that milk will not



contaminated with rain and dust. For the purpose, a) set up of roof and b) improvement of floor are required.




i) Roof

Any material can be used for roof making but it is preferable to use material which makes a place cool down in summer and warm up in winter. Specifically, thatched roof, reed stalk roof, and roof with slate can be used. Roof should be higher as much as possible for better ventilation. The length of post behind of the roof should be 2.5 meter, and the front post should be 3 meters for better ventilation. The roof need to be designed that, sunshine could reach under the roof at least once a day to dry the floor.

		
Photo 2-17 Thatched roof	Photo 2-18 Reed stalk roof	Photo 2-19 Roof with Slate

ii) Floor

Any material is fine for floor, for example bricks, block and concrete slab can be used. In some cases, mud also can be used. Mud needs to be pounded and harden to make the floor higher than the ground. Front side of the floor needs to be fixed to higher elevation from the ground for better drainage. Floor should be cleaned every time before milking, during and after milking to avoid dust coming into milk.

		
Photo 2-20 Bricks	Photo 2-21 Concrete	Photo 2-22 Block

(Concrete slabs for floor making of the milking shed)

The Project developed concrete slabs for flooring of the milking shed (Photo2-23). Concrete slabs can be purchased at shops in pilot districts which shown in the Table2-6. Concrete slabs have ditches to prevent animals from slipping. The price is 350 Rs. per piece as of April 2018. Twenty inches width, 40 inches length, 2 inches thickness, concrete slabs has built-in reinforcing with strong iron steel rod. A farmer can purchase them according to their need whenever s/he can afford to purchase and lay them gradually on floor of animal shed, paddock and place for bathing. Prior to lay concrete slabs, compact a land with tools shown in the Photo2-24. Make slight slope on floor to drain water.



Photo 2-23 Concrete slabs developed by the Project



Photo 2-24 Tools for floor preparation

Table 2-6 List of shop for concrete slab in Project Pilot Districts.

District	Name of Shop	Address	Contact Number
Matari	Shaikh Iron Store, Shop	Benazir Choke, New Saeedabad, Matari	0300-8378841
Hyderabad	Pehlwan tile, pipe works	Opposite Bhatti Road, Near Ghanghra Mori, Mirpur Khas Road, Hyderabad	0345-3591642
Tando Muhammad Khan	Talpur Iron Shop	Near Gaja Bridge	0313-4345446
Tando Allahyar	XXXX	XXXX	XXXX
Badin	XXXX	XXXX	XXXX

(Example for improvement of floor at pilot farm)

As shown in Photo 2-25, the floor of the paddock was made up of soil in front of the animal shed. Soil was soft and mixed with dung, which makes difficulty in cleaning of floor. After placing the concrete slabs as shown in Photo 2-26, cleaning of the floor became easy, so the floor remains dry and clean all the time.



Photo 2-25 Floor before improvement



Photo 2-26 Floor after improvement



iii) Protection against strong wind

Confirm major wind direction of storms in a whole year and build a removable wall to the windward of those storms. Common local materials such as waterside weeds, other wild grass and sugarcane top can be used as materials for the wall. In addition, vinyl sheets can also be used if necessary.

Photo 2-27 Twig	Photo 2-28 Sugarcane top	Photo 2-29 Reed

2) To produce and deliver sizable quantity of milk

If it is difficult to produce and deliver sizable quantity of milk for an individual farmer, it can be realized by joint group collection and delivery with farmers' neighbors or villagers. Let farmers think any possibility if there is any farmers group such as relatives and/or neighbors which may enable collectively sell their milk.



Chapter 3 Feed and Feeding Management of cattle/buffalo

Let's learn basic knowledge about full capacity of cattle/buffalo and produce expected milk quantity.

First, learn about fodder, and second, learn about proper feeding management for cattle/buffaloes before, during and after parturition.

3.1 Kinds and use of fodder

3.1.1 Roughages

Cattle/Buffalo is originally herbivores. Roughage is an essential feed for keeping healthy Cattle/Buffalo.

Roughage has a lot of fibers and its nutritional value is relatively low, but it is important to activate and normalize rumen function.

- | |
|--|
| <p>a. Rice straw and wheat straw (Dry Fodder)
It is low water content and low in nutrient.</p> <p>b. Green grass (Green Fodder)
It is high water content and relatively has many nutrients.</p> <p>c. Mixed feed of dry fodder and green fodder
This feeding method is very common in Pakistan. It is good method that to mix green fodder, which is containing much water and comparatively high in nutrients, and straw which is containing less water and low in nutrients.</p> |
|--|

Photo of roughage



Photo 3-1 Rice straw: low water content and low in nutrients



Photo 3-2 Wheat straw: low water content and low in nutrients



Photo 3-3 Green grass: High water content and relatively many nutrients



Photo 3-4 Mixed feed of green fodder and wheat / rice straw



Elephant grass, sometimes called as Mott grass, can be grown from cuttings. Elephant grass grows quickly and has high adaptability to environment; therefore, it is easy to grow and manage. Farmers who have own irrigated lands can grow elephant grass in an irrigated field. Landless farmers can grow it in the footpath between fields, empty lot, and empty land near their houses and so on. It stops growing in the cold weather season whereas it grows faster when temperature increases. Plant elephant grass with enough quantity of manure. Give supplementary manure once in 2 years. Plenty of green leaves and protein can be obtained when it is cut under the 130 cm plant height. It will grow up to 2.5 to 3 meters height. Stem of such high height plant become hard and nutritious value is less. Farmers have to be careful about the height of elephant grass for better utilization for animal fodder.



Photo 3-5 Ideal height of grass



Photo 3-6 Planting of cutting stem



Photo 3-7 Overgrown stem, low nutritive value

3.1.2 Concentrate and Formula Feed

Concentrate is feed to produce more milk. It has low water content and rich in nutrients. This feed is very important for dairy animals.

There are many kinds of concentrate and it has different nutrient value for each kind. Common concentrates in Pakistan are cotton seed cake, wheat bran, rice bran and sunflower cake, etc. A lot of farmers in Sindh province are traditionally using one kind of concentrate or mixed concentrate. Formula feed consists of some kinds of concentrate, salt and mineral to fill the target nutrient value. The main formula feed has milking, fattening, growing and calf rearing etc..

Photo of concentrate



Photo 3-8 Concentrate is necessary for milk production.



Photo 3-9 There are many kinds of concentrate.



Photo 3-10 Formula feed making



Photo 3-11 Example of formula feed

3.1.3 Example of the feeding to maximize milk production

Necessary amount of feed should be given to milking animals to increase milk production by combination of roughage and concentrate.

Roughage should be given to buffaloes to maintain their body according to the body weight.

Concentrate or formula feed should be given to buffaloes to produce milk according to milk volume.

(1) Feeding of roughage

Basically, roughages are provide to satisfy the hunger of animal.

<Way of thinking and calculation of feeding amount>

To prepare proper amount of roughage, it is necessary to know a rough estimate of required amount of roughages to be fed.

Roughage (dry matter) equal to minimum 1% of body weight need to be fed to milking animals. For instance, 4kg weight of roughage (dry matter) needs to be fed to 400 kg body weight animal. Percentage of dry matter varies in roughage types. Simple calculation is required to calculate required quantity of roughage.



The Project developed reference table for estimation of body weight for Breed of Kundhi and Kundhi cross. Body weight can be estimated from heart girth of animals. Farmers can easily estimate body weight of buffalo by measuring heart girth with reference to the table in the page 73.

Roughage can be weighted with simple spring balance. Please try it.



Photo 3-12 Measuring roughage with spring balance

(2) Exercise:

1) Ingredient table of fodder

According to the ingredient table of fodder, percentage of dry matter of natural grass and wheat straw are 20 % and 90% respectively.

Table 3-1 Ingredient table of fodder

Name of roughage	Dry Matter (%)
Natural grass	20%
Wheat straw	90%
Sugar cane top	30%

2) Body weight of targeted milking buffalo

Measure a heart girth of targeted milking buffalo. In case heart girth is 179 cm, body weight is estimated as 403 kg according to reference table. Suppose body weight is 400 kg.

3) Required quantity of intake fodder for milking buffalo

Required dry matter intake quantity is calculated as 1% of body weight.

1% of 400kg body weight is 4 kg. For a 400 kg body weight buffalo, 4 kg dry matter needs to be fed.

4) Calculation of intake quantity of natural grass

Dry matter % of natural grass is 20% according to fodder ingredient table.

$$4 \text{ kg (required intake of dry matter)} = X \text{ kg (required natural grass)} * 20\% (0.2)$$

$$X \text{ kg} = 4 \text{ kg} \div 20\% (0.2)$$

$$X = 20 \text{ kg}$$



5) Calculation of intake quantity of wheat straw

Dry matter % of wheat straw is 90% according to fodder ingredient table.

$$4 \text{ kg (required intake of dry matter)} = X \text{ kg (required wheat straw)} * 90\% (0.9)$$

$$X \text{ kg} = 4 \text{ kg} \div 90\% (0.9)$$

$$X = 4.4 \text{ kg}$$

6) Calculation of intake quantity of sugar cane top

Dry matter % of sugar cane top is 30% according to fodder standard table.

$$4 \text{ kg (required intake of dry matter)} = X \text{ kg (required sugar cane top)} * 30\% (0.3)$$

$$X \text{ kg} = 4 \text{ kg} \div 30\% (0.3)$$

$$X = 13 \text{ kg}$$

Table 3-2 Standard quantity of roughage feeding to a 400 kg body weight milking buffalo

Roughage	Amount of feeding
Natural grass	20 Kg
Sugar cane top	13 Kg
Wheat straw (50%) + Natural grass (50%)	2.2 Kg+ 10Kg =12.2 Kg
Wheat straw only	4.4 Kg

Above mentioned amount of roughages are minimum necessary feed intake amount for buffaloes/cows.

(3) Formula feed for milking animals

1) Formula feed for milking buffaloes/cows developed by the Project

The Project designed formula feed with local available concentrates. The model 1 and 2 developed by the Project are shown in the Table 3-3. Model 1 contains cotton seed cake. Later, the Project found that imported soybean cake was available in the local market in Hyderabad with comparatively reasonable price. In Model 2, therefore, good quality soybean cake are used instead of cotton seed cake. Cotton seed cake causes aflatoxin toxicity. By replacing with soybean, aflatoxin toxin affects can be avoided. Adding essential vitamins, salt minerals in formula feed is nutritious and balanced feed for milking buffaloes.

Table 3-3 Formula feed designed and produced by the Project

	Model 1	Model 2
Name of Feed	Mixed proportion %	Mixed proportion %
Maize crush	10	25
Wheat (Crush)	5	20
Cotton Seed cake	13	0
Rice polish	6	0
Wheat Bran	35	30
Sunflower Seed	30	17
Soybean	0	7
dcp(Bone meal)	1	1
Total	100	100
TDN:	67.0	74.9
CP:	18.0	18.4

3) Standard feeding of formula feed for milking buffaloes/cows

Basically formula feed for milking buffaloes/cows should be provided accordingly to milk production volume.

In case of high capacity milking cows in Japan and other developed countries, 1kg of formula feed is given to a milking cow per 3kg of milk production volume. However, in case of Pakistan, 1kg of formula feed should be given to a buffalo/ Zebu cow per 2kg of milk production volume. Therefore, 5kg of formula feed should be given to a buffalo/Zebu cow per 10kg of milk production volume.

3) The effect of formula feed, -Milk volume was doubled at pilot farms-

The Project is working in 5 pilot districts, namely, Matiari, Hyderabad, Tando Allahyar, Tando Mohammad Khan and Badin. Twenty-five small scale and medium scale pilot farms (P/F) were selected from above cited districts for verification of appropriate technologies developed by the Project.

The survey conducted before the Project’s intervention and found that 92% of P/F either are using or had ever used concentrate available in a local market. However, all P/F had never used formula feed. Formula feed is well-balanced mixture of concentrates whose nutrients value is guaranteed.

The Project developed formula feed for milking whose crude protein (CP) was more than 18%, Total digestible nutrients (TDN) was more than 72% with essential minerals. The Project conducted feeding trial of formula feed to maximum 2 heads of buffaloes at each P/F for 2 years and 8 months.

The results of the trial were shown in Table 3-4.

Table 3-4 Results of formula feed trial

	Average milk production per lactation (305 days)	Average milk production per day
Buffalo fed with formula feed (45 heads)	2,672 kg	8.8 kg
Buffalo without formula feed (18 heads)	1,443 kg	4.7 kg



Photo 3-13 Milking buffalo by farmer with smiling face.

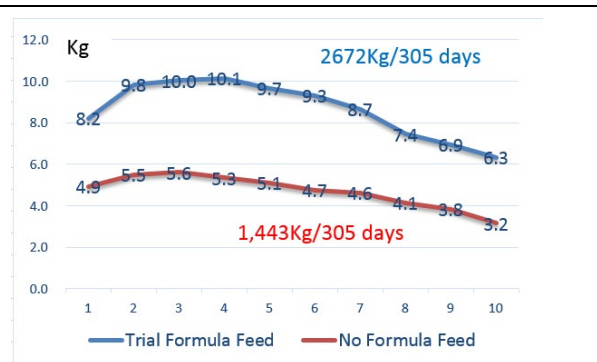


Figure 3-1 Blue line indicates the buffalo fed with formula feed and milk production becomes double, whereas the red line indicates low milk production without formula feed).



3.2 Feeding management before, during and after parturition

3.2.1 Before parturition

Start feeding formula feed before parturition. It is called ‘pre-feeding’.

Start feeding formula feed at latest 3 weeks prior to parturition so that an animal get used to those formula feed. There are various microorganism such as bacteria and protozoa in rumen of animals, which helps fermentation and decomposition of feed. Starting provision of formula feed prior to parturition allow microorganisms adjust themselves with new formula feed so that feed digestion become smooth from a beginning of lactation period. Start initial feeding of 1 to 2 kg per day and increase quantity of formula feed gradually. If an animal is emaciated, feed can be provide upto 3kg per day. However, the maximum quantity should not exceed 3kg per day. The feeding of formula feed should be maintained same till the time of parturition. Feeding formula feed before parturition is important to achieve ideal milk production.

Table 3-5 Formula feed table (before parturition)

	Condition Nutrition	Fatty	Normal	Emaciated
Dry	Before Delivery (3 weeks)	1 kg	2 kg	3 kg

3.2.2 Time of Parturition

Preliminary preparation is important.

In case an animal give a birth in daytime, bring it to shady cool place. If a delivery is in night time, bring it to place near caretaker’s residence so that caring of an animal could be easy. Make treatment immediately in hygienic manner. Make sure beforehand which veterinarian doctor is to be contacted at time of emergency such as difficult delivery.’ Placenta usually is discharged 6 to 8 hours after delivery. In case placenta is not discharges even after 12 hours after delivery, it is retained placenta. Call veterinary doctor for necessary treatment.

3.2.3 After parturition (Milking period)

(1) Feeding roughage

1) Provide good roughage

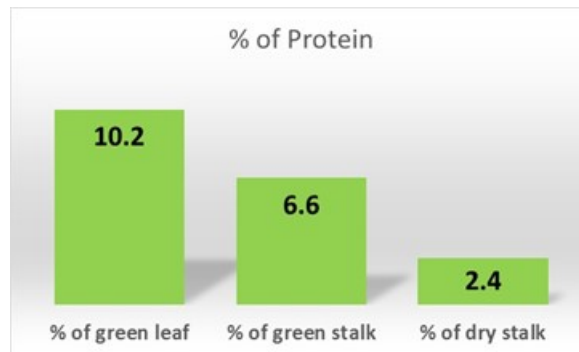
Roughage is important for ruminant animals. Good quality roughage should be given to the animals as much as possible.

It is very difficult to provide good roughage both in quality and quantity constantly throughout lactation period in Sindh province. However, provide nutritious green grass which animals like as much as possible. In case of natural grass, nutritious grass is such as “chabbar” which has many green and soft leaves. Quality of roughages deteriorates in winter. It is recommended to mix legumes Egyptian clover (Berseem) or alfalfa (Lucern) with roughages for providing necessary protein to animals.

Green -leafy roughages should be provided to the animals. Green leaves contain much crude protein.

Comparing crude protein contents of green leaf, green stalk, and dry stalk, the green leaf contains highest

percentage than green stalk and dry stalk. Good roughage means the green grass with a lot of green leaf. Figure 3-2 is shown crude protein contents of Signal grass (*Brachiaria Decumbens*) in Bolivia. Percentage of crude protein in green leaf, green stalk and dry stalk are 10.2%, 6.6% and 2.4% respectively.

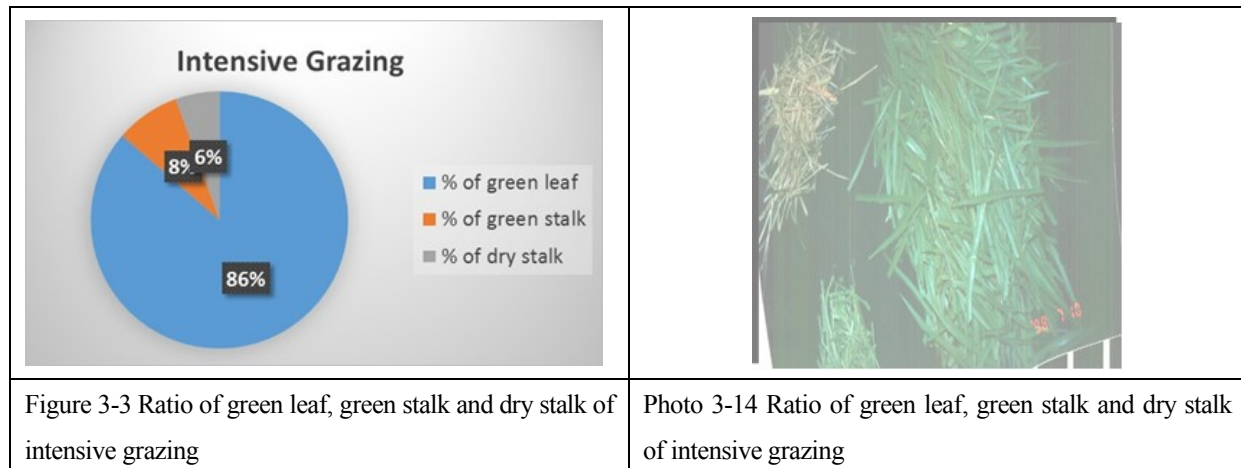


Source: The Beef Cattle Improvement Project in the Republic of Bolivia, Dr. Hideo Tominaga

Figure 3-2 Percentage of crude protein in different parts of grass

Intensive grazing increases a change to intake green leaves and helps to increase nutritive value of feed.

Intensive grazing means that rotation of pasture and suspension frequently. If it is continued that the ratio of green leaf in grazing area per unit will increase. Crude protein will also be increased. Grass in the intensive grazing area for one square meters were cut and sorted into green leaf, green stalk and dry stalk. After that each bunch of the parts were measured a weight. Look at Photo 3-14. You will see a lot of green grass. Ratio of green leaf in intensive grazing area was 86.2%. Green stalk was 8.3% while dry stalk was 5.5%.



Source: The Beef Cattle Improvement Project in the Republic of Bolivia, Dr. Hideo Tominaga

Extensive grazing increases a chance to intake stems and causes to decrease nutritive value of feed.

On the other hand, extensive grazing is long-term suspension of grazing until grass height will be tall. In this case, total weight of fresh grass was increased, however, green stalk was 74.5% and green leaf which have crude protein was only 17.5%. Dry stalk was 8.9%.

<p>Extensive Grazing</p> <ul style="list-style-type: none"> 17% % of green leaf 75% % of green stalk 8% % of dry stalk 	
<p>Figure 3-4 Ratio of green leaf, green stalk and dry stalk of extensive grazing</p>	<p>Photo 3-15 Ratio of green leaf, green stalk and dry stalk of extensive grazing</p>

Source: The Beef Cattle Improvement Project in the Republic of Bolivia, Dr. Hideo Tominaga

2) High nutrient roughage

<p>Photo 3-16 Natural grass chabbar</p>	<p>Photo 3-17 Eating chabbar with relish</p>	<p>Photo 3-18 Maize, high protein contains in unripe maize</p>

<p>Photo 3-19 Harvesting berseem (Egyptian clover)</p>	<p>Photo 3-20 Harvested berseem</p>	<p>Photo 3-21 Cotton stalk and leaves contains high protein</p>

3) Low nutrient roughage

<p>Photo 3-22 Dried up maize stalk</p>	<p>Photo 3-23 Wheat straw</p>	<p>Photo 3-24 Sugarcane top residues</p>



(2) Feeding formula feed

If profit from milk selling is higher than the cost of formula feed, you will be in surplus. In future, the Project expected that the farmers will buy formula feed by own expenses and obtain more profit from milk production.

Quantity of formula feed

Quantity of formula feed is designed accordingly to nutritious value as body condition and milk production of an animals. Normal condition of animals will be fed with formula feed with quantity prescribed in the middle column below table 3-6. If an animal is fatty, provide the quantity in the left column, whereas in case of weak animals, quantity will be given shown in the right column.

Table 3-6 Formula feed provision table (after parturition)

	Condition Nutrition	Fatty	Normal	Emaciated
Milk production	Milk Prod. Up to 2 Liter	1 Kg	1 Kg	1.5 Kg
	Milk Prod. 2.1~4 Liter	1.5 Kg	2 Kg	2.5 Kg
	Milk Prod. 4.1~6 Liter	2.5 Kg	3 Kg	3.5 Kg
	Milk Prod. 6.1~8 Liter	3.5 Kg	4 Kg	4.5 Kg
	Milk Prod. 8.1~10 Liter	4.5 Kg	5 Kg	5.5 Kg
	Milk Prod. More than 10 Liter	5 Kg	5.5 Kg	6 Kg



Photo 3-25 Technical guidance to feed proper volume of formula feed



Photo 3-26 Formula feed provision during milking time

(3) Quantity of formula feed to be fed should be decided in consideration with the quality and quantity of roughage to be fed to animals.

First of all, it is important to know the quality and quantity of roughages.

It is not possible to grasp actual stages of roughages (Vegetative, Flowering, Fruit development) provision of each seasons and of each farm correctly and precisely. The project, therefore, presume quality and quantity of roughage provision at a farm with following 3 patterns. 1) Good quality with enough quantity, 2) Mediocre quality with little shortage of quantity and 3) Bad quality with huge shortage of quantity.

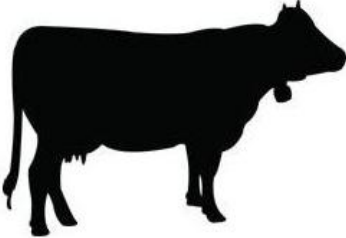


Let's feed the formula feed for milking animals according to the pattern of roughage provision in a proper manner..



1) Provision of roughage: In case roughage is good quality with enough quantity

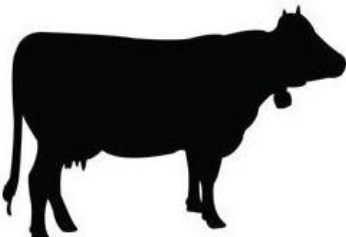


100% of energy to maintain the body can be obtained from roughages and 50% of energy can be obtained from roughage to produce milk.

In this case the 1/3 quantity of formula feed is sufficient which is shown table 3-6 previous page. For instance, normal body condition animal having 5kg milk production per day requires supply of 3kg formula feed whereas same animal fed with enough quantity of good quality roughages requires only 1/3 of prescribed quantity of formula feed, namely, 33% of 3 kg nearly equals to 1kg.

Provision of Roughage	100% energy to maintain body can be obtained from roughage only.	A part of energy to produce milk can be obtained from roughage.	Quantity of formula feed is given 1/3 of the above cited table.
1) Good Quality 2) Sufficient Quantity			

2) Provision of roughage: In case roughage is mediocre quality with little shortage of quantity

100% of energy to maintain body can be obtained only from roughage. 100% of energy can be obtained from formula feed for producing milk. Therefore, the quantity of formula feed should be provided according to the figure given in the middle column of the table. For instance, normal body condition animal having 5kg milk production per day requires supply of 3kg formula feed.

Provision of roughage	100% energy to maintain body can be obtained from roughage only.	Energy to produce milk cannot be obtained from roughage.	Formula feed is given according to the table above.
1) Quality is mediocre 2) Quantity is less than enough			

3) Provision of roughage: In case roughage is bad quality with huge shortage of quantity

Only 50% of energy to maintain body can be obtained only from roughage. Remaining 50% of energy for body maintenance and 100% of energy for producing milk needs to be obtained from formula feed. Therefore, quantity of formula feed provided according to the figure shown in left column of the table. For

instance, normal animal body condition having 5kg milk production per day requires supply of 3.5kg formula feed.

Provision of roughage	Energy to maintain body can only partially filled by roughage. (white parts represent deficit of energy)	Energy to produce milk cannot be obtained from roughage.	Formula feed for emaciation condition in the above table is shown. In some cases, more quantity of feed is given to an animal, if necessary.
<p>1) Quality is bad</p> <p>2) Quantity is not enough</p>			

(4) Feeding (Pre-feeding and Lead feeding)

Let's learn about pre-feeding and lead feeding to maximize good effect of feeding. It might make you confuse, but you can do it if you are motivated. Before start pre-feeding and lead feeding, let's understand standard milk production curve.

Standard Feeding for milking buffalo is shown in Figure 3-5. Below diagram shows relationship between milk production, quantity of given formula feed and body condition of animals. The milk curve in diagram shows milk curve of 10 months of the lactation that is ideal milk production peak. (4 boxes in a column indicates one month)

Comparison of milk production, supply of formula feed and body condition of a buffalo are shown in Figure 3-5. Yellow part shows the milk production.

When enough formula feed is given to animals with proper feeding management, buffaloes can produce their full capacity of milk production and it can show this type of ideal milk curve.

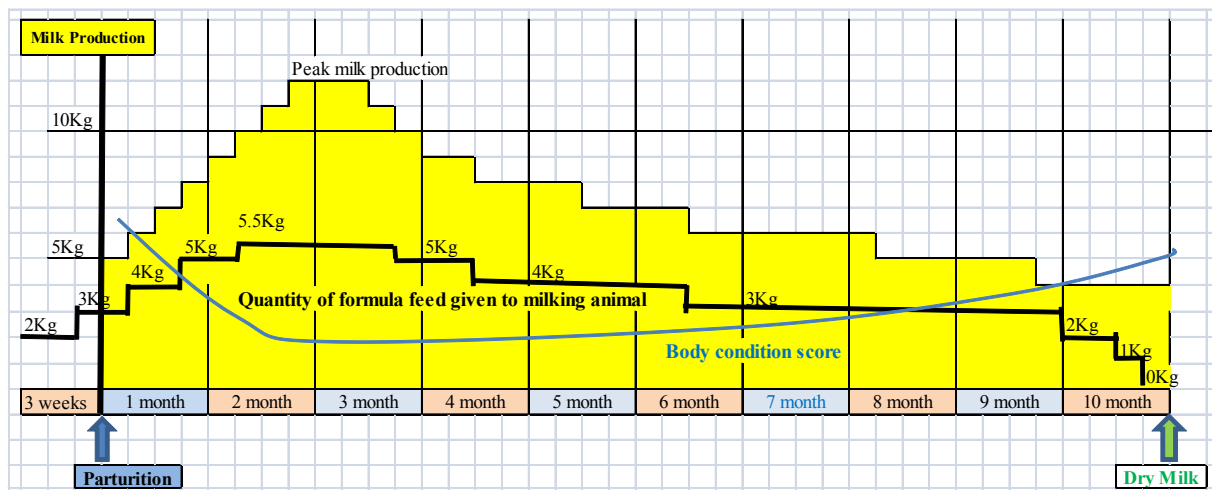


Figure 3-5 Standard Feeding for milking buffalo



1) Pre-Feeding

At least 3 weeks before parturition, formula feed should be given to a cattle/buffalo to be familiar with existing bacteria and protozoa in the rumen. It is recommended to start from 2 kg per day and increase the volume of feeding up to 3kg per day.

2) Lead Feeding

After parturition, milk production will be increased gradually. Therefore, formula feed should be increased accordingly with milk volume. So it is called lead feeding. The peak level of milk volume will be reached at 2 to 3 months after parturition. During this period, milking animal cannot produce milk from energy obtained from feed only. Thus, cattle/buffalo utilizes accumulated nutrients of their body for producing the milk, which results the losing of body weight. Blue line of Figure 10 shows Body Condition Score (BCS) Curve. It will be declined gradually after parturition. When milk production declines after peak level, a cow cattle/buffalo will start to re-gain weight. From this stage, the volume of formula feed should be reduced.

3.2.4 Dry period management

Dry period is important for normal functioning of mammary glands, that should be at least 30 days.

When milk production of animal gradually decreases towards post lactation period, reduce the quantity of formula feed supply gradually.

At last, only roughage should be given to a cattle/buffalo and continued milking for few days. Milk production will be reduced and udder started to shrink. This is appropriate time to stop milking and start of dry period.

Dry period is important for resting udder and renewing mammary gland cells for next lactation.

3.3 Other challenges for increase milk production

Ideal milk curve and stable milk production are proof that your cattle/buffalo is showing their capacity.

To realize ideal milk curve, good quality of formula feed needs to be supplied accordingly to animal milk production. However, ideal milk curve cannot be obtained only by that. There are many other factors which affect milk production of animals. Let's look into those factors and try to improve those factors.

3.3.1 Enough drinking water

Does your milking cattle/buffalo drink enough fresh water?

It is very important to give enough and fresh water to a cattle/buffalo because it will directly affect milk production volume.

(1) Required amount of drinking water

Requirement of water per day varies with temperature, breed and milk volume.

According to the reference, water requirement of each breed are as follows. It is necessary to give enough water to animals.

*Holstein: 60 liters (Winter:100 ~Summer:150 liters)



*Cross breed of European breed and Zebu breed :60~80 liters

* 6~10 liters of water are required to produce 1kg of milk

(2) Methods of Water supply

There are 2 ways for water supply, namely, free water supply and limited water supply.

1) Free water supply

If you prepare a big water trough to put water which a cattle/buffalo cannot consume it one time, you will achieve the target to secure the water for a cattle/buffalo, however, there is a disadvantage. If you don't wash it regularly, water will be dirty. Then, it will be harmful for animal health. Frequency of water container cleaning depends upon season and size of the container. It is very important to decide frequency of cleaning and wash the water container regularly. To recover a disadvantage of the big water container, Water cup has been used in the developed countries. It is a small container with 30 cm diameter. If a cattle/buffalo push a small bar, water will come out on the cup. Therefore, a cattle/buffalo can drink fresh water every time. If you have tap water, it is easy to install and use it. The price of water cup is low.

Example of water trough for free water supply:

Photo 3-27 Drum water trough	Photo 3-28 Concrete water trough	Photo 3-29 Water Cup

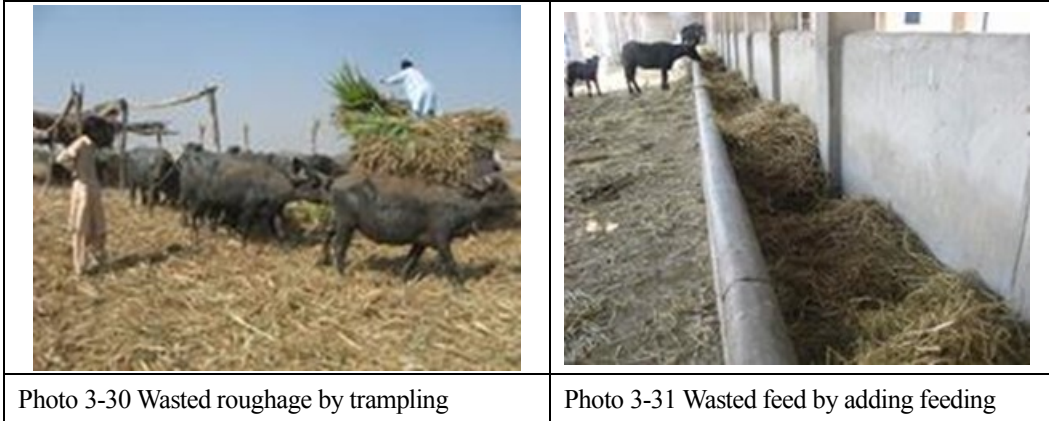
2) Limited water supply

In case of rural farmers, limited water supply which three times per day morning, daytime and evening is common practice. It is recommended to increase one time before you sleep.

3.3.2 Cleaning of feed trough

Leftover in feed trough should be thrown away every day. Do not give leftover to a cattle/buffalo again.

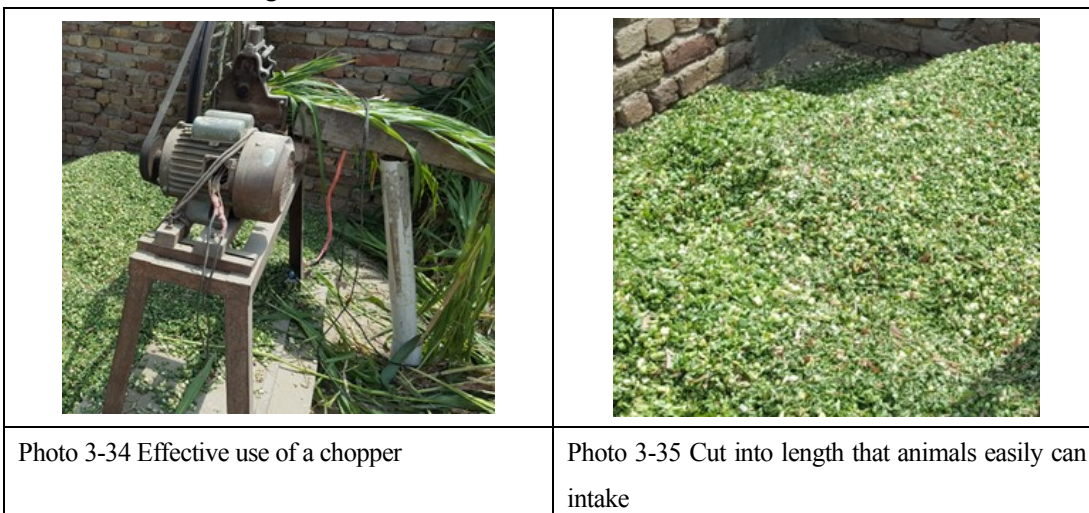
It is very important that leftover feed (roughage and concentrate) should be thrown away and fresh feed should be given to a buffalo. It is also important that try to grasp daily feed consumption of a cattle/buffalo through daily observation and avoid to have leftover as much as possible.



3.3.3 Length of roughage

It is important that make a cattle/buffalo eating roughage as much as they can. Length of roughage will affect this.

If you have a chopper, cut roughage in the length of 1 – 2 cm. If you don't have the chopper, cut grass with knife and/or sickle in the length of 5cm.





3.3.4 Countermeasure against heat

It is important to secure the place where cool with good ventilation and cool the body of a buffalo by bathing or sprinkle water. It is also important not to expose buffaloes to direct sunshine in the hot season.

There are many microorganisms and bacteria in the rumen. They will decompose hard fiber of plants. Rumen capacity of cow cattle/buffalo is 200 liters. Rumen is like a fermentation machine and radiates a lot of heat.

Heat stress of cattle/buffalos will increase if temperature is high because rumen is radiating heat. In this situation, cattle/buffalo cannot show their capacity and produce expected milk production.

(1) Shade with good ventilation

Wind direction should be check in each season. In summer season, you need to tie your cattle/buffalo where no high walls or other obstacles in wind direction.

*In case of tree shade: tree which has many leaves such as mango is better than a tree which does not have many leaves such as acacia because it will provide good shade for animals.

*In case of simple roof: a high roof has good ventilation. It should be improved or newly installed. If you incline roof by using poles its height at least 2.5m as rear poles and more than 2.5m as front poles, you will get good ventilation.



Photo 3-36 Mango trees



Photo 3-37 Tying buffaloes under the tree shade with good ventilation



Photo 3-38 Roof with good ventilation

(2) Bathing

Buffalo needs bathing. Compared to zebu cattle, buffalo is less resistant against heat. Bathing is, therefore, important for buffalo to produce consistent quantity of milk.

Bathing is highly effective than a shower to cool body temperature of a buffalo down. For bathing, a deep place is better than a shallow place. Try to find the deep place for bathing. However, if the bathing place is far from your resident more than 30 minutes by walk, you should not go for bathing because a buffalo will lose their energy.

<p>Photo 3-39 Bathing in shallow water (Second-best)</p>	<p>Photo 3-40 Bathing in deep water. Animals can soak whole body into the water. (Ideal)</p>

(3) Shower

If there is no proper place for bathing or a bathing place is very far, use a shower to cool the body of a buffalo down. During hot hours in a day, the shower should be given to a buffalo multiple times with intervals.

There are two methods for a shower. One method is that directly shower water from a hose. Another method is using buckets. You have better stop to give a shower for a buffalo at tying place because the floor will be wet and sanitary condition will be getting worse. After securing a shower place, maintain floor and make drainage. Floor will be improved easily by materials such as brick, block and logs. If you give a shower to a buffalo at tying place, it will be better to use a knapsack type sprayer so that you can avoid wetting the floor.

<p>Photo 3-41 Shower with water hose is less effective</p>	<p>Photo 3-42 Floor improvement of shower place</p>	<p>Photo 3-43 Knapsack type spray</p>

3.3.5 Facility for dairy farming

(1) Simple milking shed

The Project developed the simple milking shed made of MS pipes. In consideration with strength level of MS pipes, light weight reeds are applied as roof materials instead of heavy bamboos. For a floor, concrete slab designed by the Project is applied (refer to page 17).



1) Materials and cost

Simple milking shed for 4 numbers of milking buffaloes are shown in the Figure 3-7 to Figure 3-10. Materials used for this shed are shown in Table 3-7.

Table 3-7 Materials and cost for Simple milking shed construction

Name of materials	Spec of materials	Number of required piece	Unit price (Rupees)	Subtotal (Rupees)
MS pipe	Diameter 48mm Thickness 3mm Gauge 10 Length 20 feet (6m) See Photo 3-44	18	2,400	43,000
Universal cramp	See Photo 3-45	34	285	9,690
Fixed cramp	See Photo 3-45	21	285	5,985
Concrete slab for floor	Length100cm Width50cm	30	350	10,500
Total cost of Simple milking shed for 4 numbers of milking buffaloes(Rupees) As of January2018				69, 175



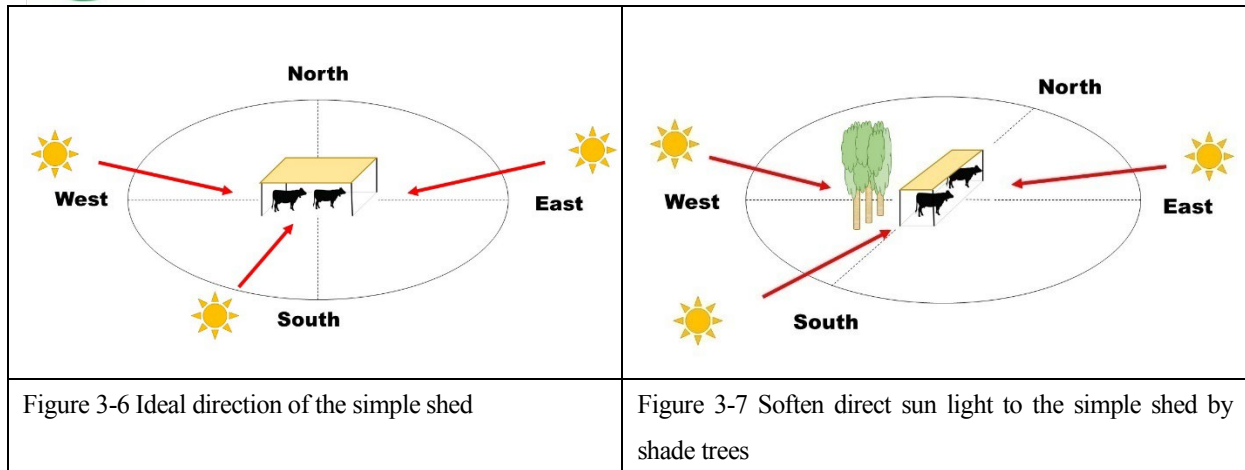
Photo 3-44 MS pipe



Photo 3-45 Flexible cramp (left) and Fixed cramp (right)

2) Direction of the shed

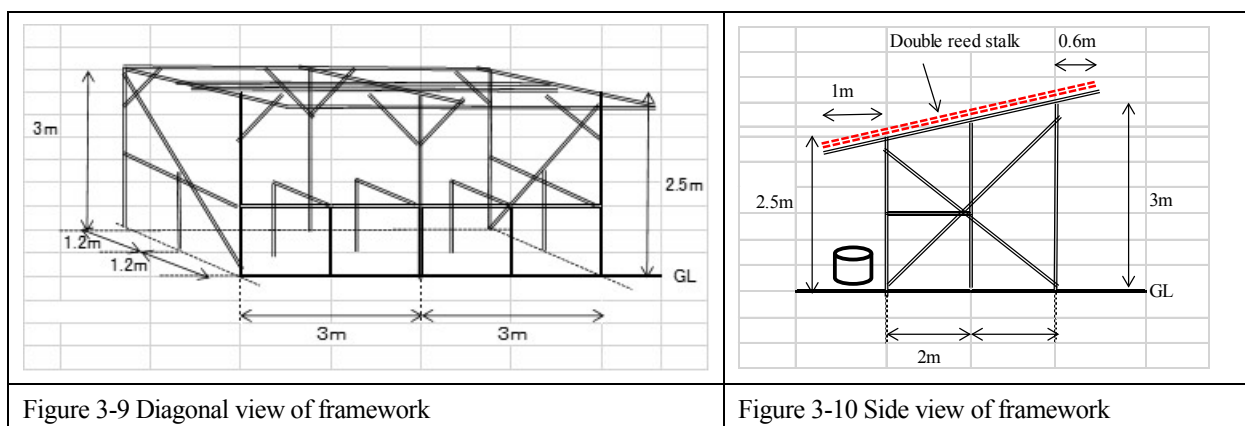
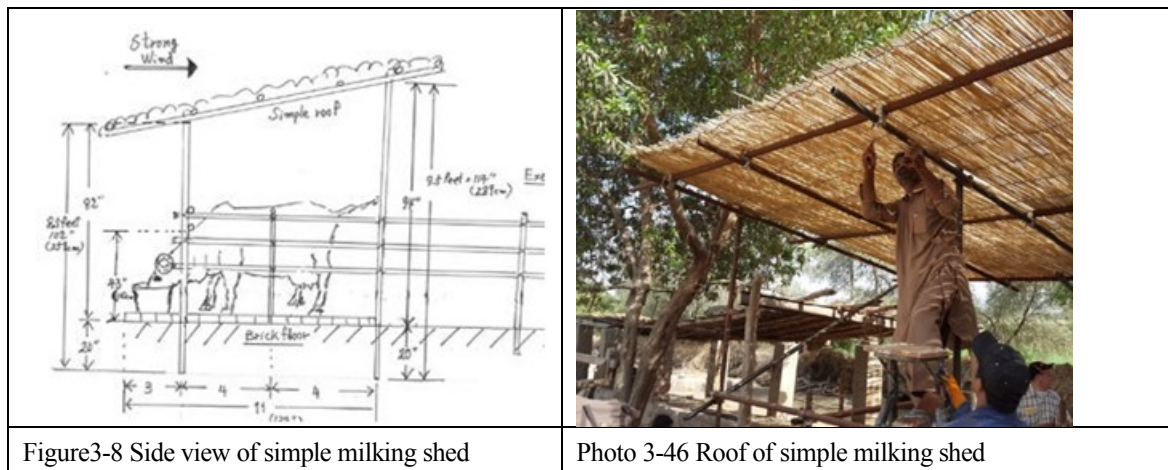
If you construct a wide milking shed, it is better to set the side of milking shed to the direction of east and west as shown in Figure 3-6 to avoid strong sunlight entering the shed. If you construct the shed to the direction of south and north, it is recommendable to plant shed trees in the west as shown in Figure 3-7 to soften direct sunlight to the shed because evening sun is very strong.



3) Advantages of this milking shed model

This simple milking shed is easy to install and effective as mentioned below;

- Simple milking shed allows to feed appropriate quantity of formula feed to each milking cow individually.
- Simple milking shed allows to milk in hygienic manner on the proper floor under the roof.



(2) The tie method

1) Tying in a line:



Place milking cow/buffalo in one line. Place 1 feed trough for each cow/buffalo. In between 2 cow/buffaloes, place 1 water trough or water cup for 2 cow/buffaloes.

In case tying milking cow/buffaloes, it is suitable to tie at their neck or use bridle, which is convenient to milk and give feed.

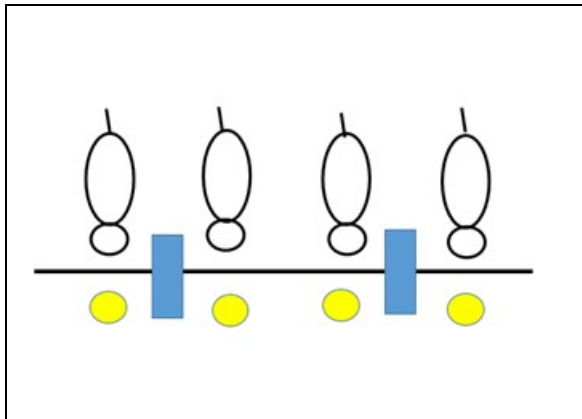


Figure 3-11 Tying in a line for four animals



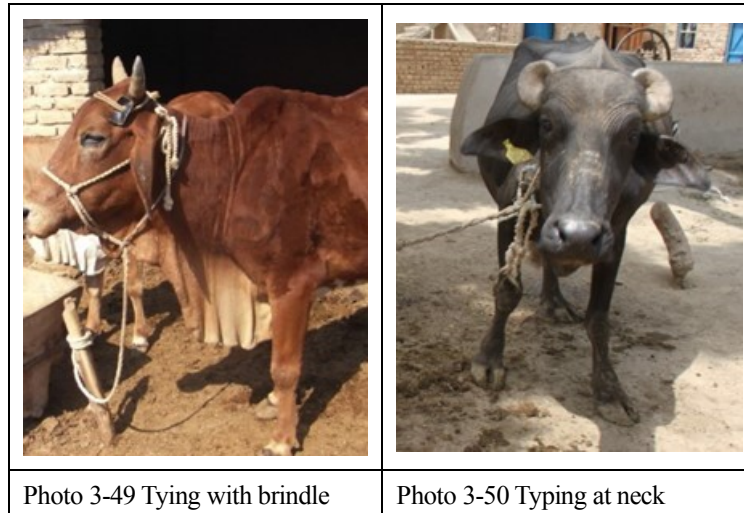
Photo 3-47 Water trough for free access to water



Photo 3-48 Bricks should be placed between concrete slabs

2) Body parts to be tied

Neck or Bridle: Tying at neck or bridle give less stress to cattle/buffaloes. It also allows easy management of feeding and drinking water. It is good for preventing cattle/buffaloes from fighting each other next to them, as well. Rope or chain used for tying should be tied and fixed with either feed trough or pillar firmly. It is not suitable to tie with a small post since a post because easily pulled out from the ground. The length of a rope or a chain should be long enough for cattle/buffaloes to eat and drink from trough.

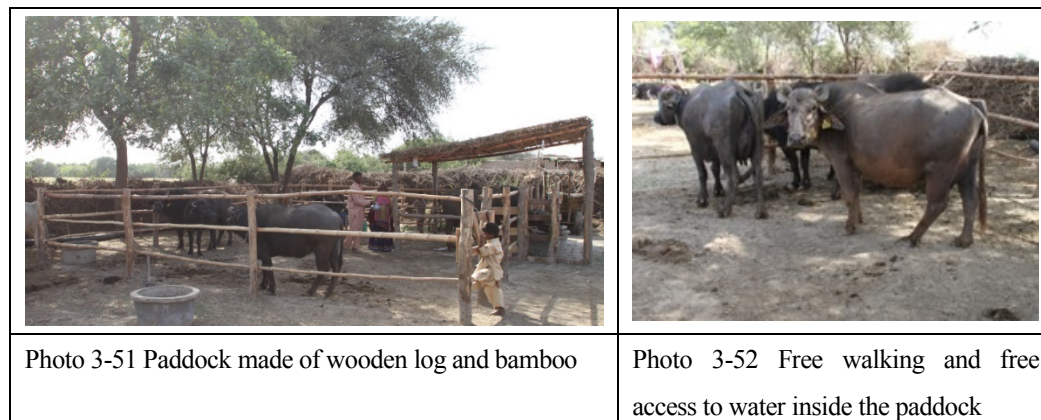


(3) Paddock

The Project verified the effectiveness of paddock made of log and bamboo and paddock made of MS pipes.

Both models have following advantages.

- Paddock allows cattle/buffalo proper exercise by walking freely in the paddock. Paddock allows cattle to drink water freely.
- Paddock allows farmers easily find detection heat of female cattle by mounting each other.
- Paddock allows to improve conception rates by having bull together with female cattle/buffalo in the paddock.



3.3.6 Grazing

Grazing brings several benefits such as promoting healthy growth of young cattle, detecting heat phenomenon of cow, reducing labor for bringing green fodder from field to farm and so on. In addition, grazing allows cattle eat various kinds of roughage from a field including micro minerals, which often in short in roughage given to tied cattle.

As for milking cow, however, it is better not to graze in distant area during hot season or in a field where little fodder is found. Grazing in such conditions lead to loss of energy of milking cow result in decrease of milk production.

Some farmers bring cattle walk to the place in 1-hour walking distance. Walking more than 30 minutes will

loss unnecessary energy of cattle, especially for the case of milking cow.

When cattle are grazed in a field with plenty of fodder, they eat fodder slowly and ruminate gradually. In case they are grazed in a field with little fodder, they walk longer distance to search for fodder result in loss of more energy.

<p>Photo 3-53 Walk in a long distance will cause energy loss</p>	<p>Photo 3-54 Insufficient fodder in a grazing field</p>	<p>Photo 3-55 Grazing in post-harvest cotton field</p>

3.3.7 Hoof-cutting

If cattle are not grazed for enough hours, regular hoof cutting by technician once in 6 months are needed.

Hoof of cattle and buffaloes are same so as management of hoof. If cattle are grazed for about 8 hours in a day, hoof of those cattle are worn away naturally and remained in a proper shape. Hoof cutting is not necessary in those cases.

Hoof grows 5mm length in a month while there is slight difference in breed, management condition or individual cattle. Monthly 5mm growth result in 6cm growth in a year.

If cattle are not grazed or less frequently grazed, hoof of them will grow like shown in the photo below.

Cattle support their heavy body with 4 legs. Long hoof will give stress to cattle. Sometimes it leads to arthritis or lameness, which also affect milk production.

Hoof cutting is, therefore, important.

<p>Photo 3-56 Hoof-cutting by a technician</p>	<p>Photo 3-57 Comparison before and after hoof-cutting</p>

(1) Standard conformation

Good posture of a buffalo/cow is shown in figure below. Straight legs are supporting heavy weight of a buffalo/cow.

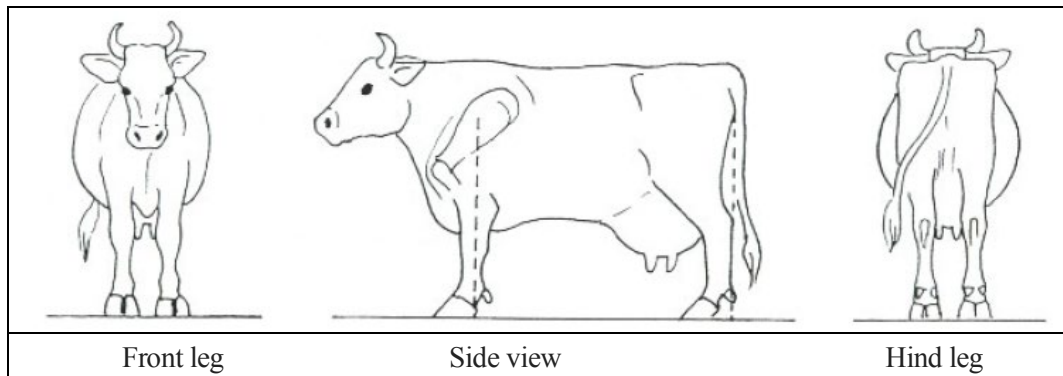


Figure 3-12 Standard conformation

Normal Shape of Legs

In the good shape of legs in standing position, 4 legs and front and hind legs should be looked strong and straight.

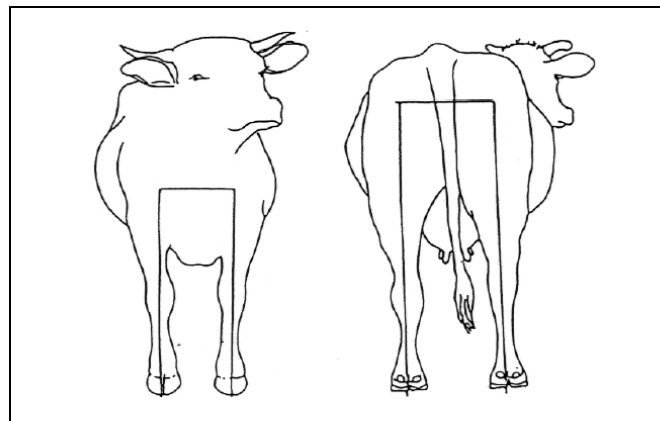


Figure 3-13 Normal Shape of Legs

In the good shape of cattle legs when standing, 4 legs, both front and hind legs should be looked straight. The distance between claws should be 2-2.5 times width of the claw in front legs, and 3 times in hind legs.

(2) Abnormal conformation

Conformation viewed from front and back

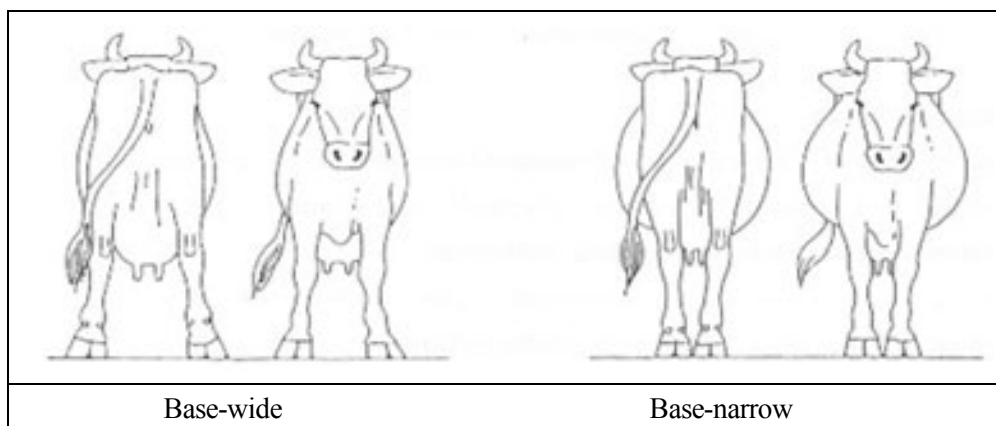


Figure 3-14 Abnormal conformation type 1

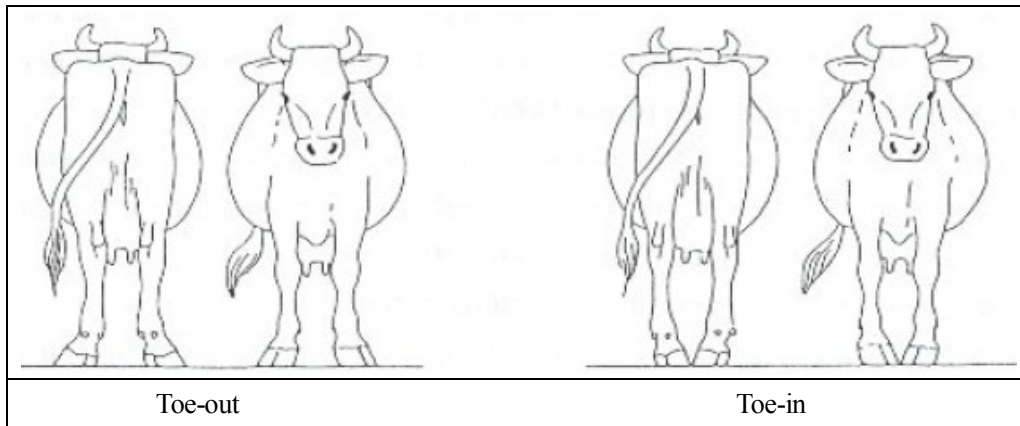


Figure 3-15 Abnormal conformation type 2

Conformation viewed from the side

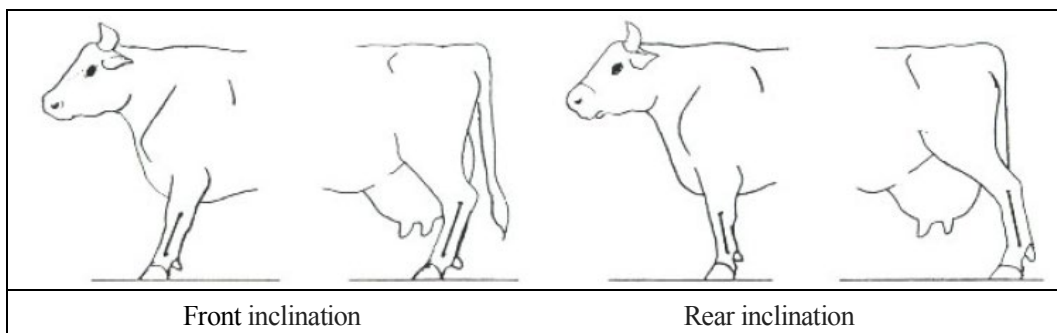


Figure 3-16 Abnormal conformation type 3

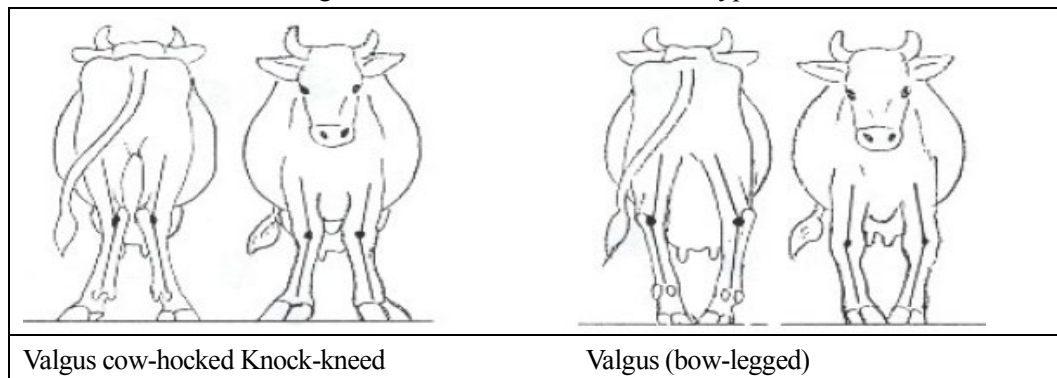


Figure 3-17 Abnormal conformation type 4

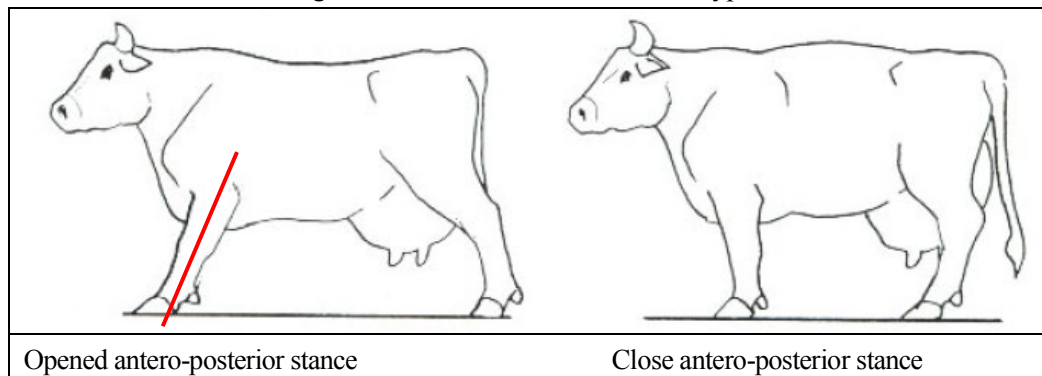
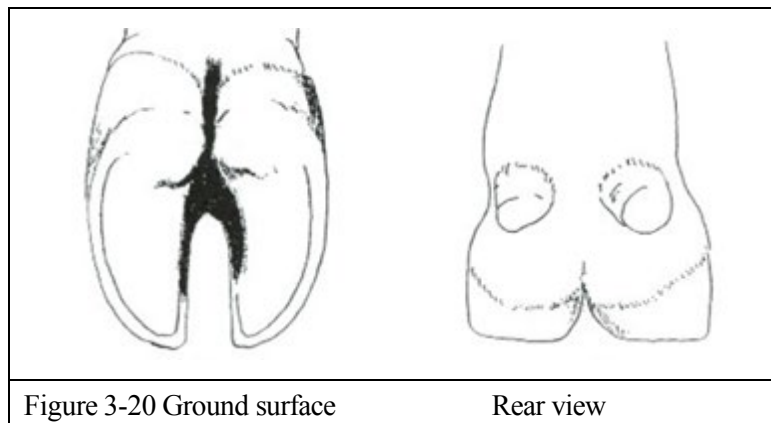
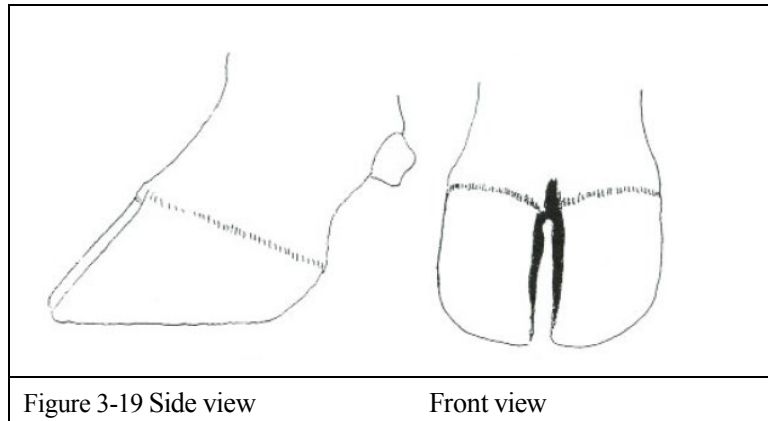


Figure 3-18 Abnormal conformation type 5



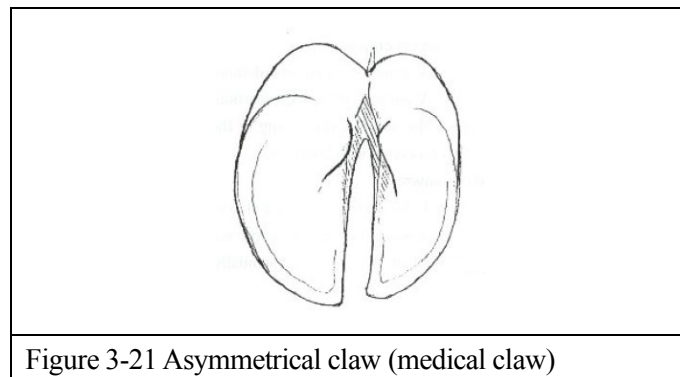
(3) Standard and abnormal claw

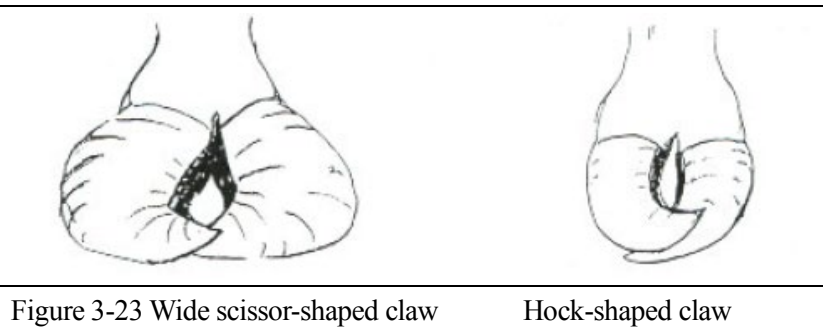
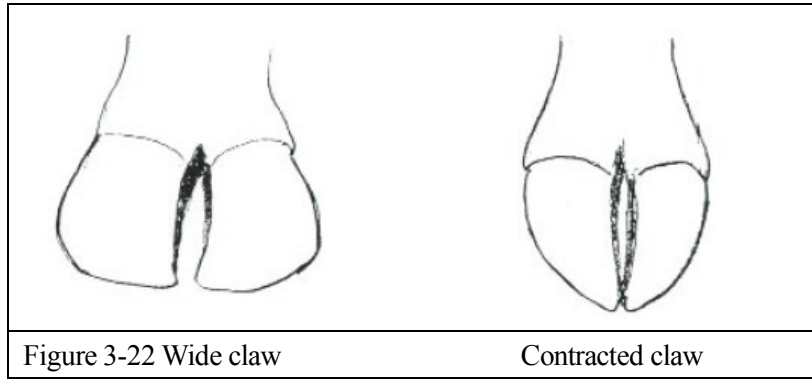
1) Standard claw



Each claw is equally supporting the body weight; 50% - 50%.

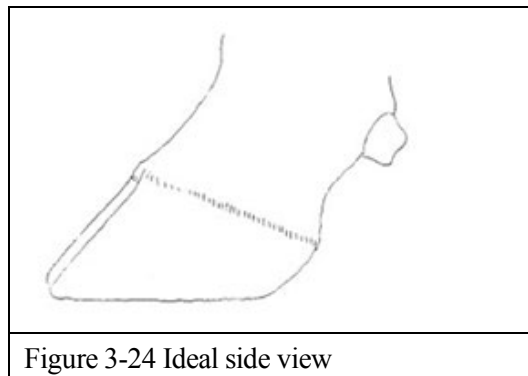
2) Abnormal claw





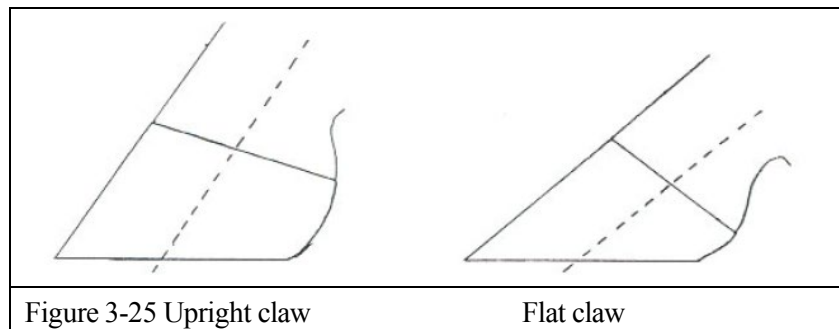
(4) Sideview

1) Standard claw



The angle of claw to the flat floor should be 45°.

2) Abnormal claw



The shape of legs is largely affected by the shape of claws. When the shape of claws is good, the cattle can stand up straight. On the contrary, when the claws are too long or short, the shape of legs become curved and the legs weakened.

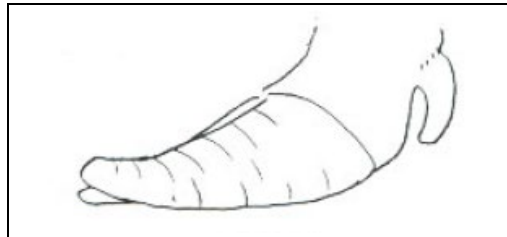


Figure 3-26 Beaked claw

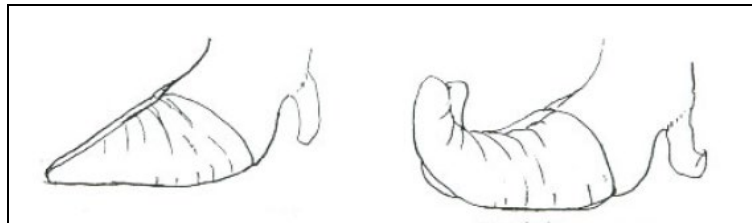


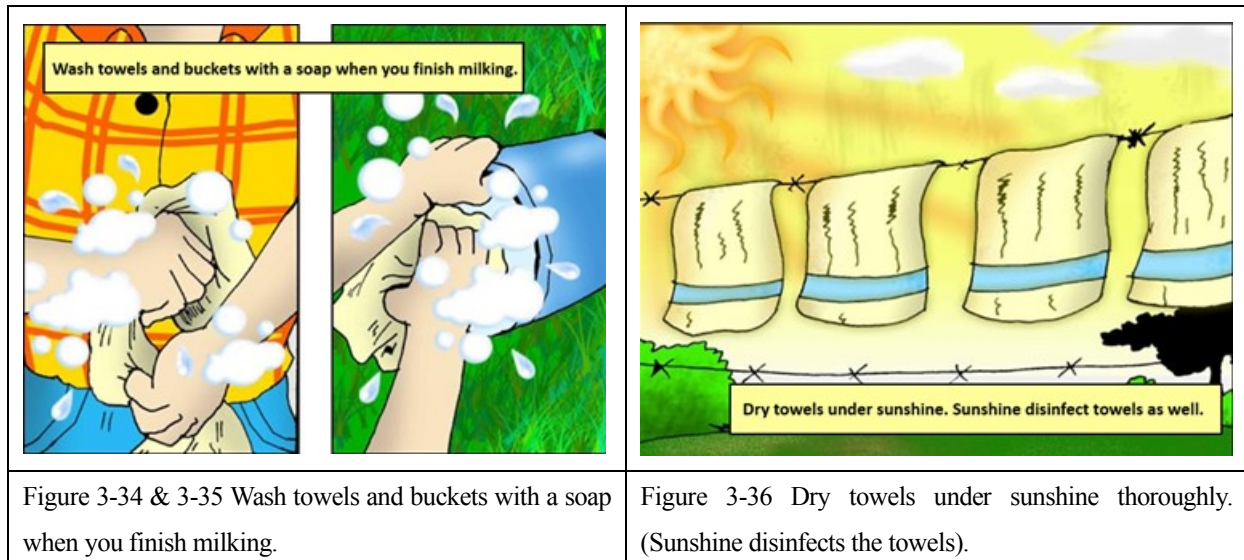
Figure 3-27 Simply over grown claw Sword-shaped claw

3.3.8 Appropriate milking method

Apply appropriate milking method for preventing mastitis and production of hygienic milk.

<p>Step 1: Pour 2cc of chlorine for industrial use into 1 gallon of water.</p>	<p>Step 2: Dip a towel one by one and wring out well. Hands will be disinfected simultaneously by following this step.</p>	
<p>Figure 3-28 & 29 Pour 2ml of Dettol into 4 liter of water, and dip a towel wring out well.</p>	<p>Figure 3-30 Now animal is ready for milking.</p>	

<p>Step 3: Clean teats with a towel and give massage before milking.</p>	<p>Step 4: Milk an animal.</p>	<p>Step 5: Wash your hands every time before milking another animal.</p>
<p>Figure 3-31 Allow a calf to suck for stimulation. Clean teats with a prepared towel. If udder is dirty, wash it and wipe with a towel.</p>	<p>Figure 3-32 & 3-33 Change a towel for each cow. Wash your hands before milking another cow / buffalo.</p>	



3.3.9 Body Condition Scores (BCS) PSLD of Kundhi buffalo

Let's learn about 5 levels of Body Condition Score (BCS) for cow. BCS changes over the period of early lactation, peak lactation, late lactation and dry. BCS within normal range is in between 2.5 and 3.5. BCS below 2.5 is regarded as underweight, which needs supplementary feed. BCS above 3.5 is regarded as overweight, for which feed needs to be reduced. Too fat and too skinny adversely affect conception rates and milk production.

Body Condition Scores (BCS) are closely related to feeding management, reproduction management, animal health management and genetic improvement of cattle and buffalo. It can be applied for various field.

In particular, Fatty (BCS more than 4.0) during dry period will cause various perinatal disease such as fatty liver, ketosis and hypocalcemia because a buffalo will reduce their weight rapidly after parturition and massive free fatty acid will developed from body fat.

Body Condition indicates 'condition of body fat accumulation' while BCS indicates 'the numerical value of the body fat accumulation'. BCS is easily determined by visual inspection and palpation. Let's learn about BCS.

Rough estimate of simple BCS are 'weak 2.0', 'normal 3.0' and 'Fatty 4.0'. These scores are developed for Kundhi buffalo, however, it can be applied for Zebu cattle and a crossbreed of Zebu and European cattle.

(1) How to determine BCS

- 1) Basic visual inspection and palpation should be done from the left side of a buffalo because the left side skin is loose and elastic.
- 2) BCS is determined with 0.5-point increase, 2.0, 2.5, 3.0, 3.5 and 4.0.
It is originally 0.25-point increase, however, 0.5-point increments are easier and it can also achieve targets.
- 3) Visual inspection and palpation

First, visual inspection and palpation on hip bone and pin bone should be conducted to check whether there is subcutaneous fat or not. Then, visual inspection for ribs of the flank, transvers process of vertebra, sacral ligament and pin bone ligament should be conducted.

- If there is no subcutaneous fat on bones, you should check whether the lines of bones are clearly recognized.

- If there is subcutaneous fat on bones, you should check that the lines of bones cannot be recognized due to round shape.

- In case of fatty, you will feel elastic skin because of fat accumulation if you push the root of a tail.

<p style="text-align: right;">Photo of LIAJ</p>	<p style="text-align: center;">Side view</p> <p style="text-align: right;">Figure of LIAJ</p>
<p>Photo 3-58 Skelton of cow is used for BCS determination</p>	<p>Figure 3-37 Rear body of buffalo is used for BCS determination</p>

<p style="text-align: center;">Visual inspection and Palpation</p>	
<p>Photo 3-59 Check points for BCS determination</p>	<p>Photo 3-60 Ligaments are used for BCS determination</p>

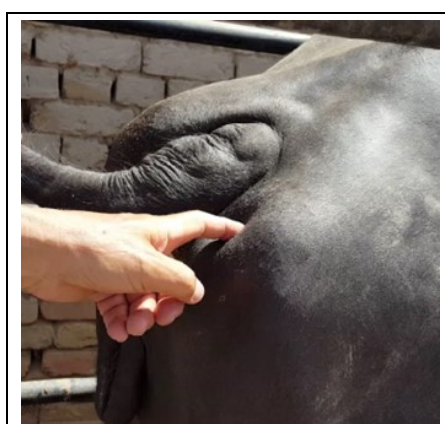
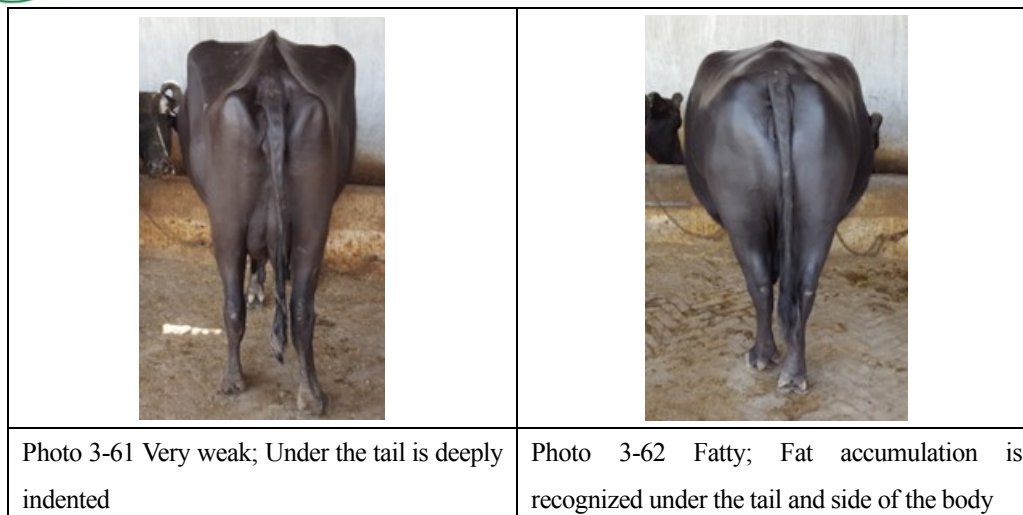


Photo 3-63 It is dented in a finger

4) Determination

【BCS 3.0】

- If there is subcutaneous fat on hip bone and pin bone even a little, BCS is determined as 3.0. The obscure lines of ribs of the flank, transvers process of vertebra, sacral ligament, pin bone ligament can be recognized by visual inspection. BCS3.0 indicates normal nutrient condition. In case of lower limit of BCS 3.0, you will recognize obscure lines of ribs of the flank. In case of upper limit of BCS 3.0, you will recognize obscure lines of transvers process of vertebra, sacral ligament and pin bone ligament.

【BCS 3.5】

- If there is subcutaneous fat on hip bone and pin bone even a little, BCS is determined as 3.0. If you cannot recognize the shape of ribs of the flank clearly (weak line) and can recognize transvers process of vertebra, sacral ligament, pin bone ligament in slightly round shape, BCS is determined as 3.5.
- If pin bone and hip bone are covered by thick subcutaneous fat and recognized in round shape, BCS is determined as 3.5.
- If there is fat under the tail, BCS is determined as 3.5.



【BCS 4.0】

- If there is subcutaneous fat on hip bone and pin bone; line of ribs of the flank cannot be recognized; and transvers process of vertebra, sacral ligament and pin bone ligament are clear round shape, BCS is determined as 4.0. If you push the root of a tail, you will feel elastic skin because of fat accumulation.

【BCS 2.5】

- If there is no subcutaneous fat on hip bone, however, there is on pin bone, BCS is determined as 2.5.
- If there is subcutaneous fat on hip bone and pin bone even a little, BCS is determined as 3.0. However, if the line of transvers process of vertebra is clearly recognized, BCS is determined as 2.5.
- If there is no subcutaneous fat on hip bone and pin bone, BCS is determined as 2.0. However, if the lines of ribs of the flank, transvers process of vertebra, sacral ligament and pin bone ligament are shown in slightly round shape, BCS is determined as 2.5.

【BCS 2.0】

- If there is no subcutaneous fat on hip bone and pin bone; and there are clear lines of ribs of the flank, transvers process of vertebra, sacral ligament and pin bone ligament, BCS is determined as 2.0.

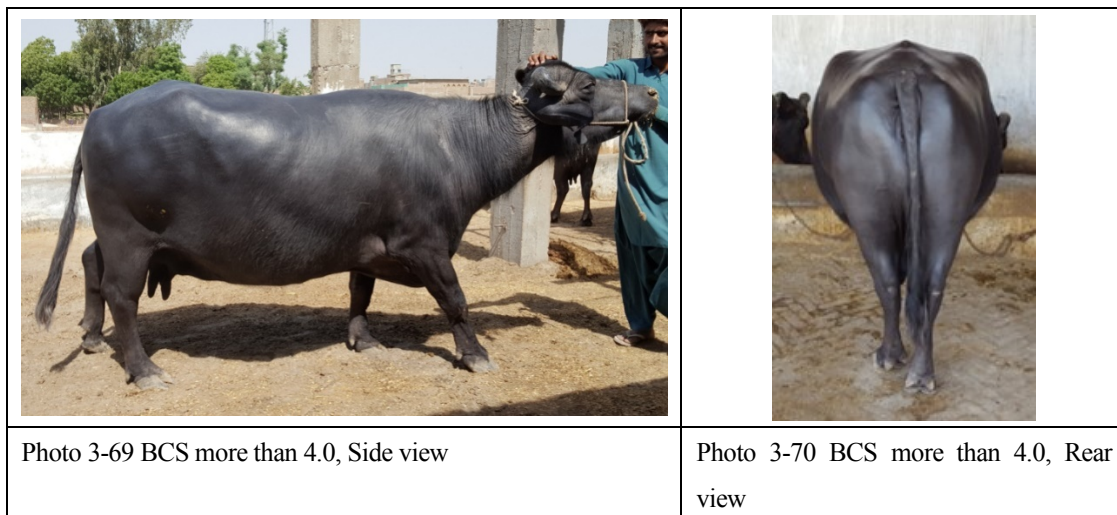
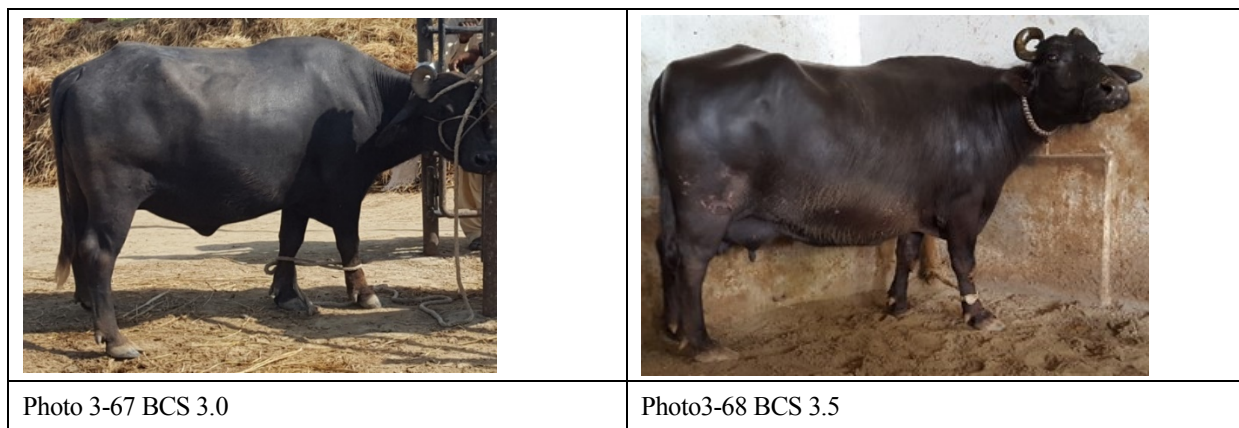
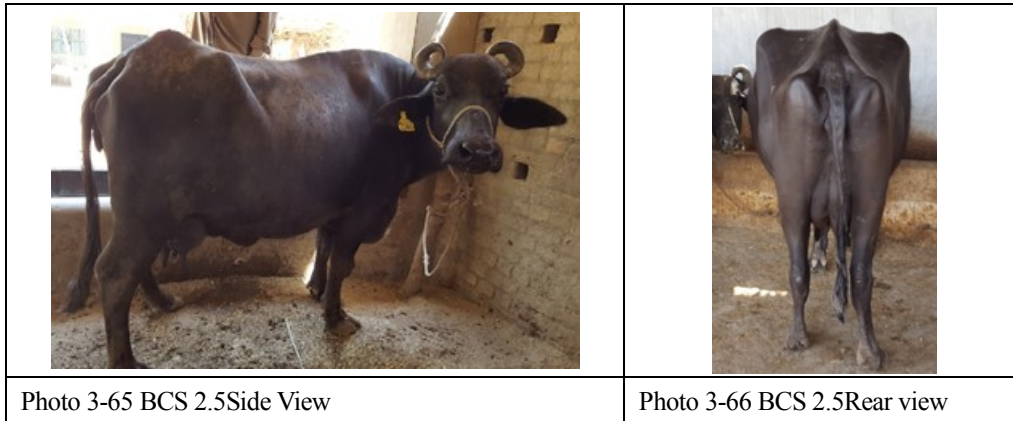
(2) BCS for each lactation period

Ideal average BCS for each lactation period are 3.5 for during parturition, 3.0 for peak of lactation, 3.25 for middle of lactation, 3.5 for late lactation and 3.5 for dry period.

BCS each period	
Period	Average
Cows at calving	3.5
Peak of lactation (50 ~60 days)	3.0
Mid lactation (100 ~200 days)	3.25
Late lactation (200 ~305 days)	3.5
Dry period	3.5

(3) Photos in different level of BCS





3.4 Retainer

The Project installed 3 types of retainers at pilot farms. The retainer allows to perform various activities easily including body weight measurement, rectal palpation, treatment, vaccination and deworming. The Project will further modify designs of retainers so that farmers can utilize them effectively and safely. The project will establish setup for farmers to maintain their retainer by themselves.



3.4.1 Iron pipe race retainer

This retainer made of iron pipe with 240-inch length corridor. This retainer allows multiple numbers of cattle into its corridor so that farmers can easily bring cattle into the retainer. It is possible to bring 3 heads of cattle in line in the corridor and inject vaccine in an efficient manner. In the left box appeared in the drawing 14, measurement of body weight, rectal palpation and treatment can easily be performed. This retainer, however, have to hire a contractor for installation.



Photo3-71 Iron pipe race retainer

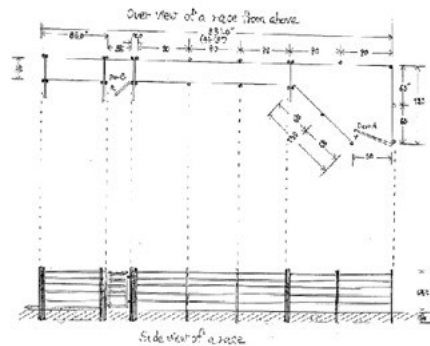


Figure 3-38 Drawing

3.4.2 Wooden retainer

This retainer is made of wood. This retainer can be installed by farmers themselves and do not require spacious places for it.



Photo 3-72 Wooden retainer

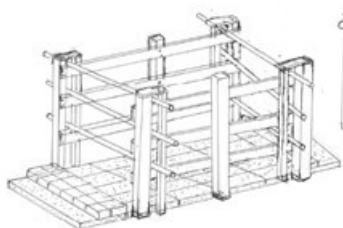


Figure 3-39 Wooden retainer

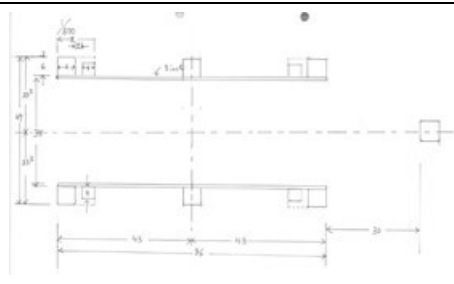
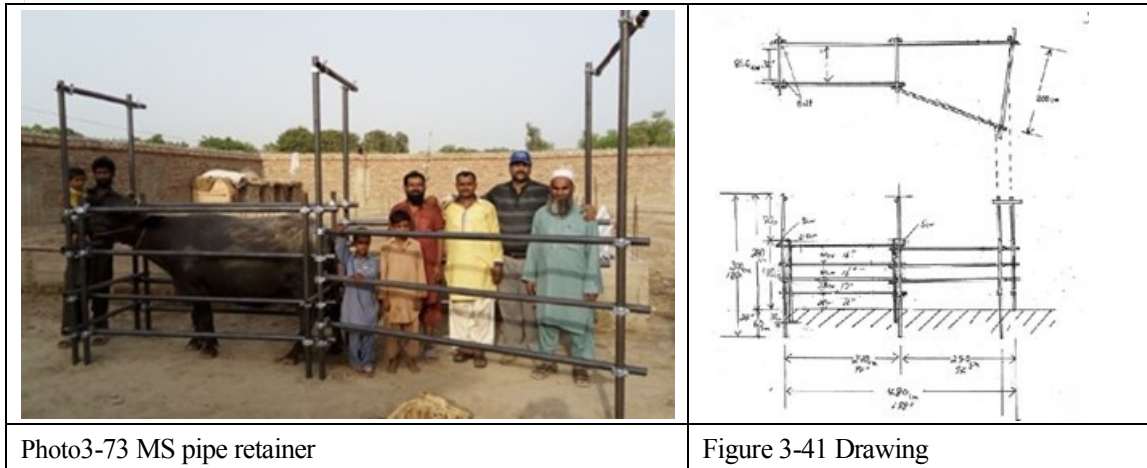


Figure 3-40 Drawing

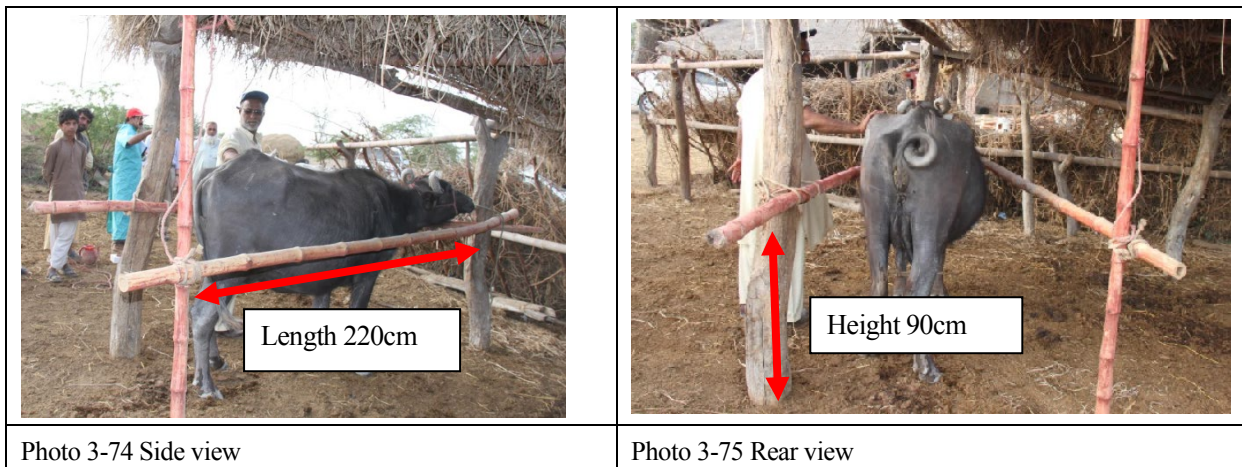
3.4.3 MS pipe retainer

This retainer is made of MS pipe. This retainer can be installed by farmers themselves within short time. The cost of MS pipe retainer is less than the above 2 models. It has V-shape inductor fence, which makes it easier to drive cattle into retainer than the wooden retainer.



3.4.4 Simple retainer

Simple retainer can easily be constructed with 3 pieces of log pillar and 2 pieces of either wooden rod or bamboo for fence. Pillars already exist in a farm also can be utilized. Simple retainer allows to performing rectal palpation and treatment easily.



3.4.5 Animal management technique

Cattle are nervous in general. They become very sensitive and nervous if any new facilities are seen in their sight or they are placed in unfamiliar environment. It is important for you to understand every facility has both advantage and disadvantages and a user has to make most use of its advantages with their ideas' and 'it needs time for cattle to get used to new facilities and environment.'

As for the iron pipe race retainer, it is rather easier to handle animals with plural number of animals can be driven into it. Wooden retainer and MS pipe retainer, however, tend to have situation like 1) Cattle run away, 2) Cattle do not like to enter into a retainer, and 3) Buffaloes jump out from a retainer. It takes some time to make cattle get used of it but they can be with the following method.

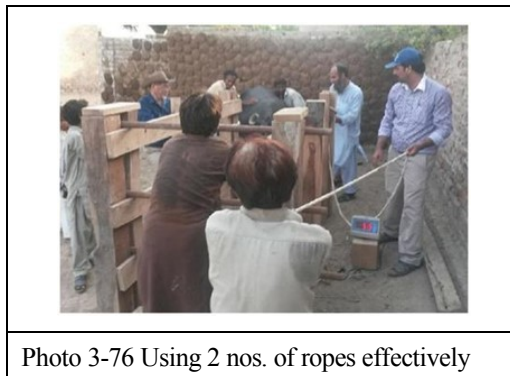
Prepared two strong ropes of 10 meters length. One rope is tied with brindle on cattle and the opposite edge of the rope is tied with a front pillar of wooden retainer. You gradually pull the rope forward to reel cattle (Figure3-43). The other rope is tied with back pillar of wooden retainer. When an animal is approaching closer to a retainer, attach the rope on the rear leg's knee or hip of an animal. Then, tie the other edge of the rope with other side of back pillar of wooden retainer. Then, push cattle gently so that cattle move forward



(Figure3-44). For the case of big and strong cattle, push cattle by using a stick making use of principle of leverage (Figure3-45). It is important not to hit or kick cattle but try to make them accustomed to facilities with gentle care. Once cattle manage to escape from wooden retainer, they remember that they can escape from them. Good animal management which does not allow them to escape from a retainer is important. Repeat training will make them accustomed to a wooden retainer and enter into a wooden retainer easily. In case of buffaloes, they jump up with their forelegs. Therefore, it is effective to stretch a rope above their shoulder to prevent from it.

Figure 3-42 Tie a rope with a front pillar of a wooden retainer	Figure 3-43 Place the other side of a rope with cattle's hip	Figure 3-44 Use a stick making use of principle of leverage

(Drawing by Dr. Teruo Sugiwaka / Expert on Feeding management)





Chapter 4 How to rear calves

4.1 Let's grow the calves which have good appetite for feed

Calves which have good appetite for feed will grow up to an adult female mother buffalo which have good appetite for feed.

An adult female mother buffalo which have good appetite for feed has large rumen and a deep body. Such adult female mother buffalo will no doubt to produce good quantity of milk. In addition to good milk production, those buffalo will conceive more and will produce milk for longer duration in her whole life. The milk production capacity of adult female mother buffalo depends largely on ways and management of rearing calves during early period of their growing, i.e. their sucking and weaning period.

4.2 Stomach of large ruminants

Large ruminants such as cattle and buffaloes have 4 stomachs.

Stomach of large ruminants includes rumen, reticulum, omasum and abomasum. Abomasum functions same as human stomach. There are thousands of bacteria and protozoa in rumen of adult animals. Those bacteria and protozoa ferment and decompose feed. The rumen of adult animal occupied 80% space of their stomach and abomasum which functions as human stomach is small. The rumen of newly born calf, however, occupies only 30% space of their stomach. It is very important to grow calves so as to enhance their rumen, which should be started from their early age.

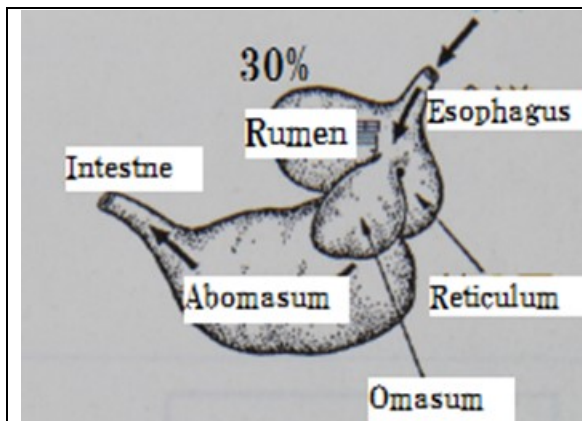


Figure 4-1 Stomach of a calf (Rumen occupies 30% of stomach)

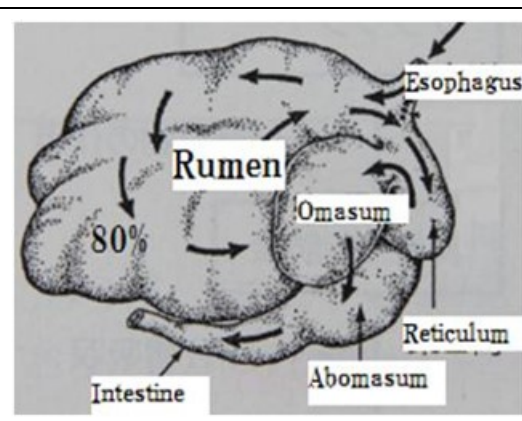


Figure 4-2 Stomach of an adult buffalo (Rumen occupies 80% of stomach)

4.3 How to develop rumen of calves

4.3.1 Let's develop rumen of calves

In this section, how to develop rumen of calves will be explained.

1) Start feeding calves with good quality of green grass from 2 weeks after their birth.

Good green grass is fibrous green leafy graminiae grass. Fibrous grass gives good stimulus to calves' rumen, which allows their rumen to grow. In the beginning, calves' intake of grass is very small quantity. But they will start eating good amount of grass gradually.

2) Feeding Hay



Rumen of calves is small. Green grass contains much water. 70% of green grass volumes are water. If calves take green grass, their small rumen becomes filled with water. Intake of green grass, therefore, will not allow calves to take enough nutrition. Hay is good alternative for green grass. Hay is not only given sufficient nutrition to calves but also prevent them from diarrhea which is common and frequent disease for calves.

4.3.2 How to prepare good quality of hay

Hay is made of green grass by deducting water content to less than 15%, which helps to restrain function of enzyme and microorganism so that they can be stored for a long time without deteriorating its quality. Natural grass and gramineae grass such as star grass are preferable for making hay for calves. Stalk of Sorghum and Maize are too hard fiber and are not suitable for calves.

Sunshine in Sindh is strong. Drying one and half day under the sunshine is enough for grass like chabbar to prepare as hay. Cut grass in a morning and spread them under the sun and turn them over every a few hours. Pile them up in a night to prevent from dew. Cover them with vinyl sheet, if necessary. On next morning when sun rise, spread grass over again and turn them over every a few hours. Hay becomes ready by an evening of second day. 1kg of hay can be made from 5 kg of green grass.

4.3.3 Feed good quality hay to calves in good quantity.

It is recommended to feed hay to calves up to 8 months of their age. Irrigated land has advantage of availability of green natural grass throughout the year thanks to irrigated water. Adult animal consumes large quantity of roughage whereas intake of 6 months' age calves is small. The priority, therefore, should be given to calves. Natural grass can be stored for a longer duration. It is recommended, therefore, to cut as much grass you can when your time allows and store them as hay.



Photo 4-1 Chabbar which is widely available in the area



Photo 4-2 Technical guidance on hay preparation



Photo 4-3 Calves are delighted to eat hay

4.4 Cow cattle/buffalo management during parturition

A cow will lose its calm if it is near to parturition. For proper delivery assistance, you should tie the cow near to your resident and carefully observe it.

You should also contact a reliable veterinarian who can help you in emergency case such as difficult delivery beforehand. In case of a delivery in night time, you should attend a birth and help as much as possible to avoid an unexpected accident.

4.5 Calf management right after its birth

First things you have to do right after their birth to grow healthy calves

(1) Drying of calf's body

Dry calf's body by allow mother buffalo to lick calf's body. Licking stimulates hormone secretion of mother buffalo as well as facilitates discharge of placenta.

(2) Disinfection of umbilical cord

Umbilical cord needs to be either disinfected with 10% iodine tincture solution or inject iodine solution into umbilical cord.



Photo 4-4 The umbilical cord should be disinfected by dipping into. Iodine Tincture solution

(3) Intramuscular injection of antibiotic



Injection of antibiotic is recommended for those calves born to a farm where many of calves get disease, in humid season right after the rainy season and in winter season. Intramuscular injection of 3ml of OTC-LA is performed.

(4) Place for rearing

The calf should be rear at dry and clean place. In case of hot season, the place where there are moderate shade and good ventilation should be chosen for calf rearing. In case of winter season, you put straw down on the ground and avoid strong wind. Cleaning should be done regularly to keep cleanness of rearing place.

(5) Good observation of suckling calves

Once suckling calves become sick, their condition often can easily and quickly deteriorate.

You should always observe movement of the calf carefully. If the calf has shining eyes, moves around vigorously and not shows dirty on the surroundings of the buttocks, the calf is in health. It is important to make a habit of observation about the calf such as color of droppings, times of breathing, having or not having fever, times of diarrhea.

(6) Colostrum

Feed colostrum to a calf within 6 hours of its birth.

It is important to feed colostrum to a calf for the prevention of infectious diseases.

Especially, the first colostrum is highly effective because it includes a lot of gamma globulin. The first suckling of colostrum should be done within 3 hours after delivery. The second suckling of colostrum should be done within 6 hours after delivery. It will be better if the calf sucks colostrum as much as possible.

After 6 hours of its birth, a calf cannot absorb gamma globulin contained in colostrum. Colostrum or milk in 3 to 5 days after parturition cannot be sold as milk, but it contains more nutrition than normal milk. Feed such colostrum as much as possible to a calf.

4.6 Separate rearing of mother cow and calf

Dairy farming of the developed countries rear mainly European cattle. After a delivery, a mother cow will be allowed to lick calf's body. The mother cow and the calf will be separated immediately after birth.

In tropical countries including Sindh province, Pakistan, Milking is carried out after suckling of calf. This is traditional method for milking to help secretion of oxytocin (lactogenesis hormone) by stimulation of calf suckling. It is believed that it is impossible to milk cows without calf suckling. However, innovative farmers in Italy and Thailand, they rear buffalo it is called *Murrah* breed, and carried out milking without calf suckling. Moreover, milking is done by a milking machine. Following pictures are shows example of Thailand. Separate rearing of mother cow and calf. It is possible if you make mother cow adjust to the situation.



Photo 4-5 Sucking of calf which separated from their mother right after their birth



Photo 4-6 Milking of a buffalo by milking machine

Even in Sindh, farmers apply massage before milking without calf suckling. This method is applied when a calf died during lactation period. The below photo is the case from district Matiari.



Photo 4-7 Massage of the teat



Photo 4-8 Normal milking after massage

4.7 Buffalo calf rearing at calf salvation center of the Project

The project is conducting separate rearing of mother buffalo and calf buffalo through the calf salvation plan. Buffalo calves which are born at the cattle colony will be given colostrum at the birth place to prevent disease. Then, they will be transferred to the calf salvation center of the Project (hereafter the Center) as soon as possible.

4.7.1 Colostrum

(1) Milking colostrum

Milk hygienic colostrum.

Prepare 2 to 3 pieces of towels cleansed with clean water beforehand. It is preferable to dip into disinfectant and wring towels. Applicable disinfectant are such as chlorine and Dettol. Bucket used for milking and suckling needs to be washed with clean water beforehand. It is preferable to use disinfectant. Clean teats with prepared towels about 30 minutes after delivery and start milking colostrum. Initial 2-3 drops of



colostrum needs to be discarded.

(2) Suckling of colostrum

Minimum 1.5 to 2 liter of colostrum is recommended to be fed to a calf within 6 hours of its birth.

The first suckling of colostrum should be done within 3 hours after delivery at the cattle colony. After that a calf will be transferred to the Center. Remaining colostrum should be brought to the Center with the calf for second suckling. The second suckling of colostrum should be done within 6 hours after delivery. It will be better if the calf sucks colostrum as much as possible. Feed colostrum as much quantity as a calf wants.



Photo 4-9 Milking colostrum



Photo 4-10 Feed colostrum to a calf

4.7.2 Suckling by purchased fresh milk from outside

Make sure always feeding fresh milk to a calf. In case of purchased milk from outside, check smell of milk before feeding to calf. If you feel any nasty smell, do not feed those milk to a calf. When a calf feel hungry, it drinks even bad quality milk. Do alert of milk quality even a calf drinks them.

4.7.3 Artificial Suckling

Main suckling methods are use of a bucket and use of a nipple. There are advantage and disadvantage for both of them.

(1) Suckle with a bucket

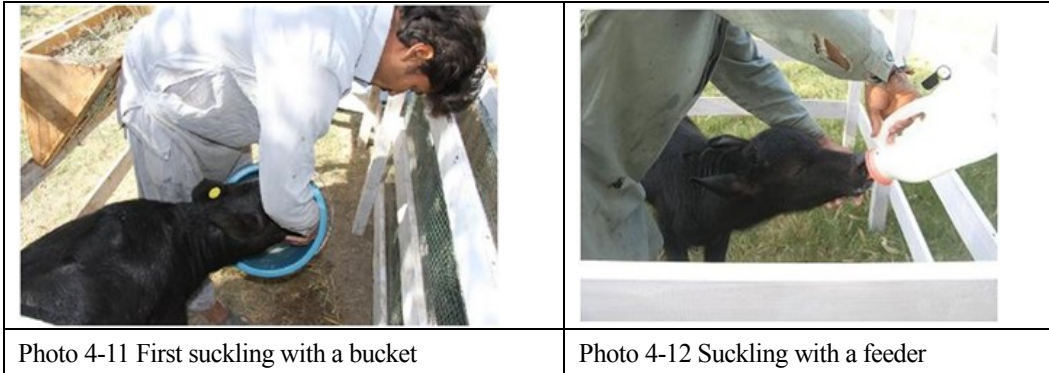
Prepare a bucket big enough to put a head of calf and arm of a caretaker. Hold and keep a bucket at angle. Insert a finger into a mouth of a calf so that they start to suck and bring its mouth to milk in a bucket. A calf often try to dip their mouth as well as nose. Guide a calf to raise its head so that its nose can breathes. After a few days, a calf become used to suck milk from bucket and can suck milk by themselves. A bucket size can be changed at this point of time from bigger one to a smaller one but enough to insert a calf head.

(2) Suckle with a nipple

Put a finger into a mouth of a calf so that it starts to suck and bring a nipple into their mouth gently. Once a calf start suckling, do not move a feeder. Height of feeder should be kept as same height of its head. When a calf stop suckling in the middle of feeding, move a feeder slightly back and forth to guide a calf to suckle again. When tightening nipple cap is too tight, milk is not running smoothly from a nipple. If a calf looks difficult to suckle, adjust the tightness of a nipple cap. Speed of suckling with nipple is slower than those



with a bucket. Nipple must be completely cleaned with detergent and brush every time it is used.



Various types of feeders are available.



4.7.4 Suckling calf management

<p>Start feeding calf starter and hay 8 days after its birth. In the beginning, let a calf play with calf starter and hay in their mouth to get used to them. Free access to fresh drinking water plays key role to facilitate a calf to eat good quantity of calf starter. In Pakistan, it is believed that suckling calf does not need drinking water, however, this is wrong perception. Prepare a small bucket for their drinking water. Replace water with fresh one at least 2 times per a day, i.e. in a morning and in an evening.</p>
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(1) Calf Starter

Let's feed calf starter

The project designed calf starter from locally available concentrates.

Feeding calf starter from 2nd week of its birth allow their rumen to develop, increase daily weight gain and make early weaning possible.

The Project developed 2 models of calf starter, i.e. model 1 and model 2. Model 2 contains soybean cake and palatability is high. It contains comparatively more crude protein than model 1, which increase daily gain results of calves.



Table 4-1 Calf Starter

	Model 1	Model 2
Name of Feed	Mixed proportion %	Mixed proportion %
Maize crush	15	22
Wheat (Crush)	30	28
Cotton Seed cake	7	0
Soybean	0	14
Rapeseed cake	0	4
Wheat Bran	30	20
Guar meal	7	0
Coan gluten 60	5	6
Molasses	5	5
dcp(Bone meal)	1	1
Total	100	100
TDN:	68.7	70.6
CP:	18.4	18.8

(2) Early weaning (60 days suckling)

Suckling period is 60 days. During suckling period, fresh milk, calf starter, hay and adequate water should be given to a calf.

When a calf is grown up as one which have good appetite for feed, rumen is developed enough in 2 months of time, which allows smooth weaning. Target day of weaning is 60 days after its birth. Target daily weight gain is 0.5 kg. Average birth weight of calves at calf salvation experimental center is 34kg. Target weight at the time of weaning, i.e. 60 days after its birth is 62kg.

1) Volume of suckling and feeding volume of calf starter

Colostrum should be fed from day 1 to day 5 after birth. 1.5litter of colostrum per time and 2 times per day are to be fed. Total 3 litter of colostrum per day to be fed to a calf. 1.5 litter of fresh milk per time and 2 times per day are to be fed in day 6 and 7. Total 3 litter of milk per day to be fed to a calf. From second week to 6th week, 2 litter of milk per time and 2 times per day are to be fed. Total 4 litters milk per day to be fed to a calf. Calf starter and hay are started to be fed from 2nd week. A small quantity of calf starter and hay will be given to a calf to play with them in their mouth to get used to them in the beginning. Increase quantity of calf starter and hay gradually after that. Once a calf eat calf starter up to 1kg per day, it can be weaned. Drinking water should be placed close to a calf so that it can drink water anytime of a day.



Table 4-2 Feed table for suckling calves

Week	Day	Body weight (Kg)	Milk (Liter)/day	Calf starter (Kg)/day	Hay	Water
1 week	1 ~ 5	34	Colostrun 1.5L x 2 times=3L	0	0	0
	6 ~ 7		Milk 1.5 L x 2 times = 3L			
2 Weeks	8 ~ 14	37	Milk 1.5 L x 2 times = 3L	Little	Trial	Free
3 Weeks	15 ~ 21	41	Milk 2.0 L x 2 times = 4L		Little	
4 Weeks	22 ~ 28	45	Milk 2.0 L x 2 times = 4L		Little	
5 Weeks	29 ~ 35	48	Milk 2.0 L x 2 times = 4L	0.5	Free	
6 Weeks	36 ~ 42	52	Milk 2.0 L x 2 times = 4L	0.5		
7 Weeks	43 ~ 49	55	Milk 1.5 L x 2 times = 3L	0.6		
8 Weeks	50 ~ 56	59	Milk 1.0 L x 2 times = 2L	0.8		
9 Weeks	57 ~ 59		Milk 0.5 L x 2 times = 1L	1.0		
	60	62	0 L Wean			

Following pictures are shown basic equipment to use suckling period.



Photo 4-15 Utensil for drinking water and calf starter

Photo 4-16 Hay rack

2) Calf hatch

Calf hatch is used during suckling period. Advantage of calf hatch is prevention from contagious diseases among calves. It also allows management of individual calves.

Care takers can measure accurate intake of milk quantity and calf starter of each individual calf as well as observe health condition of each calf properly. It is important to observe health condition of each calves to take early prevention of disease. Next to prevention, early detection, diagnosis and treatment is important.

The Project developed 2 types of calf hatch, i.e. movable type and fixed type.

a) Movable type of calf hatch

Movable type is suitable for a spacious place.

Care takers shift location of calf hatch every day gradually to a place where green grass is available. Till a calf hatch returns to an original place, new grass grows and available for fodder of calf.



Photo 4-17 Calf hatch is placed on the green grass



Photo 4-18 Shift a calf hatch gradually every day

b) Fixed type of calf hatch

The Project developed 2 types of fixed calf hatch, i.e. connecting type and single type. Connecting type is more convenient for rearing numbers of calves at a time.

Sliding plate as a floor needs to be equipped with fixed calf hatch. Dung and urine are dropped down to the ground. Cleaning of sliding plate, however, required every day.



Photo 4-19 Connecting type



Photo 4-20 Single type

4.7.5 Weaning

Target early weaning days is 60 days age. Ideal weaning timing is when a suckling calf can intake 1 kg calf starter.

According to the Project trials, however, calf that can intake 1 kg calf starter at the time of weaning was less than 5% of total number of calves. Therefore, you can wean a calf at 60 days of age, when it can intake 500 to 600 g of calf starter.

Table 4-2 shows quantity of calf starter provision to suckling calves. This tables are used for calculation and preparation of calf starter for one day. Calf starter should be placed in front of calves for 24 hours.



4.7.6 Feeding management after weaning

(1) Feeding

Stress given to calves due to weaning is strong. Feed same calf starter continuously for a week after weaning. From a second week after weaning, start mixing formula feed for growing heifer. In the second week, mix formula feed for 30 % of quantity. In the third week, mix 60% of formula feed. In the fourth week completely change to 100% formula feed. Feed formula feed to calves up to 6 months of age. Refer to Table 18 for provision of formula feed to calves after weaning. Once rumen is developed properly by 6 months of age, heifer can eat well and grow well.

Feed plenty of hay for 24 hours so that calve can eat enough quantity of hay. Drinking water should be accessible for 24 hours. Hay is better to be fed continuously at least up to 8 months of age.

From 7months after birth, a calf will grow well only for roughage feeding. However, feeding of good quality roughage is must. Amount of roughage intake of the calf is less than mother buffalo's one. Therefore, green grass or good quality hay should be given specially to the calf

Table 4-3 Feed table by age of calves

Month	Day	Body weight (Kg)	Milk (Liter)/day	Calf starter (Kg)/day	Formula feed for rearing calf (Kg)/day	Hay (Kg)	Green grass	Water
1 month	1 ~ 30	45	Average 3.5	Average 0.2	-	Little	-	Free
2 months	31 ~ 60	62	Average 3.0	Average 0.5	-	0.5	-	
3 months	61 ~ 90	77	-	Average 1.0	Average 0.5	1	-	
4 months	91 ~ 120	92	-	-	Average 1.5	1.5	-	
5 months	121 ~ 150	107	-	-	2	1.7	-	
6 months	151 ~ 180	122	-	-	2	2	-	
7 months	181 ~ 210	137	-	-	-	2	2	
8 months	211 ~ 240	152	-	-	-	1	9	
9 months	241 ~ 270	167	-	-	-	-	15	

(2) Formula feed for rearing young animal

The Project developed 2 models of formula feed for rearing young animal. Model 1 employed concentrates widely available in local markets as ingredients. The model 1, therefore, is easy to produce.

The model 2 was designed to increase crude protein for high effectiveness on daily gain. Soybean cakes, rape seed and cone gluten are included as ingredients, which are only available in city markets.

Table 4-4 Formula feed for rearing young animal

	Model 1	Model 2
Name of Feed	Mixed proportion %	Mixed proportion %
Maize crush	10	30
Wheat (Crush)	10	15
Soybean	0	17
Rapeseed cake	0	5
Cotton Seed cake	5	0
Wheat Bran	62	25
Guar meal	5	0
Sunflower Seed meal	7	2
Coan gluten 60	0	5
dcp(Bone meal)	1	1
Total	100	100
TDN:	68.7	70.4
CP:	16.7	20.0

(3) Paddock

Weaned calves will be reared by group rearing in the paddock. Group rearing in a paddock allow them to train and strengthen their legs and develop strong skeleton structure. Group rearing also make calves get used to compete with each other to eat their feed in a herd.



Photo 4-21 A paddock for weaned calves

4.7.7 Necessity of supplemental feed for calves and heifers

Intake quantity of roughage of calves and heifers are comparatively less than those of adult animals. Feed as much as green leafy natural grass and green forage to calves and heifers.

Green natural grass can be found even in winter season in irrigated land in Sindh, though availability is less than summer season. Give priority to calves and heifers for feeding green natural grass to promote good daily gain.



Before and after winter which difficult season to supply good quality of roughage, calves' body weight stop to increase and started decrease in most of the cases. To help healthy growth of a calf, locally available concentrate should be given to a calf. It is highly effective even only 2kg of concentrates because weight of calf is less than adult's one.

4.7.8 Rearing calves at small scale farms

Application of early weaning practiced in the calf salvation center is difficult at small scale farms. Small scale farms require time to adopt new technologies including proper milk feeding, free access to drinking water and 24 hours provision of calf starter and hay. The Project developed feeding unit to facilitate early weaning at small scale farms. With the use of this feeding unit, a calf can access to drinking water, calf starter and hay for 24 hours.



Photo 4-22 Feeding unit distributed to small scale farms

4.7.9 Weaning at 4 months of age

Early weaning is not possible in case nutritious condition of a calf is not good due to insufficient milk and quality roughage even though introducing feeding unit. In such a case, weaning at 4 to 5 months of age is recommended. Traditionally, calves are weaned at 4 to 5 months at small scale farms in Sindh.

Weaning methods at 4 months of age is explained below;

(1) Feeding management during suckling period

Quantity of milk fed in the beginning is same as early weaning method. Feed colostrum on day 1 to 5 after birth. Feed 1.5 kg of colostrum at a time. Feed 2 times in a day. Total 3 kg of colostrum per day is to be fed. On day 6 and 7, feed 1.5 kg of milk at a time, 2 times in a day. Total 3 kg of milk per day is to be fed. From 2nd week to 8th week, feed 2 kg of milk at a time for 2 times in a day. Total 4kg milk per day is to be fed. From 9th week, reduce quantity by 1 liter. Feed 1.5 kg at a time for 2 times in a day. Total 3 kg per day is to be fed. From 13th week, reduce quantity by 1 liter. Feed 1 kg at a time for 2 times in a day. Total 2 kg per



day is to be fed. Wean on 17th week.

Table 4-5 Quantity of milk fed

Month	Week	Day	Body weight (Kg)	Milk (Liter)/day
1st Month	1 week	1 ~ 5	34	Colostrun 1.5L x 2 times=3L
		6 ~ 7		Milk 1.5 L x 2 times = 3L
	2 Weeks	8 ~ 14	37	Milk 1.5 L x 2 times = 3L
	3 Weeks	15 ~ 21	41	Milk 2.0 L x 2 times = 4L
	4 Weeks	22 ~ 28	45	Milk 2.0 L x 2 times = 4L
2nd Months	5 ~ 8 Weeks	29 ~ 56	48	Milk 2.0 L x 2 times = 4L
3rd Months	9 ~ 12 Weeks	57 ~ 84	77	Milk 1.5 L x 2 times = 3L
4th Months	13 ~ 16 Weeks	85 ~ 91	92	Milk 1.0 L x 2 times = 2L
	17 Weeks	113 ~ 118		Milk 0.5 L x 2 times = 1L
		120	107	0 L Wean

Provide calf starter and hay for 24 hours. It is ideal that a calf intake 1 kg hay at 3 months of age. Provide drinking water for 24 hours. From 4th months start mixing formula feed for growing heifers with calf starter gradually to shift from calf starter to formula feed. At the end of 4th month, replace calf starter completely with formula feed and wean.

(2) Feeding plan in different age of month

Table 4-6 Feed table for a calf

Month	Day	Body weight (Kg)	Milk (Liter)/day	Calf starter (Kg)/day	Formula feed for rearing calf (Kg)/day	Hay (Kg)	Green grass	Water
1 month	1 ~ 30	45	Average 3.5	Average 0.2	-	Little	-	Free
2 months	31 ~ 60	62	4	Average 0.5	-	Free	-	
3 months	61 ~ 90	77	3	Average 1.0	Average 0.5		-	
4 months	91 ~ 120	92	Average 1.5		Average 1.5		-	
5 months	121 ~ 150	107	-	-	2		-	
6 months	151 ~ 180	122	-	-	2		-	
7 months	181 ~ 210	137	-	-	-		2	
8 months	211 ~ 240	152	-	-	-	Little	9	
9 months	241 ~ 270	167	-	-	-	-	15	

4.8 Judgment of nutrient condition of calf

Let's learn 4 stages of nutrient level of calf

Level 4: Fatty: It is fatty and its whole body is covered by fat. Hip bone and rib bone cannot be recognized.

Fatty calf will have physiological problems easily. It is needed to reduce amount of feed to keep proper weight.

Level 3: Normal: Desirable nutrient condition



Level 2: Slightly weak: observe calf carefully and add some concentrate or formula feed if necessary.

Level 1: Very weak: check whether calf has a disease and carry out necessary treatment and drenching.

After that add some concentrate or formula feed.

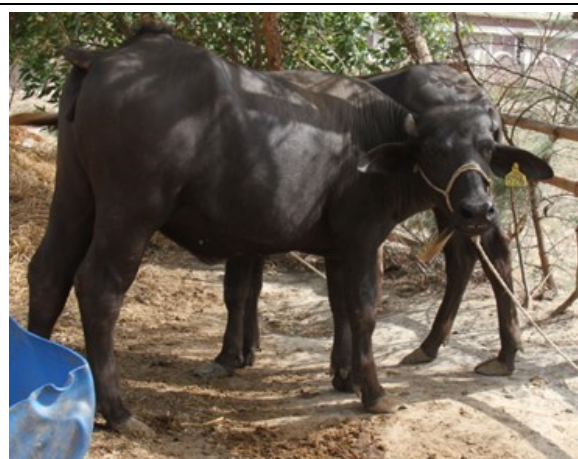


Photo 4-23 Level 4: Fatty



Photo 4-24 Level 3: Normal

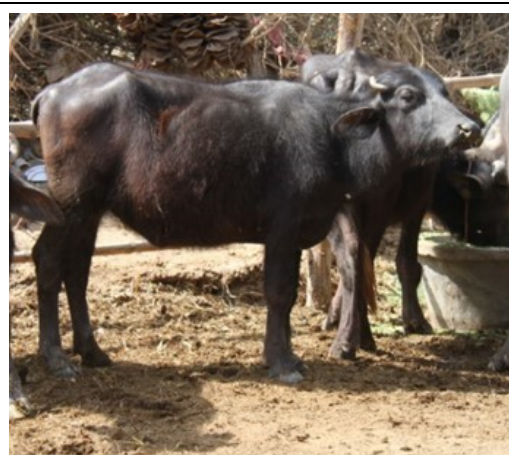


Photo 4-25 Level 2: Slightly weak



Photo 4-26 Level 1: Very weak

4.9 Preventive measures against heat for a calf

Heat preventive measures are important for calf rearing.

Bathing of a calf can be started from 6 months of its age. Heat preventive measures in hot season are important. Secure airy and shady place for calves. Sprinkle water over the surrounding area to reduce air temperature. Water spray can be used to sprinkle water over a body of calves every 30 minutes during excessively hot hours of the day so that the temperature of body surface of calves can be decreased.



4.10 Preventive measures against calf diarrhea

There are two major causes of diarrhea.

- 1) Improper nutrition and feeding management
- 2) Infectious diarrhea caused by bacteria, virus and internal parasites.

Countermeasures for calf diarrhea such as timely diagnosis, proper treatment and prevention are explained as below;

Physiological diarrhea and transient diarrhea

There is no need to treat in this case of diarrhea. Symptoms are as follows;

- Frequency of scours is once in a day
- Color of scours is white or yellow
- Calf is moving with its tail lifting up

(1) In case of lethargic calf

In this case following points should be checked.

1) Checking Dehydration:

Pull neck skin of calf. If the skin is tense or no elasticity, and eye balls recede into their sockets are the symptoms of dehydration.

2) Measurement of body temperature:

In general, normal body temperature of calf is higher than the adult animal. The normal range is 101.5-102°F (38.1-39.2°C). If the measurement shows high temperature beyond this range, calf has a fever.

(2) Treatment for dehydration

It is important to maintain the moisture in a body of calf. If calf is still vigorous, oral rehydration salts (ORS) such as electrolytes solution should be given orally as soon as possible. If calf is lethargic, intravenous injection of Ringer's solution or Normal saline (NaCl) should be given with the help of



veterinary doctors.

(3) Treatment for Infectious diarrhea with fever

Antibiotic or anthelmintic can be used to suppress infectious diarrhea.

(4) Appropriate nursing-care protocol

- 1) Separate a sick calf from a herd of healthy calves
- 2) Keep the calf on well dried place.
- 3) Disinfect the floor, rope, enclosure fence, feeding utensils etc. thoroughly

In case a calf become sick due to diarrhea, diagnose its level referring to the table below.
--

There are three categories of diarrhea score 1, score 2 and score 3.

Score 3 form is too soft to form its shape but its condition is better than score 2 and it splashes on solid floor when a calf defecates.

Score 2 is loose and soup form of stool. The stool does not splash on the solid floor because it is liquid form.




Score 1 is bloody stool. Black in color and blood is mixed. There is a possibility that a calf is infected with coccidiosis.

Each score is categorized into 2 conditions. Check the condition of a calf every time, if you find diarrhea than provide treatment with most appropriate manner. If the condition of calf gets worse quickly then immediate treatment is necessary. Medicine for stomach and intestinal disorder, antidiarrheal, oral replacement fluid “ORS” and antibiotic should be always kept available.

Once determined, treatment will continue at least 3 days.



Table 4-7 Diarrhea score of a calf

			Treatment by farmer	Treatment by veterinarian
Score 3 	Light diarrhea Stool is too soft to form its shape. When animals defecate, stool splashes.	Calf is standing. Calf drinks milk but slowly or does not drink.	ORS Medicine for stomach and intestinal disorder: 2 times	x
		Calf doesn't stand up. Calf doesn't drink milk.	ORS Antidiarrheal (Scorex oral suspension) : 2 times a day	
Score 2 	The terrible diarrhea Very loose, soup form of dung.	Calf is standing. Calf drinks milk but slowly or does not drink.	ORS Injection Sulfa drug by intramuscular injection	It is better intravenous injection 2 liter of physiological saline solution containing sulfa drug by veterinarian
		Calf doesn't stand up. Calf doesn't drink milk.		
Score 1 	Bloody stool Sometimes blood is mixed with stool	Calf is standing. Calf drinks milk but slowly or does not drink.	ORS Injection Sulfa drug by intramuscular injection	It is better intravenous injection 2 liter of physiological saline solution containing sulfa drug by veterinarian + Anti-coccidium
		Calf doesn't stand up. Calf doesn't drink milk.		

4.11 Pneumonia in calves

Pneumonia is a major problem in calves it may be due to bacterial and viral infection.

Symptoms

- Dull and depressed
- High temperature up to 105°F
- Raised breathing due to infected lungs
- Nasal discharge
- Dry muzzle
- Coughing
- Reduced food intake

Treatment

Antibiotics, anti-inflammatory and anthelmintic drugs can be prescribed for treatment.



Chapter 5 Reproduction

5.1 Improving reproduction

Reproduction can be improved in following 2 ways;

- 1) To achieve early age at first calving (for heifer); Improve feeding management so as to improve growth of heifers and to have first mating and conception in early age. When body weight of heifer reaches to 300kg (or 161cm heart girth), is appropriate time for mating can be taken place.
- 2) To achieve early conception after parturition (for parous cow); Shorten calving interval.

5.1.1 To achieve early age at first calving (for heifer)

Cattle/buffaloes can produce milk only after she conceives and delivers a calf. Cattle in Sindh Province conceives for first time at around 2.5 to 3 years old and have first calving at the age of 3.5 to 4 years. For a heifer to get conceived in its early age, it needs to grow well and reach at early maturity. Daily weight gain of calves and heifers in rural Sindh is 0.25 kg on average, which is low and main cause of late maturity and age at first mating. It is important to increase daily weight gain up to 0.5kg by providing plenty of good quality hay (of those plenty of leaves) during suckling and after weaning up to 8 months of age, followed by provision of plenty of good quality of roughage (of those plenty of leaves) after 8 months of age. The heifer can reach to optimum body weight 300 Kg at the age of 1 and half years. This is appropriate body weight for first mating.

[Example of buffalo]

- The present buffalo growth in rural Sindh: 1,064 days (about 3 years old) are needed to reach appropriate body weight for first mating
 $\text{Birth weight of } 34\text{kg} + (1,064 \text{ days} \times 0.25 \text{ kg}) = 300\text{kg}$
- In case of improved growth rate (0.5Kg/day): The heifer at the age of 532 days (about 1.5 years old) shall reach appropriate body weight for first mating
 $\text{Birth weight of } 34 \text{ kg} + (532 \text{ days} \times 0.5\text{kg}) = 300\text{kg}$

(1) Body weight

It is not easy to measure body weight of buffaloes at farm, because it is required a retainer and a load-bar. Therefore, the Project developed the table for body weight estimation by the length of heart girth of Kundhi buffalo and its mix breed which is the most common breed for livestock rearing in Sindh province. It is easy to estimate body weight by measurement of heart girth using measuring tape with few errors from actual body weight. The table for body weight estimation is covered a range of heart girth from minimum 65cm to maximum 255cm. It is equivalent from 40kg to 1,030kg in body weight.

(2) How to measure correct heart girth

- 1) Let a buffalo stand flat area and incline its head upward.
- 2) Right body position for measurement is shown in Photo 5-1. It is just next to shoulder blade.
- 3) Wrap the measuring tape around right position and fasten it with room for your two fingers. This is the standard.



4) In case of an emaciated buffalo, fasten the measuring tape slightly tight. In case of a fatty buffalo, slacken the measuring tape slightly.



Photo 5-1 Right position is shown in a white line to measure heart girth

Table5-1 Quick chart for body weight and heart girth

Heart Girth	Estimated weight	Heart Girth	Estimated weight	Heart Girth	Estimated weight	Heart Girth	Estimated weight	Heart Girth	Estimated weight	Heart Girth	Estimated weight	Heart Girth	Estimated weight	Heart Girth	Estimated weight
65	40	91	62	117	120	143	214	169	344	195	510	221	712	247	950
66	40	92	63	118	123	144	218	170	350	196	517	222	720	248	960
67	40	93	65	119	126	145	223	171	355	197	524	223	729	249	969
68	40	94	67	120	129	146	227	172	361	198	531	224	737	250	979
69	41	95	68	121	132	147	232	173	367	199	539	225	746	251	989
70	41	96	70	122	135	148	236	174	373	200	546	226	755	252	1000
71	42	97	72	123	138	149	241	175	379	201	553	227	763	253	1010
72	42	98	74	124	142	150	245	176	385	202	561	228	772	254	1020
73	43	99	76	125	145	151	250	177	391	203	568	229	781	255	1030
74	43	100	78	126	148	152	255	178	397	204	576	230	790		
75	44	101	80	127	152	153	260	179	403	205	583	231	799		
76	45	102	82	128	155	154	264	180	410	206	591	232	808		
77	45	103	84	129	159	155	269	181	416	207	599	233	817		
78	46	104	86	130	162	156	274	182	422	208	606	234	826		
79	47	105	89	131	166	157	279	183	429	209	614	235	835		
80	48	106	91	132	170	158	284	184	435	210	622	236	845		
81	49	107	93	133	173	159	290	185	442	211	630	237	854		
82	50	108	96	134	177	160	295	186	448	212	638	238	863		
83	51	109	98	135	181	161	300	187	455	213	646	239	873		
84	52	110	101	136	185	162	305	188	462	214	654	240	882		
85	53	111	103	137	189	163	311	189	468	215	662	241	892		
86	55	112	106	138	193	164	316	190	475	216	670	242	901		
87	56	113	109	139	197	165	322	191	482	217	678	243	911		
88	57	114	111	140	201	166	327	192	489	218	687	244	920		
89	59	115	114	141	205	167	333	193	496	219	695	245	930		
90	60	116	117	142	210	168	338	194	503	220	703	246	940		

5.1.2 To achieve early conception after parturition (for parous cattle/buffalo)

(1) Early reproductive diagnosis after parturition

Cattle requires 30 to 45 days to recover their uterus after parturition. To mate your cattle earlier after



parturition to get it conceived again, your proactive action will be needed. Call a veterinary doctor to have early reproductive diagnosis of cattle at 30 days after its parturition. Necessary treatment of problem cows by a veterinarian doctor at that point of time will allow cattle to come in heat and get conceived again in early stage. Short delivery interval means more number of parturition in their life time. It also means that cow produce more milk in her life time and income of the farmer increased.

(2) Shortening calving interval

1) Cattle

It might be a little bit difficult target to get one calving per year. Earlier a cow get conceived, shorten the calving interval. As a result, total milk production of a cow in her lifetime will increase.

One year is comprised of 365 days. Pregnancy period of a cow is 285 days on average. Deducting 285 days from a year equals to 80 days. Supposing recovering period of uterus as 30 days on average¹, 50 days (80 days minus 30 days) will be left for next conception. If a cow comes in heat again during these 50 days of period and get conceived, ‘one delivery per year’ can be achieved. Heat cycle of a cow is 21 days on average. You will have 2 chances of your cow becomes in heat and get conceived during this period.

Example: Parturition interval : Case of Cattle

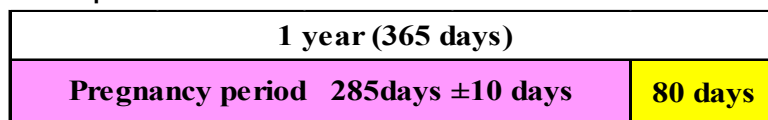


Figure 5-1 Pregnancy period of a cow

2) Buffalo

Pregnancy period of buffalo is longer than cattle, which make it more difficult to get one calving per year as compared with cattle. Earlier a buffalo get conceived, shorter calving interval becomes. As a result, total milk production of a buffalo in her lifetime will increase.

One year is comprised of 365 days. Pregnancy period of a buffalo is 310 days on average, which is 25 days longer than cattle. Deducting 310 days from a year equals to 55 days. Supposing recovering period of uterus as 30 days, 25 days (55 days minus 30 days) will be left for next conception. If a buffalo comes in heat again during this 25 days of period and get conceived, ‘one delivery per year’ can be achieved, which seems difficult for a case of buffalo. Heat cycle of a buffalo is 21 days on average. If mother buffalo comes in heat and get conceived during this period, you can achieve the target. It is, however, difficult for a case of buffalo so the ideal delivery interval would be a little bit longer than those of a cow.

Example: Parturition interval : Case of Buffalo

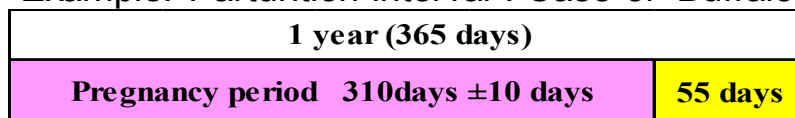


Figure 5-2 Pregnancy period of a buffalo

¹ 20 to 70 days are required to recover uterus after calving.



5.2 Detecting heat of Kundhi buffalo

Currently there is no detailed data of heat phenomenon of Kundhi buffalo available. Data of Nili Ravi buffalo breed, therefore, is used for explanation below. Comparing with cattle, it seems quite difficult to detect heat sign of buffalo.

5.2.1 Heat

Buffalo comes in heat mostly in the night, i.e. 85% heat is appeared in the night time. It is, therefore, difficult for farmers to detect their heat sign.

	Time	%	
The night	18:00 - 22:00	19	85
	22:00 - 02:00	40	
	02:00 - 06:00	26	
The day	06:00 - 12:00	4	15
	12:00 - 18:00	11	

Table 5-2 Heat sign of Nili Ravi buffalo breed detected by time

Figure 5-3 Heat sign of Nili Ravi buffalo breed detected by time

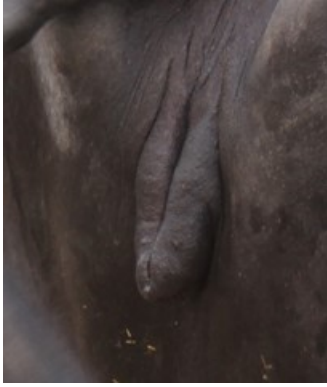
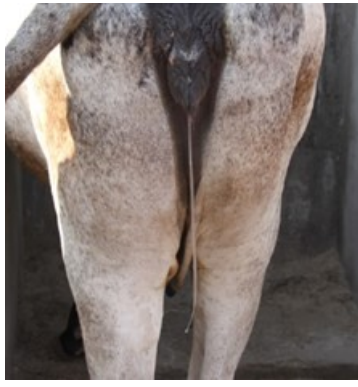

Source: National Agricultural Research Center

Besides, characteristics of buffaloes' heat sign are different from cattle, which are explained below;

- Mounting with both female animal, i.e. courtship display, are rarely seen. (buffalo mounted by fellow buffalo is in heat).
- Mucus from external genitalia is not strongly correlated with heat sign.
- Only around 30% of buffalo bellowing at the time of heat.
- Heat period is short.
- Silent heat (heat without apparent sign) frequently occurs.

Heat can also be detected from phenomenon such as decrease of milk production, becoming fidget, buffalo does not care even their hind legs are touched.



		
Photo 5-2 Swelling of external labium	Photo 5-3 Mucus from external labium	Photo 5-4 Natural mating

5.2.2 Frequency of heat detection observation for buffalo

Normally frequency of observation for heat detection can be set as 3 times in a day, namely, morning, midday and evening. At least 10 minutes per time observation are recommended. Observation of your herd in the paddock or grazing field allows to check mounting behavior of buffalo so that detection rates can be increased. As mentioned above, for the case of buffaloes, their heat occurs mostly in the night, i.e. 19% during 18:00 to 22:00 and 40% during 22:00 to 2:00. It is, therefore, recommended to observe one more time before you go to sleep in the night.

5.3 Reproductive record

Let's improve reproduction of your cattle together with veterinary doctors.
To improve reproduction of your cattle, record on reproductive activities of your cattle is essential step.
Let's look at the calendar below, learn how to record and do it!

Currently farmers in Sindh province do not take any measures against their cattle which have been nonpregnant for a long time. Proper reproductive diagnosis and treatment is almost non-existent in rural areas. There are few numbers of skilled veterinary doctors specialized in reproductive health as well.

To improve reproduction of your cattle, records of reproductive activities of your cattle is necessary.

This record will help for proper diagnosis and treatment by veterinary doctors.

Let's start recording.

As a first step, you enter the name of female cattle/buffalo.

Any calendar is used for recording. Following information should be noted down on day each activity is taken place.

- 1) Record of Parturition: Name of mother
- 2) Record of Heat: Name of female cattle/buffalo comes in heat
- 3) Record of Mating: Name of female cattle/buffalo mating, type of mating, i.e. either natural mating (NM) or artificial insemination (AI), Name of bull
- 4) Other information: Abortion, Sold out, Dead and so on.



Table 5-3 Sample of reproduction record (calendar type)

Sun.	Mon.	Tue.	Wed.	Thu.	Fri	Sat.
Note: NM: Natural mating A I : Artificial Insemination				1	2	3
4	5 Basir, Heat	6 Basir, NM	7	8	9	10 No.211, Died
11	12	13	14	15 Badin, Heat	16	17
18	19 Tand, Abortion	20	21	22 Memon, Delivery	23	24
25	26 Hyde, AI	27	28	29 Tand, Sold	30	31



Chapter 6 Animal Health

6.1 Promotion of disinfection practice

Syringes, needles and other apparatus for medical care and treatment should be sterilized by boiling. Sterilized syringes, needles and other apparatus should be kept in the disinfected metal box or glass bottle and do not mix with used syringes or needles.

Dettol which is easily available in the local market can be used for disinfection instead of alcohol. Spray will be used for disinfection of nervous cattle so that technician can quickly disinfect cattle before they run away.

Disinfection method is not practicing in Sindh province. Disinfection of syringes for vaccination, treatment and apparatus for injecting medicines to uterus were not practiced. Hands are also not disinfected when technician insert their hands in vagina at the time of delivery. Main hindering factors of disinfection practices are as follows; 1) Purchase of alcohol for disinfection needs special permission (To prevent from drinking alcohol accidently), 2) Difficulty of animal management at the time of injection (Animals are nervous and injection has to be given immediately, so there is no chance of disinfection practice), and 3) Shortage of needles and syringes. Considering all hindering factors mentioned above, following promotion of disinfection practice will be carried out to prevent cattle from infection of communicable diseases due to unhygienic treatment.



Photo 6-1 Spray for disinfection



Photo 6-2 Schimmelbusch (boiling-sterilizer) and metal box for disinfected syringes and needles

6.2 Prioritizing prevention

Focus on prevention of diseases.

Once young cattle/ become sick, their growth will be suspended. If milking cow becomes sick, their milk production will be decreased. It takes some time to recover their milk production. In some cases, milk production will not be recovered up to the previous yield. This cause huge economic loss of farm.

Prevention is less costly than treatment. Prevention is, therefore, most important in animal health.

Basis for prevention of disease is vaccination for infectious disease and regular deworming for endo and ecto parasite. When cattle become weak, resistance against disease will be decreased and become easy to get sick. Maintaining healthy body through proper daily feeding management is also very important to prevent cattle/buffalo from disease.



6.2.1 Foot and mouth disease (FMD)

What is FMD?

Initially, blisters grow in a mouth, nose, hoof and udder. Those blisters become smashed and ulcer forms. Ulcer in the mouth decrease appetite. Ulcer on hoofs causes lameness. Main symptoms are visible on mouth and hoof, thus it is called as 'foot and mouth disease'. FMD is not fatal disease but once body weight and milk production of those cattle/buffaloes are dropped, it takes long time to recovery. Loss for 1 head of FMD infected buffalo might be little, but it results in huge amount of economic loss as whole region or a country.

* Disinfection: Appropriate disinfectant for FMD are caustic soda, sodium carbonate, acetic acid. It has resistance against acid, alkaline, ether and sunshine. (Potassium permanganate, tinct: Iodine, glycerine, gentian violet).

* Transmission: Splash from breath of FMD infected animal transmit FMD virus to other animals. Wind also spread virus as far as 50km distance.

6.2.2 Hemorrhagic Septicemia HS

HS is bacterial disease and acute pasteurellosis. Most symptoms are acute and infected animals die within 8 to 24 hours after symptom appears. HS vaccine can keep in room temperature and less costly. Vaccinate HS vaccine every year at specified time to prevent from it.

HS disease outbreak is common among cattle and buffaloes. Buffaloes are more susceptible than cows to get infection of HS disease. HS is fatal disease which causes death within a very short period, it makes difficult to detect the initial symptoms. Initial symptoms are high fever, edema on neck or breast, salivation and nasal discharge. HS bacteria is transmitted through direct or indirect contact with nasal flow or saliva.

6.2.3 Endoparasite

Perform deworming according to annual deworming calendar (attached with this text).




Oral administration of deworming is less costly and effective.

Deworming of calves

Newly born calves have less number of parasites, but number of parasite in their body gradually increases while they grow up. Calves grown up with good nutrients increase their resistance by the time they reach 6 months of age. The number of parasite in their body, then, gradually decreased after 6 months of age. On the other hand, underfed and weak calves increase the number of parasite in their body very quickly, which cause frequent complication of diarrhea and pneumonia. Consequently, they lose body strength. It is vicious circle.

Most important thing is to feed proper nutrients to calves. At the same time, deworming of calves during their early month of age is equally important. To prevent from parasite being transmitted from wet floor, keep the calves always on dry floor.



		
Photo 6-3 Deworming in the iron race	Photo 6-4 Deworming in a paddock	Photo6-5 Deworming in a field

6.2.4 Blood protozoan disease

Blood protozoan include Anaplasma, Babesia, Theileria and so on. These protozoans causes high fever during outbreak. When your cattle show high fever, call veterinary doctor immediately. Let veterinary doctor investigate and identify a type of disease and give proper treatment to cattle immediately.

Blood protozoan diseases are transmitted through ectoparasite such as tick, horsefly, and stable fly. Spray insecticides or repellents for their eradication.

6.2.5 Prevention and treatment of mastitis

Please refer to the comic 'Let's learn about mastitis'.

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سنڌ جي ٻهراڙي ۾ چوپائي مال جي پائيدار ترقي وارو منصوبو
جاپان جي عالمي تعاون جي اداري ۽ حڪومت سنڌ جي سهڪار سان

ٽي

منافع بخش ڊيري فارمنگ تي توسيعي ڪارڪنن جي رهنمائي لاءِ مناسب فني مهارتن ۽ ترڪيبن جو ڪتابچو



مارچ 2020



سڀ حق ۽ واسطا محفوظ

هي ڪتابچو جانورن جي ماهرن جي لاءِ تيار ڪيو ويو آهي. جانورن جي پالنا ۽ ماهيگيري وارو ڪاتو حڪومت سنڌ هن ڪتابچي جي بهتري جي لاءِ اوهان سڀني پڙهندڙن جي مشورن ۽ صلاحن جي آڃيان ڪري ٿي. هي ڪتاب سنڌ جي بهراڙي وارن علائقن جي لاءِ پائيدار ترقي واري منصوبي طرفان تيار ڪيو ويو.

ٽيون ايڊيشن مارچ 2020

تعاون ڪندڙ ۽ ڇپائيندڙ: سنڌ جي بهراڙي وارن علائقن جي لاءِ پائيدار ترقي وارو منصوبو ۽ جاپان انٽرنيشنل ڪو آپريشن ايجنسي (JICA) ۽ جانورن جي پالنا ۽ ماهيگيري وارو ڪاتو حڪومت سنڌ.



مهاڳ

پاڪستان جي زراعت واري شعبي ۾ وڏي ۾ وڏو حصو چوپائي مال واري شعبي جو آهي، جيڪو ملڪ جي مجموعي پيداوار ۾ پنهنجي آمدني حصي طور 11.4 سيڪڙو شامل ڪري ٿو. چوپائي مال جو شعبو بهراڙي جي ماڻهن جو گذر سفر ۽ ان جي معيشت ۾ اهم ڪردار ادا ڪري ٿو، ڇاڪاڻ ته سنڌ جي بهراڙين ۾ غريب ماڻهن لاءِ چوپائي مال جي پالنا هڪ نقد آمدني ۽ کاڌ خوراڪ جو پڻ ذريعو آهي ۽ ڪڏهن ڪڏهن ته صرف چوپايو مال ئي غريب ماڻهن جي ملڪيت هوندو آهي. سنڌ جي بهراڙين ۾ هي منصوبو پنجن سالن کان چوپائي مال جي پائيدار ترقي وارو منصوبو جي نالي سان هلي پيو، جيڪو سنڌ جي چوپائي مال واري کاتي حڪومت سنڌ ۽ جاپان جي عالمي تعاون جي اداري (JICA) جي سهڪار سان شروع ڪيو ويو جنهن جو مقصد سنڌ صوبي ۾ چوپائي مال واري شعبي جي پائيدار ترقي جو بنياد وجهڻ آهي، جنهن سان سنڌ جي غريب ننڍن مالوندن جيڪي شعبي جي 80 سيڪڙو ماڻهن/مالوندن تي مشتمل آهن، کي پائيدار ترقي ۾ شامل ڪرڻ آهي. هي منصوبو فيبروري 2014 ۾ سنڌ جي 5 مثالي ضلعن ۾ شروع ڪيو ويو انهن ضلعن ۾ مٽياري، حيدرآباد، ٽنڊو محمد خان ۽ بدين ضلعو شامل آهن. هن منصوبي ۾ ماهرن مناسب ترڪيبون استعمال ڪري جانورن مان ڪير جي پيداوار وڌائڻ تي ڌيان ڏنو. پنجن ئي سالن جي عملدرآمد واري عرصي دوران اهي مناسب مهارتون ۽ ترڪيبون پڌريون ڪيون ويون ۽ آزمائشي طور تي استعمال ڪيون ويون ته جيئن سنڌ صوبي جا ننڍا ڀاڱيا انهن مهارتن ۽ ترڪيبن کي استعمال ڪري سگهن. مناسب ترڪيبن سان گڏ چوپائي مال واري شعبي سان لاڳاپيل ماهرن لاءِ بنيادي ڪارائتيون مهارتون پڻ پڌريون ڪيون ويون جيڪي انهن مختلف شعبن تي مشتمل آهن. جنهن ۾ فارم جي سار سنڀال، چوپائي مال جي بازار، کاڌ خوراڪ، گاه ۽ چارا، جانورن جي صحت، جانورن جو توليدي عمل، جانورن جو نسلي واڌارو ۽ جانورن جا اثاڻا شامل آهن. هن منصوبي ڪمرشل ڪيٽل ڪالونين ۾ جانورن جي ڪارائتن ترڪيبن ۽ مهارتن جي استعمال تي پڻ ڪم ڪيو آهي، جهڙوڪ باڪٽرين مينهن کي وري وياڻ لائق بنائڻ ۽ نون ڄاول ڦرن کي پالڻ جا طريقا آزمائشي ڪاسائين هٿان ڪسجڻ کان بچايو آهي.

هن منصوبي طرفان جيڪي مهارتون ۽ ترڪيبون آزمايون ويون آهن انهن کي ڪتابن جي صورت ۾ سهيڙيو ويو آهي، ته جيئن اهي وڏي ۾ وڏي استعمال ڪيون وڃن ۽ لاڳاپيل پيشاور ۽ سنڌ جو چوپائي مال وارو کاتو اها اميد ٿو ڪري ته هنن اشاعتن جو مجموعو سرڪاري ۽ خانگي طور تي ڪم ڪندڙ عملي جي طرفان وڏي پيماني تي استعمال ڪيو ويندو ۽ سنڌ جا مالوند ڀائر پڻ ان مان فائدو حاصل ڪري پنهنجي آمدني ۽ گذران ۾ بهتري آڻي سگهندا.

ڊائريڪٽر جنرل_پروجيڪٽ ڪوآرڊينيٽر

چوپائي مال ۽ ماهيگيري وارو کاتو حڪومت سنڌ



پيش لفظ

پاڪستان جي صوبي سنڌ جي ڏاکڻي علائقي ۾ سنڌ سرڪار جي چوپائي مال ۽ ماهيگيري واري کاتي ۽ جاپان جي عالمي تعاون جي اداري (JICA) جي سهڪار سان سنڌ جي بهراڙي ۾ چوپائي مال جي پائدار ترقي وارو منصوبو شروع ٿي چڪو آهي. هي منصوبو جاپاني ماهرن جي مدد ۽ پنيپرائي سان شروع ٿيو جنهن جي اڳواڻي محترم هيروشي اوڪابي ڪئي.

هن منصوبي جا ڊيرپا مقصد اهي هئا ته کير جي پيداوار ۽ غريب مالونڊن جي آمدني کي وڌائجي. سنڌ جا مالونڊ ننڍي پيماني تي جانور پالين ٿا جن جو تعداد ننڍا وڏا جانور ملائي پنج هجي ٿو ۽ جيڪي وڏي مينهن، ٽهاڙ ۽ ڦرن تي مشتمل هجن ٿا. عام طور تي ننڍن مالونڊن کي پنهنجي ذاتي زرعي زمين نه هوندي آهي، انهن حالتن ۾ اهو تمام مشڪل هوندو آهي ته فارم کي سٺي نموني هلائي سگهجي. تنهنڪري ڊيرپا مقصدن کي ڏسندي منصوبي جي طرفان 50 مناسب مهارتون ۽ ترڪيبون تصديق ڪيون ويون آهن. انهن ترڪيبن جي درجابندي A, B, C جي تحت ڪئي وئي، جيڪي هر هڪ ترتيب وارو 20، 22، ۽ 8 آهن. انهن مان هر هڪ کي هيٺ بيان ڪجي ٿو.

درجو A ظاهر ڪري ٿو تمام ڪارائتي مهارت ۽ ان تي آساني سان عمل ڪري سگهجي ٿو.

درجو B ظاهر ڪري ٿو تمام ڪارائتي مهارت پر ان تي آساني سان عمل نٿو ڪري سگهجي.

درجو C ظاهر ڪري ٿو وچٿري ڪارائتي مهارت ۽ منصوبي جي عرصي دوران ان کي آساني سان سمجهائي ۽ عمل نٿو ڪرائي سگهجي.

چوپائي مال جي ماهرن کي گهرجي ته شروعاتي طور تي مالونڊن کي درجو A ۾ ايندڙ مهارتن جي ڄاڻ ڏين، فارم کي سٺي نموني هلائڻ لاءِ درجو B ۽ C ۾ ايندڙ مهارتون پڻ تمام ضروري آهن. تنهنڪري ماهرن کي انهن ترڪيبن متعلق به مالونڊن کي همٿائڻ گهرجي. ان سان گڏ ڊگهي عرصي تائين کير جي پيداوار کي وڌائڻ لاءِ 32 بنيادي ڪارائتيون ترڪيبون به واضع ڪيون ويون آهن. جيڪي جانورن جون توليدي بيماريون انهن جي تشخيص ۽ علاج، کير جي چڪاس ۽ ماپ، جانورن جي نسل جي بهتري ۽ خانداني نسل جو رڪارڊ رکڻ ۽ جانورن جي چيري ٺاهڻ تي مشتمل آهن. هن ڪتاب ۾ 50 مناسب ترڪيبون ۽ 9 ڪارائتيون ترڪيبون بيان ڪيل آهن.

هن منصوبي کي هلائڻ لاءِ سنڌ سرڪار جي چوپائي مال واري کاتي جي 9 ويٽرنري ڊاڪٽرن 13 جاپاني ماهرن ۽ هڪ ٽئين ملڪ بوليويا جي ماهر گڏجي ڪم ڪيو آهي. منصوبي جي انهن ڪمن ڪارن جي بنياد تي هي ڪتاب سهيڙيو ويو آهي. ان حوالي سان منصوبي جي قومي اسٽاف جي مدد هن ڪتاب کي مڪمل ڪرائڻ لاءِ تمام ضروري هئي. اسان هن موقعي جو فائدو وٺندي انهن سڀني جا شڪر گزار آهيون جيڪي هن ڪتاب جي تياري ۾ سهڪاري هئا. اسان اميد ٿا ڪريون ته هي ڪتاب چوپائي مال جي ماهرن لاءِ ڪارائتو ثابت ٿيندو جيڪي اڳتي هلي سنڌ جي ننڍن مالونڊن کي ماهراڻا مشورا ڏيندا.

ايڊيٽر انچارج ڊاڪٽر هديو توميناگا

جانورن جي پالنا واري کاتي جا 9 ماهر ڊاڪٽر ۽ جاپاني ماهرن جي ٽيم



پاڪستاني ماهرن جي ٽيم

1. ڊاڪٽر مشتاق حسين جو ڪيو - پروجيڪٽ مئنيجر
2. ڊاڪٽر عزيز احمد پليجو - ڊپٽي پروجيڪٽ مئنيجر
3. ڊاڪٽر غلام محمد جسڪاني - فارم جي انتظامي معاملن واري شعبي جو ماهر
4. ڊاڪٽر صفدر علي فاضلاڻي - جانورن جي کاڌ خوراڪ جي شعبي جو ماهر
5. ڊاڪٽر محمد عارف - گاهن جي واڌاري واري شعبي جو ماهر
6. ڊاڪٽر علي اختر شاهڻي - جانورن جو توليدي نظام واري شعبي جو ماهر
7. ڊاڪٽر ذولفقار پناڻ - جانورن جي صحت واري شعبي جو ماهر
8. ڊاڪٽر محمد مبارڪ جتوئي - جانورن جي نسل جي بهتري واري شعبي جو ماهر
9. ڊاڪٽر اقتدار علي ميمڻ - جانورن جي واپار واري شعبي جو ماهر
10. ڊاڪٽر نعيم صديق انصاري - جانورن جا اثاثن واري شعبي جو ماهر
11. ڊاڪٽر رخسان وگهيو - سڪيا واري شعبي جي ماهر

جاپاني ماهرن جي ٽيم

1. ڊاڪٽر هديو توميناگا - جانورن جي فني مهارتن جي ترقي واري شعبي جو ماهر
2. ڊاڪٽر تيريو سوجيواڪا - جانورن جي کاڌ خوراڪ جي شعبي جو ماهر
3. تيريو ڪاوامورا - جانورن جي کاڌ خوراڪ جي شعبي جو ماهر
4. ڊاڪٽر شنسوكي ڪوبا ياشي - گاهن جي تحقيق واري شعبي جو ماهر
5. ڊاڪٽر ڪازو هيرو اونو - جانورن جو توليدي نظام واري شعبي جو ماهر
6. ڊاڪٽر تاڪيشي ابي - جانورن جو توليدي نظام واري شعبي جو ماهر
7. ڊاڪٽر شگيهيسا سومگاڙي - جانورن جو توليدي نظام واري شعبي جو ماهر
8. ڊاڪٽر يوشيتاڪا نيگامني - جانورن جي نسل جي بهتري واري شعبي جو ماهر
9. ڊاڪٽر يوشيو چيبا - جانورن جي نسل جي بهتري واري شعبي جو ماهر
10. محترم فيوميڪو اڪيگايا - جانورن جي واپار واري شعبي جو ماهر
11. ڊاڪٽر يوكيو اڪيدا - فارم جي انتظامي معاملن واري شعبي جو ماهر
12. محترم نائو فيومي سڪيداتي - جانورن جي ڪر ڪٽڻ جو ماهر
13. محترم نوريڪو هارا - جانورن جي فني مهارتن جي ترقي واري شعبي جي ماهر جي مددگار
14. محترم ميڪا ڪاواموتو - جانورن جي توسيع ۽ صنف واري شعبي جي ماهر
15. ڊاڪٽر وديس - ٽئين ملڪ بوليويا سان تعلق رکندڙ اينڊرولوجي جي شعبي جو ماهر

پاڪستاني قومي ماهرن جي ٽيم

1. ڊاڪٽر غلام سرور شيخ - جنرل ڪوآرڊينيٽر
2. ڊاڪٽر رسول بخش سومرو - ٽيڪنيڪل ڪوآرڊينيٽر
3. محترم زاهده سومرو - ٽيڪنيڪل اسسٽنٽ



مناسب فني مهارتن ۽ ترڪيبن جي فهرست

درج بندي	مناسب فني مهارتون	تعداد		ٽيڪني ڪل فيلڊ
C	فارم جو مثالي انتظام	1	1	فارم جو انتظام
B	ڪم ڪار ڪندڙ ماڻهن جو خرچ گهٽائڻ	2	2	
C	ڊيري فارم جو خرچو گهٽائڻ	3	3	
C	ڪير جو مناسب مقدار مستقل وڪري لاءِ هجي	1	4	واپاري معاملا
C	ڪير جي ڪمپني جو مثالي پاڳئي سان رابطو	2	5	
A	ڪير ۾ پاڻي نه ملائڻ	3	6	
A	ضرورت مطابق پاڻي جي موجودگي	1	7	کاڌ خوراڪ
A	صاف پاڻي	2	8	
A	جانور کي ٻڌڻ جو طريقو بهتر ڪرڻ	3	9	
B	چيرو ٺاهڻ	4	10	
A	هوا جو بهترين گذر	5	11	
A	فرش کي خشڪ رکڻ	6	12	
A	جمنڻ کانپوءِ ڦر جي مناسب سار سنڀال	7	13	
A	پس جي ڏهائي مناسب طريقي سان ۽ وقت تي ڪرڻ	8	14	
B	ڏائيندڙ ڦر جي صحت جو خيال رکڻ	9	15	
A	ڦرن کي گرمي کان بچائڻ	10	16	
B	ڏهائي واري جاءِ جي فرش ۽ ڇت کي بهتر ڪرڻ	11	17	
A	ويامن جي وقت جانور جي سار سنڀال	12	18	
B	ويامن کانپوءِ جانور کي مناسب خوراڪ ڏيڻ	13	19	



B	باڪڙي مينهن جي سار سنڀال	14	20	کاڌ خوراڪ
B	ويامن کان پهرين جانور کي مناسب خوراڪ ڏيڻ	15	21	
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A	جانورن کي ڦوهارو هڻڻ	17	23	
A	جانورن جا ڪر ڪٽڻ	18	24	
A	ڪير وارن جانورن جي جسماني صحت ۽ وزن جو جائزو	19	25	
A	ڦرن لاءِ خوراڪ جي ترتيب	20	26	
C	جانور کي قابو ڪرڻ لاءِ جهنگلي (رتينر) جو استعمال	21	27	
B	پيڻ لاءِ مناسب پاڻي جي موجودگي	22	28	
B	ڏهائي جو صحيح طريقو	23	29	
C	جانورن جي گڏيل سار سنڀال	24	30	
C	فارمولا فيڊ تي تجربو	1	31	گاهن جي بهتري
B	سني خاصيت وارو گاه ڪارائڻ	2	32	
A	چاري جا ٿانو صاف رکڻ	3	33	
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B	ڦرن لاءِ دائيڊار خوراڪ	5	35	
B	جانورن جي توليدي عمل جو رڪارڊ رکڻ	1	36	توليدي نظام
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B	توليدي عمل جي تشخيص ڪرڻ	3	38	



B	ڦرن ۾ جلابن جو علاج ڪرڻ	1	39	جانورن جي صحت
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A	نسل کي بهتر ڪرڻ لاءِ جاڳرتا مهر هلائڻ	2	49	
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بنيادي ڪارائتو مهارتن ۽ ترڪيبن جي فهرست

وڏي پيماني تي استعمال ٿيون ۵ ننڍي پيماني تي استعمال ٿيون Δ نافذ نٿيون X

ڪيتري پيماني تي عمل ۾ آيون درج بندي	بنيادي ڪارائتو مهارتون ۽ ترڪيبون	تعداد		ٽيڪنيڪل فيلڊ
○	ديري فارمرن جي درج بندي	1	1	1. فارم جو انتظام
○	ديري فارم جو اقتصادي جائزو	2	2	
○	ديري فارم جي هر خبر جو رڪارڊ رڪن	3	3	
△	ڪير ۽ جانورن جي واپار بابت ڄاڻ ۽ خبرون گڏ ڪرڻ	1	4	واپاري معاملو
X	پاڻي جي خاصيت کي بهتر ڪرڻ	1	5	جانورن جي کاڌ خوراڪ
X	جانورن کي ٻاهر چارڻ لاءِ ڪاهي وڃڻ	2	6	
○	ڪير جي ڏهائي لاءِ الڳ وٽاڻ ٺاهڻ	3	7	
○	جانورن لاءِ سادو چيرو ٺاهڻ	4	8	
○	وٽاڻ کان الڳ جانورن جي لاءِ جڳهه مخصوص ڪرڻ	5	9	
△	سردي کان بچاءُ لاءِ بندوبست ڪرڻ	6	10	
○	جانورن جي چاري لاءِ آهن جو انتظام	7	11	
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○	خوراڪي جزن جو جائزو وٺڻ	3	15	



△	زمين جي زرخيزي جو جائزو وٺڻ	4	16	گاهن جي بهتري
△	جانورن لاءِ لوڻ جو بندوبست ڪرڻ	5	17	
△	تبجڻ	1	18	توليد معاملا
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1. باب پهريون ڊيري فارم جو انتظام بهتر هلائڻ جا بنياد

اچو ته ڊيري فارم جي انتظام جون بهتر ترڪيبون استعمال ڪري وٽاڻ ۽ جانورن جي سار سنڀال عمدي طريقي سان ڪري کير جي پيداوار وڌايون ته جيئن توهان جي رهڻي ڪهڻي جي معيار ۾ بهتري اچي سگهي.

اهو آسان هدف ناهي پر توهان جي ڪوششن سان ممڪن ٿي سگهي ٿو.

1.1 کير جي پيداوار وڌائڻ لاءِ تجربو.

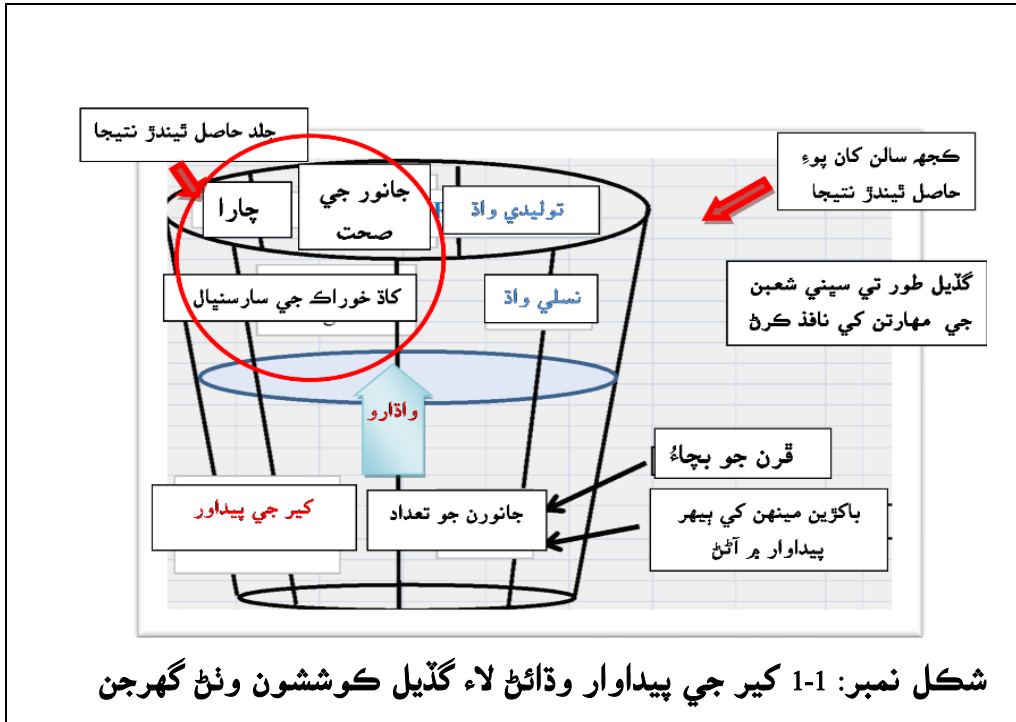
سڀ کان پهريان اهو سمجهڻ جي ڪوشش ڪجي ته ڪهڙي قسم جون مهارتون ۽ ترڪيبون استعمال ڪجن جن سان کير جي پيداوار وڌي سگهي. کير جي پيداوار ۾ واڌاري جو تعلق گهڻن ئي عنصرن سان آهي.

کير جي پيداوار ۾ اضافو ڊيري فارم جي انتظام جي ڪيترن ئي ترڪيبن ۾ بهتري آڻي، وٽاڻ ۽ جانورن جي عمدي طريقي سان سار سنڀال ڪرڻ سان ئي حاصل ڪري سگهجي ٿي.

منصوبي جا مقصد: کير جي پيداوار وڌائڻ

کير جي پيداوار ۾ اضافو سڀني شعبن تي عمدي طريقي سان عمل ڪرڻ سان ئي حاصل ڪري سگهجي ٿو. هيٺ ڏنل بالٽي جي تصوير ۾ ڏيکاريل آهي ته کير جي پيداوار ان صورت ۾ وڌي سگهي ٿي جڏهن اسان جانورن جي کاڌ خوراڪ، بهتر سار سنڀال، جانورن جي صحت، نسلي صلاحيت ۽ جانورن جي توليدي ڪارڪردگي کي بهتر ڪرڻ سان ئي جانورن جي پيداواري صلاحيتن ۾ اجتماعي بهتري آڻي سگهجي ٿي. مٿين شعبن مان اهي شعبا جيڪي ٿوري وقت اندر کير جي پيداوار ۾ بهتري آڻي سگهن ٿا انهن ۾ جانورن جي کاڌ خوراڪ، سائي چاري جي موجودگي ۽ جانورن جي صحت، جڏهن ته توليدي ڪارڪردگي ۽ جانورن جي نسلي بهتري لاءِ 4 کان 5 سالن جو عرصو درڪار آهي. جانورن جو تعداد وڌائڻ لاءِ ميسر ذريعن جي استعمال سان جهڙوڪ ننڍڙن ڦرڙن کي پالڻ ۽ باڪڙي مينهن کي ٻيهر ڳپ ڪرائي وڌائي سگهجي ٿو جنهن سان پڻ کير جي پيداوار ۾ اضافو آڻي سگهجي ٿو. ليڪن ان لاءِ وڏو عرصو گهربل هوندو جنهن سان کير ۾ اضافي جا مقصد حاصل ٿيندا.

هن منصوبي جو مرڪزي ڌيان ڪير جي پيداوار وڌائڻ تي آهي



شڪل نمبر: 1-1 ڪير جي پيداوار وڌائڻ لاءِ گڏيل ڪوششون وٺڻ گهرجن

1.2 فارم جي آمدني وڌائڻ لاءِ تجربو

جيتوڻيڪ ڪير جي پيداوار ۾ اضافو ٿيو ليڪن ان جو مطلب اهو نه هجڻ گهرجي ته خرچو آمدني کان وڌي وڃي. ڪير جي وڪري مان حاصل آمدني هوندي به جيڪڏهن نقصان ٿئي ٿو ته ان سان منصوبي جو مقصد پورو نه ٿيندو.

انهي صورتحال کان بچڻ لاءِ پنهنجي فارم جي منفعي ۾ اضافو آڻڻو پوندو جنهن سان فارم جي آمدني وڌندي، ان لاءِ هيٺين انگن اکرن کي ڄاڻڻو پوندو.

(1) آمدني: ڪير جي وڪري ۽ موجوده جانور جي قيمت

هن وقت توهان جي فارم تي ڪير جي وڪري جو اگهه ڪهڙو آهي؟

هن وقت اوهان جي پاڙي ۾، ويجهي شهر ۽ ڳوٺن ۾ ڪير جو اگهه ڪهڙو آهي؟

ڇاتوهان جنهن اگهه تي ڪير وڪڻو پيا ان مان مطمئن آهيو؟

(2) خرچو: ڊيري فارم جي ڪاروبار سان لاڳاپيل خرچو جهڙوڪ چاري تي ايندڙ خرچ، فارم تي ڪم ڪندڙ مزدورن تي ايندڙ خرچ، ۽ ٻيا روز مره جا خرچا وغيره.

ساڳي وقت توهان ڪير بهتر اگهه تي وڪڻڻ لاءِ ڪوشش ڪريو جيئن باب ٻيون مثالي ڊيري فارم جو انتظام ۽ ان جي سيڪشن 2.3 واپاري معاملا ۾ ڄاڻايل آهي.



1.3 مينهن جي موجوده ڪير جي پيداوار ۽ پيداوار جو هدف

گراف نمبر 1.2 سنڌ جي بهراڙين ۾ مينهن جي موجوده ڪير جي پيداواري صلاحيت جو گراف ۽ مثالي پيداواري صلاحيت واري مينهن جي ڪير جي گراف جي وچ ۾ پيٽ ڪري بيان ڪيل آهي..

هيٺ ڏنل گراف کي غور سان ڏسو.

- نيري لڪير: ڪير جي مثالي پيداواري صلاحيت کي ظاهر ڪري ٿي.
- سائي لڪير: ڪير جي گهٽ پيداوار کي ظاهر ڪري ٿي جيڪا سنڌ جي بهراڙين ۾ نامناسب کاڌخوراڪ ۽ رواجي انتظام جي ڪري آهي.
- ڳاڙهي لڪير: ٻيو نمبر سني مينهن جي ڪير جي پيداواري صلاحيت کي ظاهر ڪري ٿي. جيڪا ڪجهه بهتر کاڌخوراڪ ۽ مناسب انتظام جي ڪري آهي.

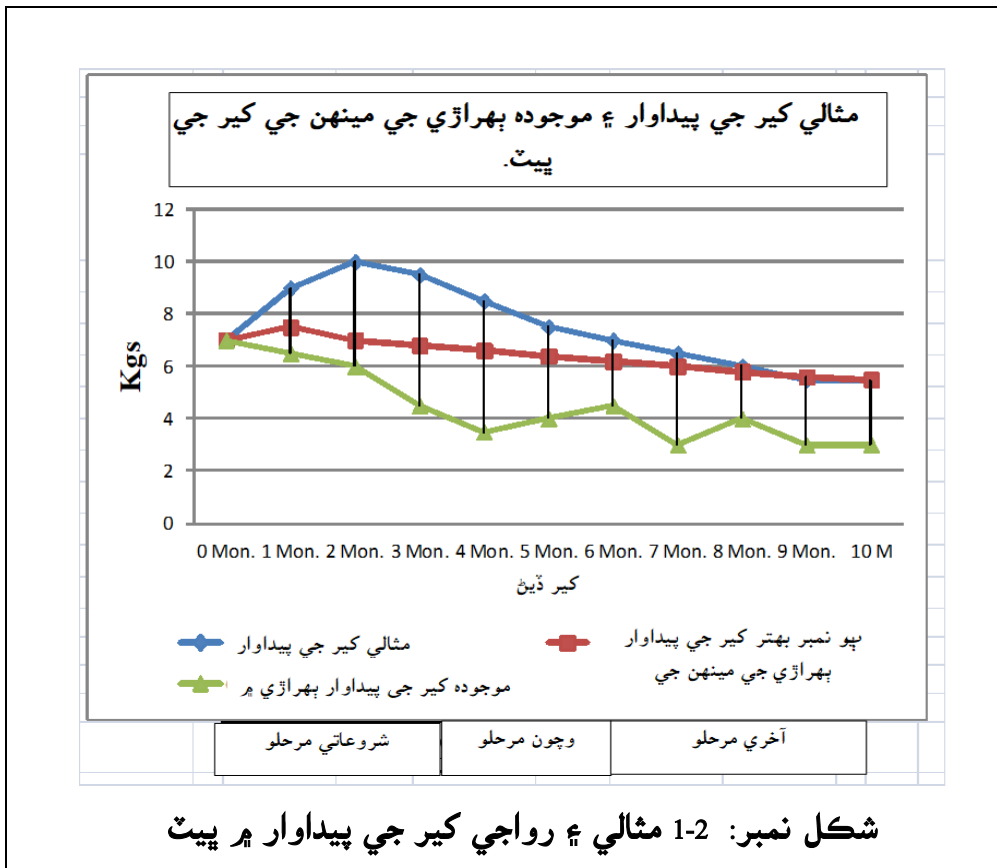
سائي رنگ واري لڪير ان مينهن جي آهي جيڪا پاڪستان جا عام بهراڙي جا مالوند ڌارين ٿا. ويامن جي ڪجهه ڏينهن کانپوءِ ڪير جي پيداوار هيٺين سببن جي ڪري گهٽجڻ لڳندي آهي. عام رواجي وٽائڻ ۾ صحيح انتظام نه هجڻ ڪري سني ۽ مناسب چاري جي مستقل موجودگي ممڪن نه هوندي آهي. وٽائڻ ۾ گهڻي گرمي ۽ گهربل تازي پاڻي جي کوٽ سبب جي ڪري پڻ ڪير جي پيداوار متاثر ٿئي ٿي. جنهن سبب ڪير جي پيداوار جو گراف گهٽ وڌ ٿيندو رهي ٿو ۽ ڪير جي پيداوار آهستي آهستي گهٽجي ويندي آهي ۽ جانور خشڪ ٿي ويندو آهي. اهڙن حالتن ۾ جانور جي ڪير ڏيڻ واري عرصي جي ڪل پيداوار اندازن 1260 ڪلو هوندي آهي يعني روزانه 4 ڪلو. ڳاڙهي لڪير ٻيو نمبر سني مينهن جي ڪير جي پيداواري صلاحيت کي ظاهر ڪري ٿي. جيڪا ڪجهه بهتر کاڌخوراڪ ۽ مناسب انتظام جي ڪري آهي. اهڙي جانور مان ڪير ڏيڻ جي هن عرصي دوران ڪل پيداوار 1902 ڪلوگرام ملندي، جڏهن ته اها گهربل مثالي ڪير جي پيداوار جي پيٽ ۾ 14 سيڪڙو گهٽ آهي.

نيري رنگ واري لڪير ڪير جي تمام سني پيداواري صلاحيت کي ظاهر ڪري ٿي. اها ان صورت ۾ ممڪن آهي جڏهن فارم تي بهتر انتظام هوندو جهڙوڪ جانورن کي ويامن کانپوءِ مناسب کاڌ خوراڪ ڏيڻ. ويامن کانپوءِ شروعاتي عرصي ۾ مينهن جي ڪير جي پيداوار وڌڻ لڳندي آهي ۽ 2 کان 3 مهينن کانپوءِ اها پيداوار وڌي آخري حد تي پهچندي آهي. پيداوار جي آخري حد تائين پهچڻ کانپوءِ ڪير جي پيداوار آهستي آهستي گهٽجڻ لڳندي آهي ۽ آخر ۾ جانور خشڪ ٿي ويندو آهي. اهڙي جانور مان ڪير ڏيڻ جي هن عرصي دوران ڪل پيداوار 2250 ڪلوگرام ملندي يعني 7 ڪلو روزانو.

توهان هيٺين گراف ۾ ظاهر ڪيل سائي ۽ نيري لڪير جي وچ ۾ عمودي لڪيرن جو مطلب ڪيئن سمجهندا؟

هي عمودي لڪيرون ظاهر ڪن ٿيون ته فارم تي صحيح انتظام نه هجڻ ڪري توهان کي ڪير جي پيداوار جو ڪيترو نقصان ٿي سگهي ٿو. اندازي مطابق سنڌ جي ٻهراڙين ۾ رواجي طريقي تي پاليا ويندڙ ڪير جي جانورن ۾ هي نقصان هر پيٽ تي 1000 ڪلو گرام تائين ٿي سگهي ٿو. ان جو مطلب ته سنڌ جي ٻهراڙين ۾ ڪير ڏيندڙ مينهنون گهريل مثالي ڪير جي پيداوار جي پيٽ ۾ 40 سيڪڙو گهٽ پيداوار ڏيئي رهيون آهن.

اچو ته ڪير وارين مينهن جي پيداواري صلاحيت وڌائڻ فارم جي انتظام کي بهتر هلائڻ لاءِ ڪوششون ڪريون جيئن انهن مان مثالي ڪير جي پيداوار حاصل ڪري سگهون.





هيٺين ڏنل ٽيبل ۾ کير جي پيداواري صلاحيتن جي ٽن لڪيرن جي وچ ۾ مشابهت ڪئي ويئي آهي.

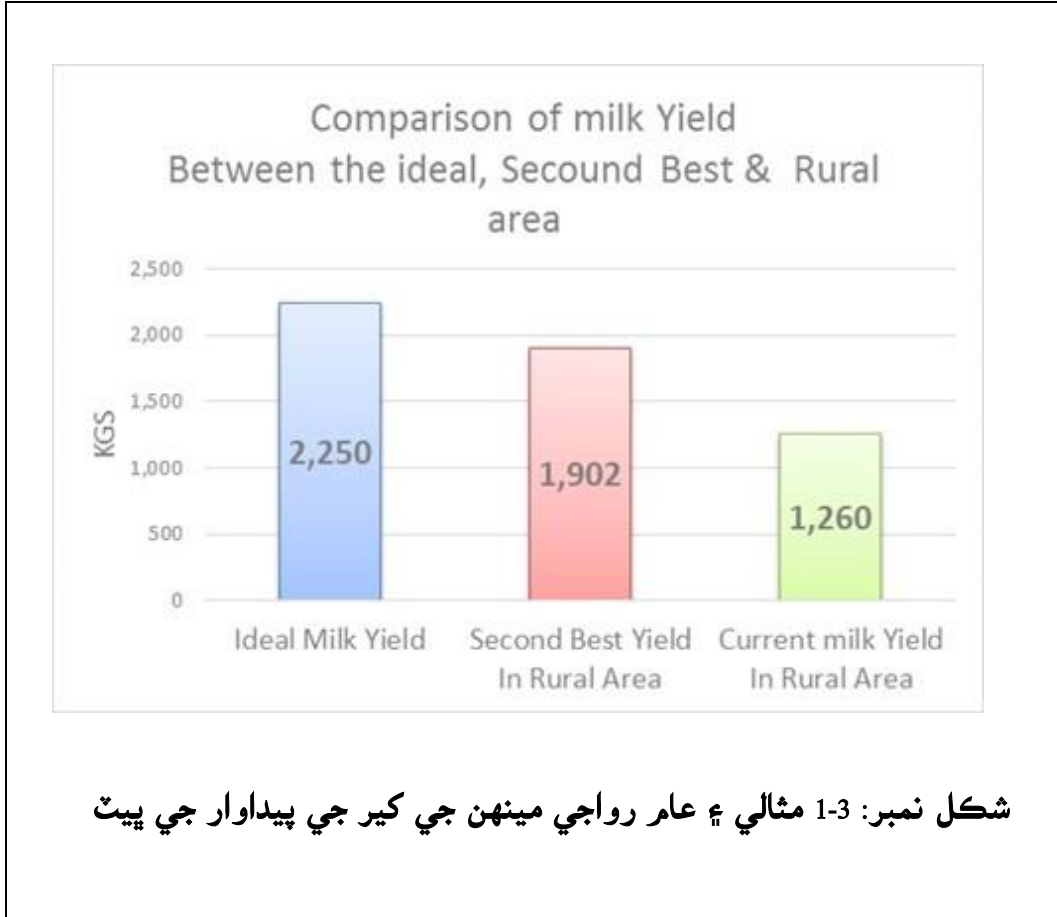
- (1) مثالي کير جي پيداوارجي لڪير
- (2) ٻيو نمبر بهتر کير جي پيداوار جي لڪير
- (3) ۽ موجوده سنڌ جي ٻهراڙي ۾ پالي ويندڙ مينهن جي کير جي پيداوار جي لڪير. مثال طور جيڪڏهن کير جو اگهه 60 رپيا في ڪلوگرام ٿي وڃي ته ان سان آمدني ۾ وڏو فرق ايندو. هيٺ ڏنل ٽيبل 1.1 ۾ ساڄو خانو جنهن ۾ مثالي کير جي پيداوار ڏيندڙ مينهن 100 سيڪڙو، ٻيو نمبر کير جي پيداوار ڏيندڙ مينهن 84 سيڪڙو، ۽ موجوده سنڌ جي ٻهراڙي ۾ روايتي فارم جي نظام ۽ طريقي مطابق پالي ويندڙ مينهن جي کير جي پيداواري 56 سيڪڙو صلاحيت مثالي کير جي پيداوار ڏيندڙ مينهن جي پيٽ ۾ ڏيکاري وئي آهي.

ٽيبل 1-1 مختلف کير جي پيداواري صلاحيتن وارين مينهن ۽ انهن جي کير مان آمدني جي مثالي کير جي پيداواري صلاحيت واري مينهن ۽ ان جي کير مان حاصل آمدني سان پيٽ

پيداوار جي پيٽ ۾ منفعي جي شرح	آمدني کير جو اگهه (60 رپيا في ڪلو)	کير جي پيداوار ڪلوگرام ۾	مينهن جي پيداواري صلاحيت
100	135000	2250	مثالي کير جي پيداوار
84	114120	2112	ٻيو نمبر کير جي پيداوار
56	75600	1470	روايتي فارم جي نظام ۽ طريقي سان ٻهراڙي ۾ پالي ويندڙ مينهن جي کير جي پيداوار



تصوير 1.3 ظاهر ڪري ٿي ته ٽيبل 1.1 جو گراف جيڪو تنهي مينهن جي ڪير جي پيداوري صلاحيتن کي ظاهر ڪري ٿو. اچو ته مينهن مان مثالي ڪير جي پيداوار حاصل ڪرڻ لاءِ ڪوشش ڪريون.



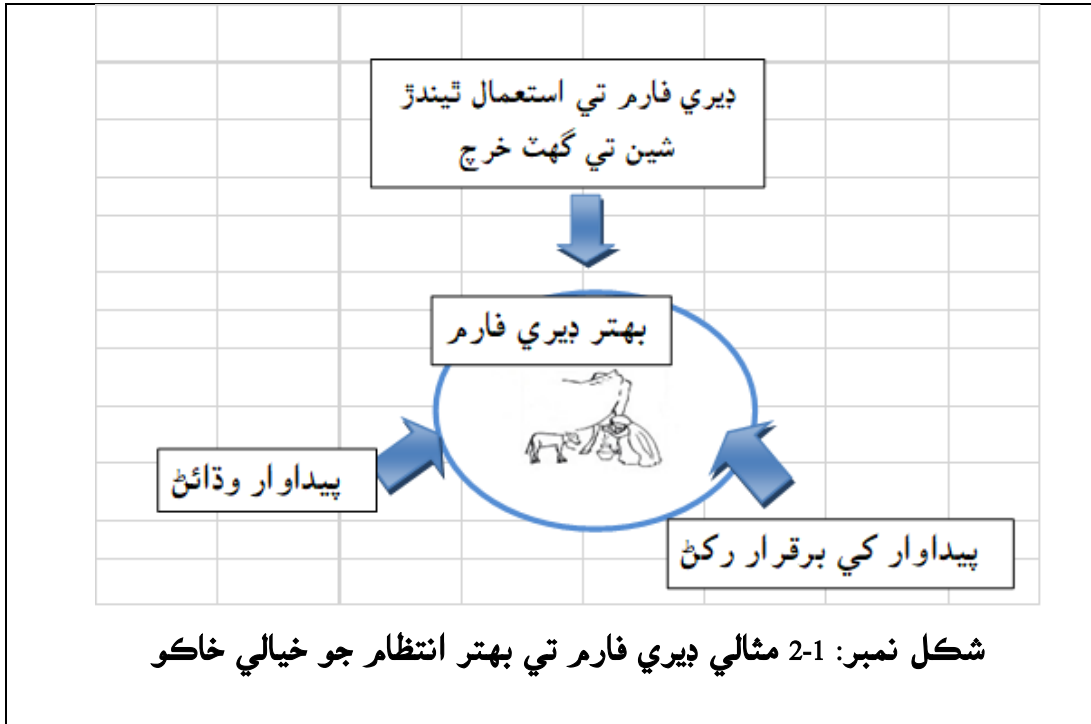
2. باب ٻيون مثالي ڊيري فارم جو انتظام

2.1 مثالي ڊيري فارم جي انتظام جا اصول

اچو ته ڊيري فارم کي ڪامياب ۽ پائيدار بنائڻ لاءِ ان جي انتظام کي بهتر هلائڻ لاءِ ڪوشش ڪريون

مستقل طور تي ڊيري فارم جي انتظام کي بهتر ڪرڻ آسان هدف ناهي پر ان لاءِ اوهان کي پنهنجي فارم جي انتظامي معاملن ۾ آهستي آهستي بهتري آڻڻي پوندي. مثالي ڊيري فارم جي انتظامي معاملن لاءِ هيٺين عنصرن ۽ مرحلن ۾ بهتري آڻڻي پوندي.

- (1) پيداوار ۾ اضافو
 - (2) پيداوار کي برقرار رکڻ
 - (3) فارم جي خرچن ۾ ممڪن حد تائين گهٽتائي ڪرڻ
- مثالي فارم جو انتظام قابل عمل بنائي سگهجي ٿو جيڪڏهن مٿين عنصرن ۽ مرحلن تي پابندي سان مستقل بنيادن تي عمل ڪيو ويندو.



2.2 مثالي ڊيري فارم جي انتظام کان پهرين بنيادي ڳالهون سمجهڻ.

سڀ کان پهرين فارم جي موجوده صورتحال کي سمجهڻ گهرجي.

- (1) فارم تي موجود اثاثن جي فهرست ٺاهي اندازو ڪريو ته توهان وٽ ڪيترا ۽ ڪهڙا اثاڻ آهن.
- (2) پنهنجي جانورن جي پيداواري صلاحيتن کي ڄاڻو.
- (3) پنهنجي فارم تي ڊيگن ۽ مينهن جي مناسب تعداد جو تعين ڪريو ۽ کير جي پيداوار جو هدف پڻ طئي ڪيو.

2.2.1 ڊيري فارم جا اثاڻا

اثاثن ۾ زمين، جانور، موجود سهولتون ۽ موجود اوزار اچي وڃن ٿا انهن سڀني اثاثن جي فهرست تيار ڪريو ۽ انهن جي تسلي بخش استعمال کي يقيني بڻايو.

اوزار جهڙوڪ ڪٽر جي مشين، گڏه گادي، جيڪا گاهه ۽ پاڻي جي ڪٽڻ لاءِ استعمال ٿئي ٿي. لوهه جي ڏاندري انهن سڀني شين لاءِ مناسب سرمايو گهرجي.



تصوير نمبر 2-3
وڻاڻ لاءِ سهولتون



تصوير نمبر 2-2 جي
ڏهائي لاءِ سهولتون



تصوير نمبر 2-1
چوپايو مال



تصوير نمبر 2-5 باربرداري



تصوير نمبر 2-4 ڪٽر جي مشين



2.2.2 ٻني (اٿائو)

گاه جي پوکي جي لاءِ موجود ٻني کي ڏسو.

(a) گاه جي پوکي لاءِ ٻني موجود آهي ته ان صورت ۾.

ڏسو ته اها ٻني توهان جي پنهنجي آهي يا نه، اها اوهان وٽ هارپ واري ٻني آهي يا نه، يا ٻي ڪا مقاطعي واري ٻني وغيره آهي. ان لاءِ هيٺيون ڳالهون جانچڻ گهرجن.

- ڪل ٻني ڪيتري آهي ۽ گاه جي پوکي لاءِ ڪيتري آهي.
- گاه جون ڪهڙيون جنسون پوکيل آهن ۽ هر جنس لاءِ ڪيتري ٻني پوکي هيٺ آهي.

(b) گاه جي پوکي لاءِ ٻني موجود نه آهي ته ان صورت ۾.

- ڏسو ته سڄو سال سائو گاه ڪيتري عرصي تائين ڪيترو موجود آهي، ۽ جانورن کي ٻاهر چراهه گاهن ۾ روزانا ڪيترو وقت چارين ٿا ۽ سال جي ڪهڙي عرصي دوران چارين ٿا (اهو ڪيترو ممڪن آهي)

- هارپو ڪندڙ مالوند: اهڙا مالوند هارپ واري ٻني مان قدرتي گاه ڪٿي پنهنجي جانورن کي چارين ٿا يا هارپي واري ٻني مان فصل جي ڪٽائي کانپوءِ پيلاڙي واري عرصي دوران جانورن کي کليل ٻني ۾ چارين ٿا.

- چارن جا قسم ۽ وزن جيڪي مالوند ٻاهران خريد ڪن ٿا.

2.2.3 چوپايو مال (اٿائو)

(1) مستقبل جي رٿابندي ڪرڻ کان پهرين پنهنجي مينهن/ ڳڻن جي ڪير جي پيداواري صلاحيتن جي خبر هجڻ.

مينهن/ ڳڻن ۽ ٻيا جانور مالونڊن جا اهم اٿاڻا سمجهيا ويندا آهن. جانچ ڪري حساب لڳايو ته توهان جي فارم تي موجود جانورن مان اوهان کي ڪيتري آمدني ٿئي ٿي.

- (1) هر مينهن/ ڳڻن جي ڪير جي پيداواري صلاحيتن جي ڄاڻ رکڻ
- (2) هر مينهن/ ڳڻن جي ڪير جي وڪري مان اوهان کي ڪيتري آمدني ملي ٿي
- (3) هاڻي ساليانو ڪير جي پيداوار جو هدف مقرر ڪريو

صرف مينهن/ ڳڻن جو تعداد وڌائڻ سان اهو تصور نه ڪيو وڃي ته آمدني ۾ اضافو ٿيندو ان سان اوهان کي ڪامياب نتيجا نه ملندا. ڪير جو هدف مقرر ڪرڻ کان پهرئين اهو سوچيو ته اوهان وٽ مزدورن جي موجودگي ڪيتري آهي، اوهان وٽ ڪيترو مفت وارو معياري گاه ججهي مقدار ۾ روزانا موجود آهي ۽ ڪيتري دائيدار خوراڪ ۽ فارمولا فيڊ پنهنجي ڪيسي مان خريد ڪريو ٿا. انهن سڀني شين کي پنهنجي ذهن ۾ رکي احتياط سان جانچ ڪريو. انهن سڀني مٿين نقطن کي چڪاس ڪرڻ کان سواءِ ڳڻن/ مينهن جو تعداد وڌائيندا ته في جانور ڪير جي پيداوار ۽ اجتماعي طور جانورن جي پيداواري صلاحيت گهٽجي سگهي ٿي. آخر ۾ اهو نتيجو نڪرندو جو توهان کي ڊيري فارم جي ڪاروبار ۾ نقصان ٿيندو.

**1) هر مينهن/گئون جي کير جي پيداواري صلاحيتن جي ڄاڻ**

هر مينهن/گئون جي کير جي پيداواري صلاحيتن جي ڄاڻ هجڻ لازمي آهي. بهراڙين ۾ پاليون ويندڙ مينهن/گئون جي کير ڏيڻ واري عرصي دوران سراسري پيداوار 1200 ڪلوگرام آهي، جڏهن ته ڪيٽل ڪالونين ۾ مينهن/گئون جي کير ڏيڻ واري عرصي دوران سراسري پيداوار 2400 ڪلوگرام آهي. اچو ته توهان جي مينهن/گئون جي کير جي پيداواري صلاحيت جو جائزو وٺو ۽ انهن جي پيٽ مٿين کير وارن جانورن سان ڪريو.

هن ڪتاب ۾ پيٽ ڪرڻ جا 3 طريقا متعارف ڪرايا ويا آهن.

(a) ٻه پوائنٽ طريقو

هي طريقو جاپان ۾ جانور جي کير ڏيڻ جي هڪ عرصي جو حساب لڳائي ناهيو ويو آهي. ڪمپيوٽر پروگرام ۾ جانور جي پيداوار متعلق چئن شين جي انگن اکرن جي ڄاڻ داخل ڪريو ۽ ڪمپيوٽر ۾ موجود پروگرام (Software) پاڻمرادو حساب لڳائي هر مينهن/گئون جي کير ڏيڻ واري عرصي (305 ڏينهن) جي متوقع کير جي ڪل پيداوار ٻڌائيندو.

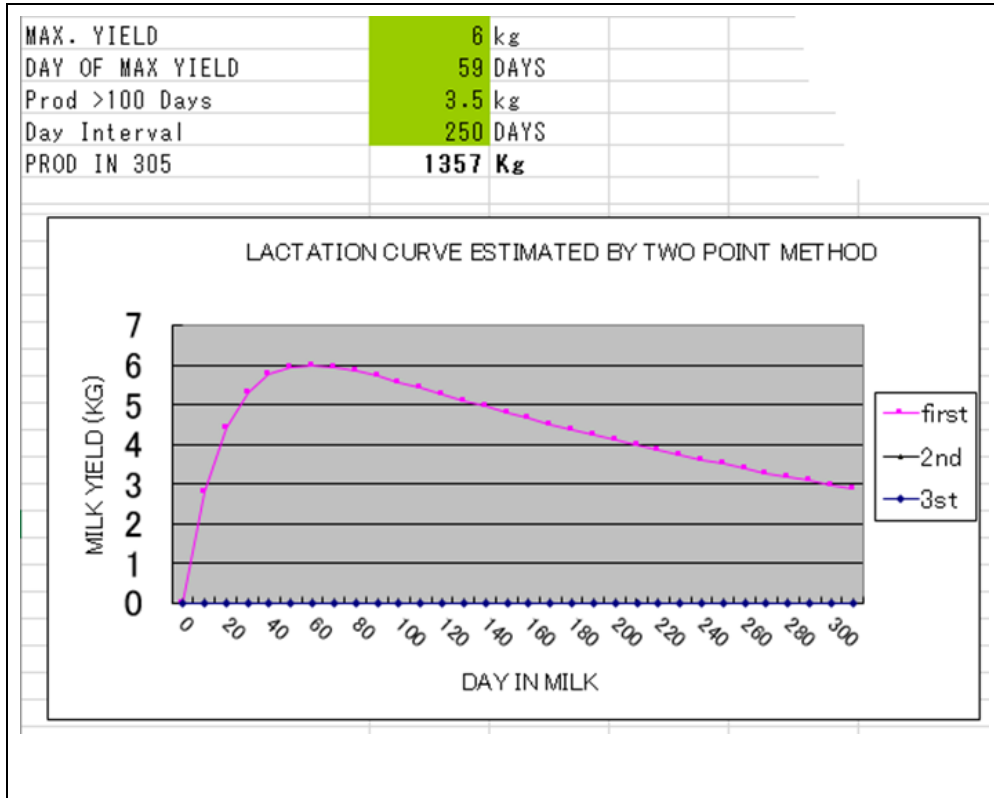
- ڪير جي وڌ کان وڌ پيداوار جڏهن اها آخري حد تي هجي (ڪلوگرام)
- ويامڻ کانپوءِ ڏينهن جو تعداد جنهن دوران کير جي پيداوار وڌ کان وڌ هجي. (ڏينهن)
- ڪير ڏيڻ جي پوئين عرصي دوران کير جي پيداوار (ڪلوگرام)
- ويامڻ کان وٺي کير ڏيڻ جي پوئين عرصي تائين ڏينهن جو تعداد (ڏينهن)

جيڪڏهن توهان وٽ موجود بالٽي جيڪا روزانو کير جي ڏوهائي لاءِ استعمال ٿئي ٿي ان جي گنجائش جي خبر آهي، ته پوءِ توهان کير جي مقدار جي تور آساني سان ڪري سگهو ٿا.

- عام طرح کير جي وڌ ۾ وڌ پيداوار وٺڻ کانپوءِ ٻئين ۽ ٽئين مهيني جي عرصي دوران حاصل ٿيندي آهي، پيداوار جي آخري حد تائين پهچڻ کانپوءِ آهستي آهستي گهٽجڻ لڳندي آهي ۽ آخر ۾ جانور کير ڏيڻ ڇڏي خشڪ ٿي ويندو آهي.
- هر مينهن/گئون جي کير جو مقدار ان جي پيداوار جي آخري وڌ ۾ وڌ حد تائين معلوم ڪريو ته توهان ڪيترو کير حاصل ڪيو آهي ۽ حساب لڳايو ته جانور کي ويامڻ کان پوءِ وڌ کان وڌ کير ڏيڻ واري حد تي پهچڻ لاءِ ڪيترا ڏينهن لڳا.
- حساب لڳايو ته ويامڻ جي 200 کان 250 ڏينهن جي درميان جڏهن کير جي پيداوار گهٽجڻ لڳي ته سراسري روزانه کير جي پيداوار ڪيترا ڪلوگرام هئي. جڏهن توهان وٽ کير جي



پيداوار جا ٻه انگ اکر هوندا ته توهان مينهن/ گئون جي کير ڏيڻ واري هڪ عرصي جي پيداوار معلوم ڪري سگهو ٿا.



شڪل 2-2 گراف ۾ ٻه پوائنٽ طريقو استعمال ٿيل آهي

(b) ان صورت ۾ جڏهن ماهانه کير جي پيداوار جا انگ اکر موجود هجن

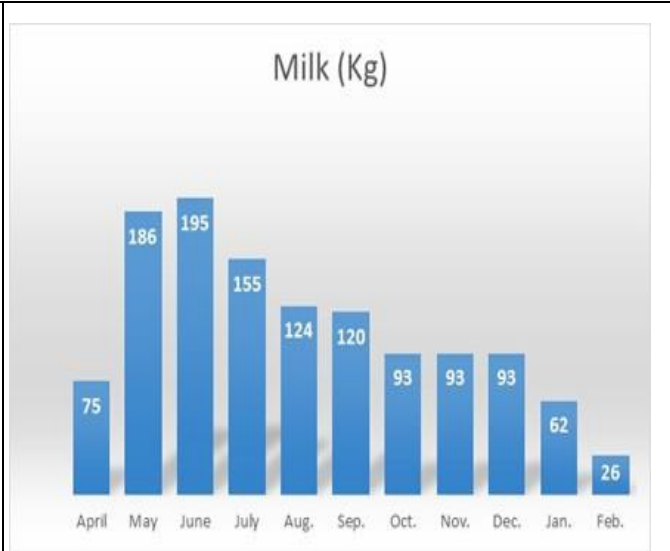
جيڪڏهن اوهان جي فارم تي ماهانه کير جي تور ٿيندي هجي ۽ ان جو رڪارڊ موجود هجي ته مينهن/ گئون جي کير ڏيڻ واري هڪ عرصي جي پيداوار معلوم ڪري سگهجي ٿي. جهڙوڪ ڪل کير جي پيداوار جوڙ آهي ماهانه کير جي پيداوار جو. جيڪڏهن ان کي ڏينهن سان ضرب ڪنداسين ته ڪل کير جي پيداوار اچي ويندي.

فرض ڪريو ته هڪ مينهن 16 اپريل 2015 تي هڪ ڦر کي جنم ڏنو. اپريل واري مهيني جا 15 ڏينهن کير وارا سمجهيا ويندا. مئي مهيني کان وٺي مهيني جي هر ڏينهن سان ماهانه کير جي پيداوار ضرب ڪئي ويندي. فيبروري جو مهينو جيڪو کير جي پيداوار جو آخري مهينو هوندو جنهن سان کير ڏيڻ جا 305 ڏينهن مڪمل ٿين ٿا انهن کي ماهانه کير جي پيداوار سان ضرب ڪيو ويندو.



Month	Milk (Kg)	Days	Milk(Kg) x day
April	5	15	75
May	6	31	186
June	6.5	30	195
July	5	31	155
Aug.	4	31	124
Sep.	4	30	120
Oct.	3	31	93
Nov.	3	31	93
Dec.	3	31	93
Jan.	2	31	62
Feb.	2	13	26
Total		305	1222

ٽيبل نمبر 1-2 ماهوار ڪير جا
انگ اکر



شڪل نمبر 2-3 ماهوار ڪير جي انگ اکر جو
گراف

(c) ان صورت ۾ جڏهن انگ اکر موجود نه هجن ۽ مينهن/ ڳئون جي ڪير جي پيداوار پڻ گهٽ هجي.

هن صورتحال ۾ جڏهن ڪير جي پيداوار گهٽ هجي ۽ پيداوار جو اندازو لڳائڻ لاءِ ڪي به انگ اکر موجود نه هجن ته ان صورت ۾ پاڳڻي کان انٽرويو وارو طريقو استعمال ڪرڻو پوندو. هي اندازو تصديق شده ته نه چئبو ليڪن هن طريقي سان مينهن/ ڳئون جي ڪير پيداوار جو ڪاٿو اندازن لڳائي سگهجي ٿو. مينهن/ ڳئون جي ڪير جي پيداوار ڏيڻ دوران پاڳڻي کان انٽرويو جي تاريخ نوٽ ڪريو. مينهن/ ڳئون جي روزانه ڪير جي پيداوار لاءِ صبح ۽ شام جو ڪير جوڙ ڪريو.

i. انٽرويو مينهن/ ڳئون جي روزانه ڪير جي پيداوار (مثال طور شام وارو ڪير انٽرويو واري ڏينهن کان پهرين 2 ڪلوگرام + صبح وارو ڪير انٽرويو واري ڏينهن 2 ڪلوگرام اهو ڪل 4 ڪلو ٿيو.

ii. ڪير ڏيڻ واري عرصو جيڪڏهن 305 ڏينهن جو سمجهجي ته ڪير ڏيڻ واري عرصي دوران ڪنهن به مقرر ڏينهن تي هر مهيني ڪير جي تور ڪجي ۽ جانور جي ڪير ڏيڻ واري سڄي عرصي جي ڪير جي پيداوار جو حساب هيٺين طريقي سان ڪري سگهجي ٿو.



• ان صورت ۾ جڏهن جانور جي کير جي تور کير ڏيڻ واري وچين عرصي کان شروع ڪئي وئي هجي: انٽرويو واري ڏينهن کير جي پيداوار 4 ڪلوگرام X 305 ڏينهن ڪل 1220 ڪلوگرام

• ان صورت ۾ جڏهن جانور جي کير جي تور کير ڏيڻ واري وڌ ۾ وڌ پيداوار واري عرصي کان شروع ڪئي وئي هجي: انٽرويو واري ڏينهن کير جي پيداوار 5 ڪلوگرام - 1 ڪلوگرام X 305 ڏينهن ڪل 1220 ڪلوگرام

• ان صورت ۾ جڏهن جانور جي کير جي تور کير ڏيڻ واري پوئين عرصي کان شروع ڪئي وئي هجي: انٽرويو واري ڏينهن کير جي پيداوار 2 ڪلوگرام + 2 ڪلوگرام X 305 ڏينهن ڪل 1220 ڪلوگرام

هاڻي توهان کي خبر پئي ته توهان جي مينهن/ ڳئون جي کير جي ڪل پيداوار ڪيتري آهي. هن منصوبي جي ٽيم طرفان ڪيل سروي جي نتيجن مطابق بهراڙين ۾ مينهن/ ڳئون پنهنجي اصلي پيداواري صلاحيت مطابق کير جي پيداوار نه ڏيئي رهيون آهن جنهن جو سبب فارم جي معاملن جو صحيح انتظام نه هئڻ آهي جهڙوڪ نامناسب چارو، جانورن ۾ کاڌ خوراڪ جي ڪمي، چاري ڏيڻ جو خراب انتظام ۽ وڻاڻ جو خراب ماحول.

(2) طئي ڪريو ته اوهان جي فارم تي جانورن جو ڪيترو مناسب تعداد هئڻ گهرجي ۽ کير جي پيداوار جو ڪيترو هدف طئي ڪجي.

(a) مينهن/ ڳئون جو مناسب تعداد پالڻ گهرجي

اهو ضروري ناهي ته هر وقت فارم تي جانورن جو تعداد وڌائڻ سان فارم جي ڪل کير جي پيداوار ۾ اضافو ٿيندو. مثال طور فارم تي ٽي مينهن/ ڳئون جن جي سراسري پيداوار 4 ڪلوگرام روزانه هجي، ضروري ناهي ته انهن مان اوهان کي 12 ڪلوگرام کير روزانه ملي.

هر فارم تي جانورن جو مناسب تعداد طئي ڪرڻ آسان ڪم ناهي. مناسب تعداد طئي ڪرڻ لاءِ اهو به ڏٺو وڃي ته فارم تي ڪم ڪندڙ ڪيترا مزدور آهن، جانورن جي چاري جو ڪيترو بندوبست ٿيل آهي (پنهنجي بني ۾ پوکيل چارو ۽ ٻاهران خريد ڪيل چارو) ۽ هر فارم جا مالي ۽ معاشي وسيلا.

جيڪڏهن توهان مٿين ذڪر ڪيل عنصرن کان سواءِ مينهن/ ڳئون جو تعداد وڌائيندا ته پوءِ توهان انهي فارم جو صحيح انتظام هلائڻ جا اهل نه هوندا، ۽ آخر ۾ نتيجو اهو نڪرندو جو هر مينهن/ ڳئون جي انفرادي کير جي پيداوار گهٽبي ۽ فارم جي اجتماعي ڪل پيداوار پڻ گهٽبي.

**(b) پنهنجي فارم تي کير جي پيداوار جو هدف مقرر ڪرڻ**

توهان کير جي وڪري مان آمدني بابت سمجهيو. هاڻي اچو ته توهان جي فارم تي کير جي پيداوار جو هدف مقرر ڪريون. اهڙو هدف مقرر ڪريون جنهن سان اوهان جي موجوده آمدني برقرار رهي يا ان کان ٻيڻو يا ٽيڻو وڌائجي.

انهي صورت ۾ جيڪڏهن توهان کير جي پيداوار جو هدف وڌائڻ چاهيو ٿا ته اوهان جي فارم تي ڪيترين ئي مهارتن ۽ ترڪيبن کي بهتر ڪرڻ جي ضرورت پوندي جنهن سان اوهان جون ڊگيون پنهنجي مڪمل پيداواري صلاحيتن جي مطابق کير ڏيئي سگهنديون. اوهان جي فارم تي لاڳو ڪرڻ لاءِ جن مختلف سڌاري وارين مهارتن ۽ ترڪيبن جي ضرورت آهي انهن جو تفصيل هيٺ ڏجي ٿو.

اچو ته سمجهون سٺي پيداواري صلاحيت واري ڳئون جي سڃاڻپ ڪيئن ڪريون.

هن مهارت ۽ ترڪيب سان اوهان پنهنجي فارم ۾ نيون سٺي صلاحيت واريون مينهنون/ڳئون داخل ڪري سگهو ٿا ۽ گهٽ پيداواري صلاحيت وارين مينهنن/ڳئون جي پنهنجي فارم مان ڇڏي سگهو ٿا.

(2) ڌڻ جي کير جي پيداواري صلاحيت کي بهتر ڪرڻ

جيڪڏهن توهان پنهنجي فارم جي ڌڻ جي کير جي پيداواري صلاحيت بهتر ڪرڻ چاهيو ٿا ته توهان کي سٺي صلاحيت واريون مينهنون/ڳئون فارم ۾ رکڻيون پونديون ۽ گهٽ پيداواري صلاحيت وارين مينهنن/ڳئون جي فارم مان ڇڏي پوندي. گهٽ پيداواري صلاحيت وارين مينهنن/ڳئون کي وڪڻي انهن پئسن مان سٺي صلاحيت واريون مينهنون/ڳئون خريد ڪرڻيون پونديون. خريد ڪيل مينهنن/ڳئون جي پيداواري صلاحيت کي وڌيڪ بهتر ڪرڻ لاءِ سٺي نسل جو سانھ ڌڻ جي نسل ڪشي لاءِ رکڻو پوندو ته جيئن انهن مان سٺي نسل جا ڦر حاصل ڪري سگهجن.

پهرين مرحلي ۾ اوهان کي اهو ضرور سکڻ گهرجي ته سٺي صلاحيت وارين مينهنن/ڳئون ۽ سانھ جي سڃاڻپ ڪيئن ڪجي.

(1) سٺي صلاحيت وارين مينهنن/ڳئون جي سڃاڻپ ڪيئن ڪجي.

هر حالت ۾ مينهنن/ڳئون کي صحتمند هئڻ گهرجي. اچو ته سکون، وڌيڪ پيداواري صلاحيت رکندڙ مينهنن/ڳئون جون نسلي خاصيتون ڪيئن معلوم ڪجن.

پيداواري صلاحيت واري مينهنن/ڳئون جو اوه وڏو ۽ کير جو گهڻو مقدار رکندڙ هوندو آهي. سخت اوه واري مينهنن/ڳئون سنو کير ڏيندڙ نه هوندي آهي ڇو ته ان جو اوه وڏو ۽ نه هجي. سنو اوه آهي جيڪو لچڪدار، نرم ۽ ملائم هجي. سنو اوه آهي جنهن ۾ لچڪ هجي. سٺي لچڪدار اوه واري مينهنن/ڳئون جي ڏهائي کانپوءِ انهن جو اوه سڪڙجي نديو ۽ نرم ٿي ويندو. سروي جي انگن اکرن جي مطابق جنهن مينهنن/ڊگي

جي اوه ڏانهن ويندڙ کير جي نس ٿلهي، اپريل هوندي ۽ اوه وڏو ۽ لڳل هوندو ان مان کير جي پيداوار وڌيڪ ملندي.

<p>تصوير نمبر 2-6 گهڻي حجم واري اوه جي پاسي وارو ڏيک</p>	<p>تصوير نمبر 2-7 گهڻي حجم واري اوه جي پوئين پاسي جو ڏيک</p>	<p>تصوير 2-8 نمبر کير واري جانور جي اپريل نس</p>

*** ڊگين يا مينهن جي خريداري ڪرڻ وقت هيٺيون ڳالهون ذهن ۾ رکڻ گهرجن.**

خريداري ڪرڻ وقت پيداواري صلاحيت واري مينهن / گئون جي اوه جي خاصيت جاچڻ کانسواءِ جانور جي مالڪ يا واپاري کان ان جانور جي ماءُ يا پيئرن جي کير جي پيداوار بابت پڇو، ان جي توليدي حالت بابت پڇو. ڪنهن ڄاڻو مال جي ڊاڪٽر کان ان جانور جي ڍڪڻ جي چڪاس ڪرايو ته اهو جانور ڍڪو آهي يا خالي آهي. جيڪڏهن جانور ڍڪو نه آهي ته پڇا ڪجي ته ان جانور کي ويامي ڪيترو وقت ٿيو آهي.

(2) سٺي صلاحيت واري سانھ جي سڃاڻپ ڪيئن ڪجي.

ان صورت ۾ جيڪڏهن توهان گوشت جي نسل وارو سانھ خريد ڪريو ٿا ته سانھ جي صلاحيت ان جي جسماني وزن ۽ واڌ ويجهه جي عرصي دوران روزانه وزن جي واڌ جي انگن اکرن کي ذهن ۾ رکڻ گهرجي. جڏهن ته کير وارن مينهن / گئن لاءِ سانھ خريد ڪريو ٿا ته پوءِ ان جي چونڊ ان جي جسماني وزن ۽ ظاهري ڏيک ویک جي بنياد تي نه ڪبي پر ان جي برعڪس ان سانھ جي ڏين جي کير جي پيداوار جي انگن اکرن جي بنياد تي ان سانھ جي خريداري ڪئي ويندي.

جنهن سانھ جي چونڊ ان جي ڏين جي کير جي پيداواري صلاحيت جي بنياد تي ڪئي وڃي ان سانھ کي تصديق ٿيل سانھ (پروجيني ٽيسٽيڊ) چئبو. جيڪڏهن توهان پنهنجي جانورن ۾ هٿرادو نسل ڪشي ڪرائڻ جي خواهش رکو ٿا ته پوءِ اهڙي سانھ جو بچ (سيمن) مصنوعي نسل ڪشي لاءِ استعمال ڪري سگهجي ٿو.

موجوده صورتحال ۾ بهراڙي جا ننڍا ڀاڱيا جيڪي هن منصوبي جي علائقن ۾ رجسٽر ٿيل آهن انهن وٽ پنهنجا سانھ ڪونه آهن. اهي ڀاڱيا پنهنجي جانورن جي نسل ڪشي لاءِ ويجهن



زميندارن يا پاڙيسرين جا سانھ استعمال ڪن ٿا جنھن جي ڪري اھي ڀاڳيا پنھنجي جانورن لاءِ مرضي جي سانھ جي چونڊ جي ترجيحات کان محروم آھن. سنڌ صوبي ۾ مينھن ۾ هٿرادو نسل ڪشي واري طريقي کي اڃان تائين مڪمل ڪاميابي نه ملي آهي. تنهنڪري ننڍن ڀاڳين لاءِ اهو بهتر آهي ته پنهنجي مرضي واري تصديق ٿيل سانھ جي بچ جو هٿرادو نسل ڪشي ذريعي استعمال بابت سوچين، ليڪن انهي سهولت کي حاصل ڪرڻ ۾ اڃا وقت لڳندو. اچو ته هيٺين طريقي تحت توهان جي سانھ جي جانچ ڪريون

(a) ڳالهه ٻولھه جي ذريعي کير جي پيداواري صلاحيت بابت معلومات وٺڻ

i. سانھ جي ماءُ ۽ پيٽن جي کير جي پيداوار

ii. سانھ جي ڏيءُ جي کير جي پيداوار جيڪڏهن هجي ته.

(b) سانھ جي توليدي صلاحيتن جي چڪاس / تصديق ڪرڻ

i. چڙهڻ جي خواهش / رغبت رکندڙ هجي (جنسي هوس).

ii. ٽنگن جو مضبوط هجڻ (جيئن آرام سان چڙهي سگهي)

iii. اکين جو صحتمند هئڻ

iv. آنورن جي سائيز مناسب هجي ۽ اهي ٻنهي پاسن کان هڪجهڙا ۽ هڪجيترا ڏسڻ ۾ اچن.

سنو سانھ

			
تصوير 2-12 مضبوط ٽنگون	تصوير 2-11 آنورن جي گولائي	تصوير 2-10 ٻئي آنورا برابر	تصوير 2-9 ٻئي آنورا برابر

خراب سانھ

			
تصوير 2-16 غير معياري اڳيون تنگون	تصوير 2-15 وريل آنورا	تصوير 2-14 اڻ برابر آنورا ساجو آنورو ننڍو	تصوير 2-13 اڻ برابر آنورا

2.2.4 فارم تي موجود سهولتون ۽ اوزار

ڏسو ته اوهان وٽ فارم تي ڪهڙيون سهولتون ۽ اوزار موجود آهن. ڪهڙي سال ۽ مهيني ۾ اهي خريد ڪيا ويا ۽ انهن کي استعمال ڪندي ڪيترو وقت ٿيو آهي. اها ڄاڻ هيٺ ڏنل ٽيبل ۾ داخل ڪريو. ان کانپوءِ انهن جي اثرائتي استعمال جي جانچ ڪريو ۽ انهن جي اثرائتي استعمال ۾ جيڪڏهن ڪي مسئلا آهن ته انهن کي حل ڪرڻ لاءِ ضروري اپاءَ وٺو. جيڪڏهن توهان وٽ اوزارن ۾ ڪتر جي مشين ۽ گاهه ڪٽڻ لاءِ بيل گاڏي، ته ان جي خريداري ڪيتري قيمت ۾ ۽ ڪهڙي سال ۽ مهيني ۾ ڪئي وئي.



ٽيبل 2-2 فارم تي موجود سهولتن ۽ اوزارن جو چارٽ

خدمتن جو عرصو	پائيواري ۾ شموليت جو			پائيواري گهراڻا	تعداد	چورس ميٽر	نالو
	قيمت	مهينو	سال				
1		نومبر	2010	100	1	20	وٽاڻ جي ماپ 4X5 ميٽر
10			2008	100	1		ڪتر واري مشين
1				100	4		ڏانتو

2.2.5 ڪم ڪندڙ مزدور

ڏسو ته ٻني جي پوکي ۽ وٽاڻ تي اوهان جي گهر جا ڀاتي ڪيترا ڪلاڪ ڪم ڪن ٿا. هيٺ ڏنل ٽيبل ۾ ترتيب وار هر هڪ فرد جي گهر ۾ حيثيت، انهن جو ڌنڌو، ٻني جي پوکي ۾ انهن جو ڪم ۾ حصو ۽ ڏنل وقت ۽ وٽاڻ جي ڪم ڪارن ۾ انهن جو ڪم ۾ حصو ۽ وقت جو تفصيل ڏنل آهي.

ٽيبل 2-3 گهر جا مزدور

ڪلاڪ	جانورن جو ڪم ڪار	هارپ واري ۽ پنهنجي ٻني ۾ ڪم ڪار	خاص ڌنڌا	گهر جا مزدور
1	مجموعي انتظام سنڀالڻ	ٻني جي تياري ۽ پوکي	ٻني جي پوکي جو انتظام سنڀالڻ	گهر جو اڳواڻ
2	صفائي ۽ کير جي ڏهائي	7 بجي کان 11 بجي تائين 2 بجي کان 6 بجي تائين	گهر جو ڪم ڪار ڪرڻ	زال
4	جانورن کي چارڻ ۽ گاه ڪرڻ	چار ڪلاڪ صبح جي وقت	شاگرد	ٻارنهن سالن جو پٽ
4	جانورن کي چارڻ ۽ نظرداري ڪرڻ	زرعي ڪم ڪار ۾ مدد ڪرڻ	شاگرد	ڇهن سالن جو پٽ

اچو ته مٿي ڏنل ٽيبل ۾ بيان ڪيل گهر جي ڀاتين طرفان ٻني ۽ واڙي جي ڪم ڪارين ۾ وقف ڪيل وقت جو حساب ان علائقي ۾ مقرر ڪيل مزدور جي ڏهاڙي جي پئسن سان ان جو حساب ڪتاب ڪري اندازو لڳايون:



- a. ان علائقي جي زرعي زمين ۽ واڙي تي ڪم ڪرڻ جي روزانو ڏهاڙي جو حساب ڪرڻ. ان مزدوري جي ڏهاڙي کي 8 ڪلاڪن سان ونڊ ڪبو ته پوءِ في ڪلاڪ جي اجرت جو حساب نڪري ايندو.
- b. في ڪلاڪ مزدوري جو حساب: في ڪلاڪ جي اجرت X ڪلاڪ ڪم ڪيو ويو هاڻ توهان ان ڏينهن جي ڪيل ڪم جي ڪل اجرت سمجهي ويا هوندا.
- c. ٻارن جي مزدوري: وڏن جي ڏهاڙي جي اجرت جي پيٽ ۾ ٻارن جي ڏهاڙي جي اجرت اڌ سمجهي ويندي.

مثال طور:

- جانورن کي ٻاهر چارڻ جو انتظام ڪرڻ
 - مينهن کي وهنجارڻ
 - گاهه ڪٽڻ، گاهه کي گڏ ڪرڻ، گاهه ۽ پاڻي جي ڊرم کي ڍڪي يا گڏهن گاڏي ۾ کڻي اچڻ وغيره
 - بچاءَ جا ٽڪا لڳرائڻ
 - پيٽ جي ڪيڙن جون دوائون پيارڻ
- جيڪڏهن توهان مٿيان سڀ ڪم مائٽن يا پاڙيوارن سان گڏجي واري واري سان ڪندا ته توهان ماڻهن کي گهڻي سيڙجڻ کان بچائي سگهندا، واڙي تي ايندڙ خرچن کي گهٽائي سگهندا ۽ پنهنجي ڪم جي ڪارردگي بهتر ڪري سگهندا.



ٽيبل 2-4 واڙي جو انتظام هلائڻ لاءِ 24 ڪلاڪن جو ڪيلنڊر			
	پاڳڻي جو نالو	تاريخ:	
	ضلعو:		
	تعلقو:		
	يونين ڪائونسل:		
	ديھ:		
	ڳوٺ جو نالو:		
گهر جي پاڻي تي ڪم جي نگراني	پاڳڻي سان ڳالهه ٻولهه		وقت
	اهم ڪم ڪار	منت	
		0	4
		30	
		0	5
		30	
		0	6
		30	
		0	7
		30	
		0	8
		30	
		0	9
		30	
		0	10
		30	
		0	11
		30	
		0	12
		30	
		0	13
		30	
		0	14
		30	
		0	15



		30		
		0	16	
		30		
		0	17	
		30		
		0	18	
		30		
		0	19	
		30		
		0	20	
		30		
		0	21	
		30		
		0	22	
		30		
		0	23	
		30		
		0	24	صبح
		30		
		0	1	
		30		
		0	2	
		30		
		0	3	
		30		

2.2.6 پيداوار تي ايندڙ خرچ

هن مرحلي تي اهو ڏاڍو ڏکيو آهي ته اوهان پنهنجي فارم تي ايندڙ پيداوار جي خرچن جو ڪاٿو لڳائي سگهو. جيڪڏهن توهان پنهنجي فارم تي ايندڙ پيداوار جي خرچن جو ڪاٿو لڳائڻ چاهيو ٿا ته پوءِ ڪنهن تجربڪار ڊيري فارم جي انتظامي ماهر کان مدد وٺي پوندي. جيڪڏهن هڪ دفعو توهان کي فارم تي ايندڙ غير ضروري خرچن جي خبر پئجي وڃي ته پوءِ انهن کي اوهان گهٽائي سگهو ٿا.



2.3 واپار

2.3.1 جانورن جي واپار جا مقصد

جانورن جي واپار جو بنيادي مقصد جانور ۽ انهن مان پيدا ٿيندڙ شين جي واپار جي مارڪيٽ کي سمجھجي ۽ ٻهراڙي جي ڀاڱين جي رهنمائي ڪري انهن جي آمدني وڌائڻ ۽ مالونڊن جي زندگي جي معيار کي بهتر ڪرڻ ۾ انهن جي مدد ڪجي. جانورن جي کير جي پيداوار ۽ کير مان ٺهندڙ شيون جهڙوڪ گيهه، مکڻ، لسي ۽ ڌنورو مارڪيٽ جي گهرج مطابق ٺاهي سٺي اگهه تي وڪڻي ڀاڱين جي آمدني ۾ اضافو ڪجي.

ان جو اهو به مقصد آهي ته اهي ڀاڱيا جن کي انهن شين کي وڪرو ڪرڻ جي ڄاڻ نه آهي ته انهن جي جانورن مان پيدا ٿيندڙ ڪهڙيون شيون ڪيتري تعداد ۾، ڪيئن ۽ ڪٿي وڪرو ڪجن. اهڙن ڀاڱين کي جانورن جي کير مان پيدا ٿيندڙ مختلف شين ٺاهڻ جي ترڪيب ۽ هنر ڏجي، انهن شين جي صحيح هنڌن تي وڪڻڻ جي بهتر معلومات ۽ رهنمائي ڏجي ته جيئن اهي کير ۽ ان مان ٺهندڙ معياري شين کي بازار ۾ بهتر اگهه تي وڪرو ڪري سٺي آمدني حاصل ڪري سگهن.

انهي مقصد لاءِ مالونڊن کي اهو سمجهائڻ ضروري آهي ته اهي پنهنجو ذهن ٺاهين ته صاف کير ۽ ان مان معياري شيون ٺاهجن ته جيئن انهن کي کائي يا وڪرو ڪري سگهجي نه ڪي ان لاءِ ٺاهجن ته پوءِ کائبو يا وڪرو ڪبو.

2.3.2 جانورن جي واپار جا بنياد

سڀ کان اول ته جانورن جي ڊاڪٽر ۽ توسيعي ڪارڪن کي جانورن جي واپار جي بنيادي ڳالهين کي سمجهڻ جي ضرورت آهي. جانورن جي مارڪيٽ جون بنيادي ڳالهيون منصوبي طرفان ڇپيل مارڪيٽ بابت فني مهارتن ۽ ترڪيبن واري ڪتابچي مان پڙهڻ گهرجن.

(Guideline for Basics of Marketing and Livestock Marketing).

2.3.3 کير جو واپار

(1) واپار کي سمجهڻ

(1) جانورن جي ۽ توسيعي ڪارڪن کي کير جي واپار جي ڄاڻ هجڻ ضروري آهي.

جانورن جي ڊاڪٽر ۽ توسيعي ڪارڪن کي کير جي واپار جي ڄاڻ هجڻ ضروري آهي جهڙوڪ منصوبي طرفان رجسٽر ڪيل ڳوٺ جي ويجهي ڳوٺ، ننڍي شهر ۽ وڏي شهر ۾ کير جي دڪان ۽ هوٽل وغيره کان کير جي وڪري ۽ خريد جي اگهه جي ڄاڻ هئڻ گهرجي. هيٺ ڏنل ٽيبل ۾ کير جي وڪري ۽ خريداري جي جڳهين ۽ کير جي اگهن جي بابت مهيني وار انگن اکرن جو تفصيل گڏ ڪيل آهي، جيڪو هن منصوبي "سنڌ جي ٻهراڙي لاءِ چوپائي مال جي پائيدار ترقي وارو منصوبو" ۾ ڪئي وئي آهي. توسيعي سرگرمين کي شروع ڪرڻ



ڪان پهريان جانورن جي ڊاڪٽر ۽ توسيعي ڪارڪن کي ويجهي اهم شهرن ۾ موجود ڪير جي مارڪيٽن ۽ ڪير ۽ ان مان ٺهندڙ شين جي اڳهن بابت ڄاڻ هئڻ لازمي آهي.

ٽيبل 2-5 منصوبي طرفان ماهوار ڪير ۽ ان مان ٺهندڙ شين جي وڪري ۽ خريداري بابت گڏ ڪيل ڄاڻ.

ڪير جي وڪري جو اگھ في لٽر في ڪلو	ڪير جي وڪري جو وزن (لٽر)	ڪير جي خريداري جو ذريعو	ڪير جي خريداري جو اگھ (رپيا)	خريد ڪيل ڪير جو وزن (لٽر)	ڪير جي دڪان جو نالو ۽ جڳھ
اضافي ڪير خريد ڪرڻ جو امڪان	ڪير جي وڪري جو اگھ في لٽر في ڪلو	ڪير جي وڪري جو وزن (لٽر)	ڪير جي خريداري جو ذريعو	ڪير جي خريداري جو اگھ (رپيا)	ڪير جي دڪان جو نالو ۽ جڳھ
جيڪڏهن ڪير صاف ۽ سنو هوندو	ڪير جي وڪري جو اگھ في لٽر في ڪلو	ڪير جي وڪري جو وزن (لٽر)	ڪير جو واپاري	67.5	ڪير جو دڪان (ڪاري موري حيدرآباد)
	ڪير جي وڪري جو اگھ في لٽر في ڪلو	ڪير جي وڪري جو وزن (لٽر)	ڪير جو واپاري	80	

(2) ڀاڳين کي مارڪيٽ بابت سمجهائي

مٿئين ڏنل ٽيبل ۾ مارڪيٽ جي بابت ڄاڻ مان ڀاڳيا سمجهي سگهن ٿا، پر گهڻن ڀاڳين کي ان جي خبر نه آهي. تنهن ڪري اهو ضروري آهي ته ڀاڳين کي مارڪيٽ جي موجوده حالتن جي باري ۾ پنهنجو پاڻ سمجهڻ ۾ مدد ڪئي وڃي ته ڪهڙيون شيون مارڪيٽ ۾ وڪرو ڪري سگهجن ٿيون پوءِ ان بابت پاڻ فيصلو ڪري عمل جي شروعات ڪن. ان مقصدن کي حاصل ڪرڻ لاءِ ڪير جي واپار بابت ڀاڳين جون گڏجاڻيون ڪرائجن. مارڪيٽنگ بابت گڏجاڻين جو بنيادي طريقو ڪار فني مهارتن واري گائيڊلائين جي ڪتابچي ۾ تفصيلي ڏنل آهن ته ڪير ۽ ڪير مان ٺهندڙ شين جو ورڪشاپ ڪيئن ڪرائجي ان بابت رهنمائي جو طريقو ڪار موجود آهي.

ڀاڳين کي اهو ٻڌايو ته ڪير جي مارڪيٽنگ چينل کي ڪيئن سڌاريو وڃي. اڳواڻ ڀاڳين ۽ ٻين جون مارڪيٽنگ جون سڃيون ڪهائون ٻڌائي مارڪيٽنگ ورڪشاپ ڪرائي ڄاڻ ڏني وڃي. مارڪيٽنگ جي سڃين ڪهائين جو خلاصو فني مهارتن جي رهنمائي ۾ آهي. "سڃي ڪهائي جي لاءِ هدايتون ۽ مثالي مستحڪم مارڪيٽنگ"



جيڪڏهن جانورن جي ڊاڪٽر ۽ توسيعي ڪارڪن کي تربيت يا گڏجاڻي دوران ڪا سڄي ڪهاڻي هدايتن واري ڪتاب کان علاوه ملي ته ان جي ڄاڻ پٺيان ضلعن جي جانورن جي ڊاڪٽرن، توسيعي ڪارڪنن، ۽ جانورن جي واپار جي معاون ماهر کي ضرور ڏين ته جيئن ان نئين معلومات کي بهتر انداز ۾ رهنمائي واري ڪتابچي ۾ شامل ڪري سگهجي.

(2) ڊيري فارم تي مارڪيٽ جي ضرورت مطابق ڪير پيداوار هٿ ڪرڻ گهرجي.

ڪير جي سني خريدارن جي تلاش ڪرڻ جهڙوڪ ڪير جا واپاري، ڪير ۽ دهلي جا دڪان، ڳوٺن ۽ شهرن ۾ ڪير خريد ڪندڙ گهر، ڇانهه جي هوٽلن وارا، آئسڪريم، ڦلڦي ۽ مائي ٺاهڻ وارا ۽ ڊيري ڪمپنيون ٿي ڪير خريد ڪندڙ اهم ذريعو آهن. بهتر خريدار جي تلاش ڪرڻ کان پهرين ڀاڳين کي هيٺين بنيادي مسئلن تي سوچڻو پوندو ۽ ان لاءِ ڪوششون وٺيون پونديون.

- (1) سني خاصيت واري ڪير جي پيداوار
سني خاصيت وارو ڪير اهو چئبو جنهن ۾ ملاوت نه هجي، اهو جراثيمن کان پاڪ هجي ۽ وڌيڪ سٺو وارو هجي.
- (2) ڪير جي پيداوار ايتري هجي جو ٻاهر وڪرو ڪري سگهجي
اهو سمجهڻ گهرجي ته ننڍي مالوند کي اڪيلي سر ڪوشش ڪرڻ کان بهتر آهي ته گڏيل طور تي پاڙي وارن سان گڏجي يا ڳوٺ وارن سان گڏجي وڪرو ڪري وارو ڪير گڏ ڪري وڪرو ڪرڻ گهرجي ان سان ڪير جو مستحڪم واپار ٿيندو ۽ سٺو اگه ملندو.

ڪير جا خريدار عام طور تي مٿي ڄاڻايل شرطن جي بنياد تي ڪير جي خريداري ڪندا جيڪي مٿي 1 ۽ 2 ۾ بيان ڪيل آهن.

- جيڪڏهن توهان مٿي بيان ڪيل 1 ۽ 2 شرطن مطابق ڪير جي پيداوار ڪندا ته يقينن ڪير جا خريدار توهان سان پاڻ رابطو ڪندا ۽ ڪير سني اگه تي خريد ڪندا.
- توهان پنهنجي هن اختيار تي سوچڻ شروع ڪريو
- سوچيو ته توهان مٿيون شرطون ڪهڙي طريقي سان پوريون ڪري سگهو ٿا.

(1) سني کير جي پيداوار

(a) کير ۾ ملاوت نه کبي

سمجهو ته توهان کير واپرائڻ وارا آهيو.
توهان ڪهڙو کير پيئڻ پسند ڪندا خالص کير يا پاڻي مليل کير؟
اچو ته ڪوشش ڪريون واڙي تي خالص ۽ سني خاصيت وارو کير پيدا ڪريون جنهن تي اسان ۽ اسان جي ڳوٺ وارا فخر محسوس ڪن.
جيڪڏهن توهان کير ۾ ملاوت نه ڪندا ته توهان کان خريد ڪندڙ کير جي گراهڪن جو توهان تي اعتماد وڌندو ۽ توهان کي کير جو سٺو اگهه ملندو.

(b) جراثيم کان پاڪ کير

جراثيم کان پاڪ کير پيدا ڪرڻ جي لاءِ ضروري آهي ته کير ڏهڻ واري جڳهه پڪي صاف ستري هجي ۽ ان مٿان چپرو هڻڻ گهرجي جيئن کير ۾ مٽي يا برسات جو پاڻي وغيره نه پوي. ان لاءِ کير ڏهڻ واري جاءِ بهتر ڪري پڪي ڪئي وڃي ۽ ان مٿان چت ٺاهي وڃي.

(1) چپرو

چپرو ٺاهڻ لاءِ ڪنهن به قسم جو سامان استعمال ڪري سگهجي ٿو جيڪو وڻاڻ کي گرمين ۾ تڏو ۽ سردين ۾ گرم رکي. خاص طرح ٿوڻين تي اڏيل ڪڪانوان وڻاڻ، باس جي لڪڙن جا اڏيل وڻاڻ ۽ پلاسٽڪ جي چادر سان ڍڪيل لڪڙن جا اڏيل وڻاڻ ٺاهي سگهجن ٿا. چپرو جيترو مٿي هوندو اوترو هوادار هوندو. وڻاڻ جي پوئين حصي واري ٿوڻي جي اوچائي 2.5 ميٽر کان مٿي هجڻ کپي. ۽ اڳئين حصي جي ٿوڻي جي اوچائي 50 سينٽي ميٽر پوئين ٿوڻي کان مٿي هجڻ گهرجي ته جيئن وڻاڻ هوادار رهي. وڻاڻ اهڙو ٺاهجي جيئن سج جي روشني ڏينهن جو هڪ دفعو وڻاڻ جي اندر تائين رسي سگهي.

		
<p>تصوير 2-19 چادر جو چپرو</p>	<p>تصوير 2-18 ڪانن جو چپرو</p>	<p>تصوير 2-17 ڪڪن جو چپرو</p>

(2) وڻاڻ جو فرش

وٽاڻ جو فرش ٺاهڻ لاءِ ڪنهن به قسم سامان استعمال ڪري سگهجي ٿو جهڙوڪ سرون، سيمنٽ جا بلاڪ ۽ ڪاٺ جو تختو استعمال ڪري سگهجي ٿو. ڪاٺ جا تختا ڊگها استعمال ڪجن. گهڻي غربت واري حالت ۾ گارو پٽ استعمال ڪري سگهجي ٿو. وٽاڻ جو پٽ ٻاهرين پٽ کان مٿانهون رکي گاري جو گهاتو لپيو ڏجي ۽ ان کي خشڪ رکجي. وٽاڻ جي پٽ جو سامهون وارو حصو مٿانهون رکجي ته جيئن پاڻي جو نيڪال آساني سان ٿي سگهي. وٽاڻ جي پٽ جي روزانه صفائي ڪجي خاص ڪري کير جي ڏهائي کان پهرين، ڏهائي دوران ۽ ڏهائي کان پوءِ ضرور ڪرڻ گهرجي ته جيئن مٽي يا پيو ڪڪ ڪچرو کير ۾ نه پوي.



تصوير نمبر 2-22 سيمنٽ جي بلاڪ وارو فرش	تصوير نمبر 2-21 سيمنٽ واري فرش	تصوير نمبر 2-20 سرن وارو فرش
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(وٽاڻ ۾ کير جي ڏهائي واري جڳهه جو فرش سيمنٽ جي سليب سان ٺاهڻ)

منصوبي تحت وٽاڻ ۾ کير جي ڏهائي واري جڳهه جو فرش سيمنٽ جي سليب سان ٺاهيو ويو. هر مثالي ضلعي ۾ مالوند سيمنٽ جا سليب تجويز ڪيل جڳهين تان خريد ڪري سگهجن ٿا جن جو تفصيل هيٺ ڏنل ٽيبل 2_6 ۾ آهي. منصوبي طرفان تجويز ڪيل سيمنٽ جي سليبن ۾ گهاريون ڏنل آهن جيڪي جانور کي ترڪڻ کان بچائڻ ٿيون. اهي سيمنٽ جا سليب جيڪي 20 انچ ويڪرا ۽ 40 انچ ڊگها ۽ 2 انچ ٿلها آهن جن جي اندر لوهي شيخون لڳل آهن جنهن سان اهي وڌيڪ مضبوط ٿين ٿا انهن جي قيمت اپريل 2018 تائين 350 روپيا في سليب هئي. هاڻ مالوند اهي تجويز ڪيل سيمنٽ جا سليب ضرورت مطابق ۽ حسبي توفيق خريد ڪري سگهن ٿا. مالوند اهي سليب ٿورا ٿورا خريد ڪري وٽاڻ جي مختلف جاين جهڙوڪ وٽاڻ جو پٽ، وٽاڻ جي ٻاهرين ڪليل جاءِ ۽ جانورن کي وهنجارڻ واري جاءِ کي پڪو ڪري سگهن ٿا. سيمنٽ جا سليب لڳائڻ کان پهرين زمين تي ڌمڪ هڻي ان کي پڪو ڪجي جيڪو تصوير نمبر 2_24 ۾ ڏيکاريل آهي. وٽاڻ جي پٽ کي ٿورو لهوارو رکجي ته جيئن پاڻي جو نيڪال سولو ٿي سگهي.

	
تصوير نمبر 2-24 زمين هموار ڪرڻ جي لاءِ ڌمڪ	تصوير نمبر 2-23 منصوبي جي طرفان تيار ڪيل سينمٽ جو سليب

ٽيبل 2-6 سينمٽ جا سليب خريد ڪرڻ جي جاين جو تفصيل

رابطي لاءِ نمبر	اٿڊريس	سليب خريد ڪرڻ جي جاءِ جو نالو	ضلعو
0300-8378841	بينظير چوڪ نئي سعيد آباد مٽياري	شيخ آٿرن اسٽور شاپ	مٽياري
0345-3591642	پتي روڊ سامهون، گهانگهرا موري ويجهو، ميرپور خاص روڊ حيدرآباد	پهلوان ٽائيل پائپ ورڪس	حيدرآباد
0313-4345446	گاجا پل ويجهو	ٽالپر آٿرن شاپ	تندو محمد خان
			تندو الهيار
			بدين

هڪ مثالي فارم تي وٽاڻ جو فرش سينمٽ جي سليب سان ٺاهي بهتر ڪرڻ جو مثال) جيئن تصوير نمبر 2_25 ۾ ڏيکاريل آهي ته وٽاڻ جي ٻاهرين کليل جاءِ جيڪا ڪچي مٽي واري آهي، مٽي سان چيٽو پڻ مليل آهي جنهن سان پت ڪي صاف ڪرڻ ۾ ڏکيائي پيش اچي ٿي. سينمٽ جا سليب لڳائڻ کانپوءِ جيڪو تصوير نمبر 2_26 ۾ ڏيکاريل آهي هاڻ وٽاڻ جي صفائي آساني سان ڪري سگهجي ٿي، جنهن سان وٽاڻ جو فرش هر وقت صاف ۽ خشڪ رهندو.

<p>تصوير نمبر 2-25 وٿاڻ بهتر ڪرڻ کان پهرين</p>	<p>تصوير نمبر 2-26 وٿاڻ بهتر ڪرڻ کان پوءِ</p>

3 تيز هوائن کان بچاءُ:

مهرباني ڪري انهي جي تصديق ڪريو ته سڄو سال هوائن جو رخ ڪهڙي طرف کان رهي ٿو انهي طرف کي مد نظر رکندي طوفاني هوائن کان بچڻ لاءِ ديوار جي تعمير ڪريو. جنهن لاءِ ڳوٺ ۾ موجود سامان جهڙوڪ قدرتي گاه جا پن ۽ تاريون، ڪمند جا پن ديوار ٺاهڻ لاءِ استعمال ڪري سگهجن ٿا. ان سان گڏوگڏ پلاسٽڪ جي شيٽ استعمال ڪري سگهجي ٿي جيڪڏهن ضروري هجي.

<p>تصوير نمبر 2-29 سر جي ڪانن جي ٺهيل پت</p>	<p>تصوير نمبر 2-28 ڪمند جا پن</p>	<p>تصوير نمبر 2-27 چار جي ٻوٽن جي تارين جي ٺهيل پت</p>

2) کير جي پيداوار ايتري هجي جو ٻاهر وڪرو ڪري سگهجي
اهو سمجهڻ گهرجي ته ننڍي مالوند کي اڪيلي سر وڪري لائق کير جو وزن پنهنجي فارم تي پيدا ڪرڻ مشڪل آهي، تنهنڪري ننڍي مالوند کي اڪيلي سر ڪوشش ڪرڻ کان بهتر آهي ته هو گڏيل طور تي پنهنجي مائٽن، پاڙي وارن سان گڏجي يا ڳوٺ وارن سان گڏجي کير وڪرو ڪندڙن جو گروپ ٺاهي ۽ ٻيا گروپ جيڪڏهن هجن ته انهن سان گڏجي گڏيل گروپ ٺاهي جنهن سان کير گڏ ڪرڻ ۽ گڏجي کير وڪرو ڪرڻ سان کير جو مستحڪم واپار ٿيندو ۽ سٺو اگه ملندو.

3. باب ٽيون ڊگين ۽ مينهن جو چارو ۽ ان جو انتظام

اچو ته سڪون مينهن/ گڻن جي نسلي صلاحيت مطابق کير پيدا ڪرڻ جي ڪل صلاحيت ڪيتري آهي ۽ اندازي طور ڪيترو کير ڏيئي سگهي ٿي.

سڀ کان پهرين چاري جي ڄاڻ هجي پوءِ سڪڻو آهي ته مينهن/ گڻن کي ويامڻ کان پهرين، ويامڻ وقت ۽ ويامڻ کان پوءِ مناسب چاري جو انتظام ڪيئن ڪرڻو آهي.

3.1 چاري جا قسم

3.1.1 ساوا ۽ خشڪ چارا

مينهنون/ گڻون بنيادي طور گاهه خور جاندار آهن. چارو مينهن/ گڻن جي جسماني صحت ۽ واڌ ويجهه برقرار رکڻ لاءِ ضروري آهي.

سائي ۽ خشڪ چاري ۾ وڌيڪ ريشيدار جزا هوندا آهن ۽ انهن ۾ گهٽ غذائيت هوندي آهي. ليڪن اهي اوجھري کي متحرڪ رکڻ ۽ هاضمي جي نظام کي صحيح هلائڻ لاءِ ضروري آهن.

a. پلال ۽ بهه (سڪل چارا): هنن ۾ پاڻياڻ ۽ غذائي جزن جو مقدار گهٽ هوندو آهي
b. ساوا گاهه (ساوا چارا): هنن ۾ پاڻياڻ جو مقدار وڌيڪ هوندو آهي ۽ ڪيترائي غذائي جزا هوندا آهن
c. گڏيل گاهه (ساوا ۽ سڪل گاهه) پاڪستان ۾ خوراڪ ڏيڻ جو هي طريقو عام آهي. هي تمام سٺو طريقيڪار آهي جنهن ۾ ساوا چارا ملايا ويندا آهن جن ۾ پاڻياڻ ۽ غذائي جزن جو مقدار نسبتن گهڻو هوندو آهي ۽ سڪل چاري ۾ پاڻياڻ ۽ غذائي جزن جو مقدار گهٽ هوندو آهي.

مختلف چارن جون تصويرون



تصوير نمبر 3-1
پلال: پاڻياڻ ۽ غذائيت جي مقدار گهٽ هوندي آهي.

تصوير نمبر 3-2
بُهه: پاڻياڻ ۽ غذائيت جي مقدار گهٽ هوندي آهي.



<p>تصوير نمبر 3-3 سائو گاه: پاڻياٺ ۽ غذائيت جي مقدار وڌيڪ هوندي آهي.</p>	<p>تصوير نمبر 3-4 گڏيل ساوا ۽ سڪل چارا.</p>
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هاڻي گاه يا مات گراس جيڪو گاه جي ڪٽيل گرين مان پوکيو ويندو آهي. مات گاه جي واڌ ويجهه جلدي ٿيندي آهي ان جي اها خصوصيت آهي ته ماحول ۽ موسمي حالتن مطابق واڌ ويجهه ٿيندي آهي. تنهنڪري ان جي واڌ ويجهه ۽ سار سنڀال ڪرڻ سولي آهي. اهي مالوند جن وٽ پنهنجي زرخيز زمين آهي اهي اهو چارو سولائي سان پوکي سگهن ٿا. هاري مالوند جن وٽ پنهنجي زمين ناهي اهي هاري واري زمين جي بن تي، خالي جڳهين ۽ سندن گهرن جي ڀرپاسن ۽ ٻين جڳهين تي پوکي سگهن ٿا. هن گاه جي واڌ ويجهه سياري جي موسم ۾ گهٽجي ٿي ۽ گرمين جي موسم ۾ وڌيڪ ٿيندي آهي. پوکڻ وقت بني ۾ ججهي مقدار ۾ وڻاڻ جو پاڻ (چيٽو) استعمال ڪجي. ٻن سالن ۾ هڪ دفعو وڻاڻ جو پاڻ ڏيڻ ضروري آهي. گهڻا ساوا پن ۽ گهڻي غذائيت ان وقت حاصل ٿيندي جڏهن ان جو قد 130 سينٽي ميٽر ٿئي ته پوءِ ڪٽيو وڃي. هن گاه جو قد 2.5 کان 3 ميٽرن تائين ويندو آهي. ايتري اوچائي تي پهچڻ وقت گاه جي ڏانڊي سخت ٿيڻ جي صورت ۾ ان جي غذائيت گهٽجي ويندي آهي. پاڳين کي مات گراس جي اوچائي جو احتياط ڪرڻ گهرجي ته جيئن جانور جي چاري جي لاءِ بهتر استعمال ڪري سگهجي.



<p>تصوير نمبر 3-7 مات گاه جي گهڻي اوچائي ٿيڻ جي صورت ۾ انهن ۾ خوراڪي جزا گهٽجي ويندا</p>	<p>تصوير نمبر 3-6 مات گاه جون ڪٽيل گريون پوکڻ</p>	<p>تصوير نمبر 3-5 مات گاه جي ڪٽائي لاءِ صحيح اوچائي</p>
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3.1.2 داڻيدار خوراڪ ۽ فارمولا فيڊ

داڻيدار خوراڪ ڪارائتو سان وڌيڪ کير حاصل ڪري سگهجي ٿو. داڻيدار خوراڪ ۾ پاڻي جو مقدار گهٽ ۽ غذائي جزن جو مقدار وڌيڪ هوندو آهي. داڻيدار خوراڪ کير ڏيندڙ جانورن لاءِ تمام اهم آهي.

داڻيدار خوراڪ جا ڪيترائي قسم آهن ۽ هر قسم ۾ غذائي جزن جو تناسب مختلف هوندو آهي. عام طور تي پاڪستان ۾ ملندڙ داڻيدار خوراڪ ۾ جيڪي شيون شامل هونديون آهن انهن ۾ ڪڪڙن جي کڙ، ڪڻڪ جو بوسو، چانورن جي کڙي يا چونو ۽ سورج مکي جي کڙ وغيره. سنڌ ۾ عام ڀاڱيا روايتي طور ڪا به هڪ قسم جي داڻيدار خوراڪ يا مکس داڻيدار خوراڪ جانورن کي ڏين ٿا. فارمولا فيڊ ۾ مختلف قسم جون داڻيدار خوراڪون، انهن سان گڏ نمڪيات ۽ معدني جزا پڻ شامل هوندا آهن جيڪي جانور جون غذائي ضرورتون پوريون ڪن ٿا. فارمولا فيڊ جا ٽي قسم ٿين ٿا جهڙوڪ کير جي پيداوار وڌائڻ لاءِ، گوشت جي پيداوار وڌائڻ لاءِ ۽ ڦرڙن جي واڌ ويجهه لاءِ وغيره.

داڻيدار خوراڪ جي تصوير

	
<p>تصوير نمبر 3-9 مختلف قسم جي داڻيدار خوراڪ</p>	<p>تصوير نمبر 3-8 کير جي پيداوار وڌائڻ لاءِ داڻيدار خوراڪ ضروري آهي.</p>
	
<p>تصوير نمبر 3-11 فارمولا فيڊ جو نمونو</p>	<p>تصوير نمبر 3-10 فارمولا فيڊ تيار ڪئي پئي وڃي</p>

3.1.3 کير جي پيداوار وڌائڻ لاءِ چاري ڪارائڻ جو مثال

کير وارن جانورن جي پيداوار وڌائڻ لاءِ انهن کي گهربل ضروري خوراڪ جو مناسب مقدار ڏجي جنهن ۾ سائو گاه، خشڪ چارو ۽ دائيدار خوراڪ مناسب تناسب ۾ گڏيل هجي.

جانورن کي سائو گاه ۽ خشڪ چارو انهي ڪري ڏنو ويندو آهي جيئن جانور جون گهربل غذائي ضرورتون پوريون ٿين ۽ هو پنهنجي جسم جي واڌ ويجهه کي برقرار رکي سگهن ۽ دائيدار خوراڪ يا فارمولا فيڊ انهي لاءِ ڏجي ٿي ته جيئن انهن مان گهربل کير جي پيداوار حاصل ڪري سگهجي.

(1) جانورن کي سائو گاه ۽ خشڪ چارو ڏيڻ

جانورن کي سائو گاه ۽ خشڪ چارو ڏيڻ جو مقصد انهن جو پيٽ پرڻڻ آهي

جانورن لاءِ گهربل خوراڪ بابت سوچڻ ۽ ان جو حساب ڪرڻ.

اهو سمجهڻ ضروري آهي ته ٿلهي ليکي جانور کي سائو ۽ خشڪ چارو ڪيترو گهربل آهي ته جيئن ان جي مناسب مقدار ۾ تيار ڪري سگهجي. کير وارن جانورن کي چاري جو (خشڪ مادو) جيڪو زنده جانور جي جسماني وزن جي گهٽ ۾ گهٽ هڪ سيڪڙي برابر ڏنو وڃي. مثال طور چاري جو 4 ڪلو گرام خشڪ مادو 400 ڪلوگرام جسماني وزن واري جانور کي ڏيڻ جي ضرورت آهي. خشڪ مادي جو سيڪڙو چاري جي قسم مطابق تبديل ٿي سگهي ٿو. جانور لاءِ گهربل چاري جو حساب ڪرڻ لاءِ چاري جي مختلف شين جي تناسب ۽ مقدار جو حساب ڪتاب ڪرڻ ضروري آهي.

منصوبي طرفان ڪنڊي مينهن يا انهن جهڙين مينهن جي جسماني وزن معلوم ڪرڻ لاءِ حوالي طور استعمال ڪرڻ لاءِ ٽيبل تيار ڪئي وئي آهي. جانور جو جسماني وزن ان جي چاتي جي ماپ ذريعي معلوم ڪري سگهيو. مالوند پنهنجي جانور جو وزن ان جي چاتي جي ماپ وٺي ٽيبل ۾ ڏنل ماپ جيڪا صفحي نمبر 73 تي آهي سان پيٽ ڪري سگهن ٿا.

سائو گاه اسپرنگ واري ڪاتي سان توري سگهجي ٿو. مهرباني ڪري ڪوشش ڪري ڏسو.



تصوير نمبر 3-12 سائو گاه اسپرنگ واري ڪاتي سان توريو پيو وڃي.



(2) مثال ذريعي سمجهاڻي:

(1) چاري جو چارٽ

چاري جي چارٽ مطابق قدرتي گاهه ۾ 10 سيڪڙو ۽ بوهه ۾ 90 سيڪڙو خشڪ مادو هوندو آهي.

ٽيبل 1-3 چاري ۾ موجود خوراڪي جزن جي

خشڪ مادي جو تناسب (%)	چاري جو نالو
20	قدرتي گاهه
90	ڪڻڪ جو بهه
30	ڪمند جا پن

(2) کير واري مينهن جو جسماني وزن

کير واري مينهن جي چاتي جي ماپ ڪريو. جيڪڏهن چاتي جي ماپ 179 سينٽي ميٽر ٿئي ته ريفرينس ٽيبل مطابق ان جو جسماني وزن 403 ڪلوگرام ٿيندو. مثال طور جسماني وزن 400 ڪلوگرام آهي.

(3) کير واري مينهن لاءِ گهربل سائوچارو

کير واري مينهن لاءِ چاري جو گهربل خشڪ مادو ان جي جسم جي وزن جو هڪ سيڪڙو هيٺين طرح معلوم ڪبو:

هڪ سيڪڙو 400 ڪلوگرام جسماني وزن واري مينهن جو ٿيو 4 ڪلو. تنهنڪري 400 ڪلوگرام واري مينهن کي ايتري سائي چاري جي ضرورت هوندي جنهن ۾ 4 ڪلوگرام خشڪ مادو هجي.

(4) کير واري مينهن لاءِ گهربل قدرتي چاري جو حساب ڪرڻ

قدرتي گاهه جي وزن واري ٽيبل مطابق قدرتي گاهه ۾ موجود خشڪ مادي جو سيڪڙو 20 آهي
 $4 \text{ ڪلوگرام (گهربل خشڪ مادو)} = \text{ڪلوگرام (گهربل قدرتي گاهه)} * 10 \text{ سيڪڙو}$

$$X \text{ Kg} = 4 \text{ kg} \div 20\% (0.2)$$

$$X = 20 \text{ kg}$$

**5) گهربل ڪٽڪ جي بهه جو حساب ڪرڻ**

بهه جي وزن واري ٽيبل مطابق بهه ۾ موجود خشڪ مادي جو سيڪڙو 90 سيڪڙو آهي

4 ڪلوگرام (گهربل خشڪ مادو) = ڪلوگرام (گهربل ڪٽڪ جو بهه) * 90 سيڪڙو

$$X \text{ Kg} = 4 \text{ kg} \div 90\% (0.9)$$

$$X = 4.4 \text{ kg}$$

6) گهربل ڪمند جي پنن جو حساب ڪرڻ

ڪمند جي پنن جي وزن واري ٽيبل مطابق ڪمند جي پنن ۾ موجود خشڪ مادي جو سيڪڙو 30 سيڪڙو آهي

4 ڪلوگرام (گهربل خشڪ مادو) = ڪلوگرام (گهربل ڪمند جي پنن) * 30 سيڪڙو (0.3)

$$X \text{ kg} = 4 \text{ Kg} \div 30\% (0.3)$$

$$X = 13 \text{ Kg}$$

ٽيبل 2-3 کير واري مينهن جنهن جو جسماني وزن 400 ڪلوگرام هجي ان لاءِ چاري جو گهربل معياري وزن

چاري جو قسم	چاري جو گهربل وزن
قدرتي گاه	20 ڪلوگرام
ڪمند جا پن	13 ڪلوگرام
ڪٽڪ جو بهه ۽ قدرتي گاه	2.2 ڪلوگرام + 10 ڪلوگرام = 12.2 ڪلوگرام
ڪٽڪ جو بهه صرف	4.4 ڪلوگرام

مٿي ڏيکاريل گاه جو وزن گهٽ ۾ گهٽ گهربل وزن آهي جيڪو کير وارين مينهن يا ڍڳين کي ڏيڻ گهرجي

3) کير وارن جانورن لاءِ فارمولا فيڊ

پروجيڪٽ ٽيم طرفان کير وارن مينهن ۽ ڍڳين لاءِ فارمولا فيڊ ٺاهيو ويو جيڪو ان علائقي ۾ موجود داڻيدار خوراڪ کي مناسب سيڪڙي جي حساب سان ترتيب ڏيئي تيار ڪيو ويو. هيٺ ڏنل ٽيبل نمبر 3-3 ۾ ماڊل 1 ۽ ماڊل 2 ڏيکاريل آهن. ماڊل نمبر 1 ۾ ڪڪڙن جي کڙ شامل آهي. پروجيڪٽ جي ٽيم کي معلوم ٿيو ته حيدرآباد جي مارڪيٽ ۾ امپورٽيڊ معياري سويابين جي کڙ مناسب آهي تنهنڪري پروجيڪٽ جي ٽيم فارمولا فيڊ جي



ماڊل 2 ۾ ڪڪڙن جي کڙ جي جاءِ تي سويابين جي کڙ شامل ڪئي. ڪڪڙن جي کڙ ۾ اوفلاتاڪسن جا زهريلا اثرات هئڻ ڪري ان جي جاءِ تي سويابين جي کڙ شامل ڪئي وئي. فارمولا فيڊ ۾ ضروري وٽامن ۽ نمڪيات شامل ڪري فارمولا فيڊ کي کير واري جانورن لاءِ وڌيڪ معياري ۽ بهتر غذائي قوت واري دائيڊار خوراڪ ٺاهي ويئي.

ٽيبل 3-3 پروجيڪٽ طرفان ترتيب ڏيئي ٺاهيل معياري ۽ بهتر غذائي قوت واري دائيڊار خوراڪ

ماڊل نمبر 2	ماڊل نمبر 1	دائيڊار خوراڪ جو نالو
مڪس ڪيل حصو	مڪس ڪيل حصو	
25	10	مڪئي جو ڌارو
20	5	ڪڻڪ جو ڌارو
0	13	ڪڪڙن جي کڙ
0	6	سارين جي ڪٽي يا چونو
30	35	ڪڻڪ جو بوسو
17	30	سورج مڪي جو بچ
7	0	سويابين جي کڙ
1	1	هڏن جو چورو (ڊي سي پي)
100	100	ڪل حصا :
74.9	67.0	ڪل هاضميڊار جزا (ٽي ڊي اين)
18.4	18.0	لحميات (سي پي)

(3) کير واري مينهن ۽ ڍڳين کي فارمولا فيڊ ڪارائڻ جو معياري طريقو.

کير واري مينهن ۽ ڍڳين کي فارمولا فيڊ بنيادي طور ان جي کير جي پيداوار مطابق ڏيڻ گهرجي

جاپان ۽ ٻين ترقي يافته ملڪن ۾ گهڻو کير ڏيندڙ ڍڳين کي فارمولا فيڊ ڪارائڻ جو معيار ٽي ڪلو کير جي پيداوار تي هڪ ڪلو فيڊ ڏيڻ آهي. جڏهن ته پاڪستان ۾ کير ڏيندڙ ڍڳين ۽ مينهن کي فارمولا فيڊ ڪارائڻ جو معيار ٻه ڪلو کير جي پيداوار تي هڪ ڪلو فيڊ هئڻ گهرجي. تنهنڪري 10 ڪلو کير ڏيندڙ مينهن يا ڍڳي کي 5 ڪلو فيڊ ڏيڻ کپي.



3) فارمولا فيڊ ڪارائت جي نتيجي ۾ مثالي پاڳي جي ڪير وارن جانورن جي پيداوار ٻيڻي ٿي وئي.

هي منصوبو پنجن ضلعن جهڙوڪ مٽياري، حيدرآباد، ٽنڊوالهيوار، ٽنڊومحمد خان ۽ بدين ۾ ڪم ڪري رهيو آهي. انهن ضلعن مان 25 ننڍا ۽ وچولي درجي جا مثالي پاڳيا چونڊيا ويا آهن، جتي منصوبي طرفان متعارف ڪرايل ترڪيبن ۽ مهارتن کي مثالي پاڳين جي وٽان ۽ جانورن تي آزمائي ان جي ڪارگر ۽ مناسب هئڻ جي تصديق ڪئي ويندي.

انهن علائقن ۾ منصوبي جي شروع ٿيڻ کان پهرين سروي ڪئي وئي. ان سروي ۾ اهو معلوم ٿيو ته 92 سيڪڙو مالوند پنهنجن جانورن کي جيڪا داڻيدار خوراڪ ڪارائين پيا يا ڪارائين هئي اها ان علائقي جي مارڪيٽ مان ورتي وئي هئي. انهن سڀني مثالي پاڳين مان ڪنهن به پنهنجي جانورن کي فارمولا فيڊ نه ڪارائين هئي.

فارمولا فيڊ هڪ متوازن داڻيدار خوراڪ آهي جيڪا مختلف داڻيدار خوراڪي شين کي مناسب تناسب سان ملائي ناهي ويندي آهي ۽ ان جي غذائي قوت کي ليبارٽري طرفان چڪاس ڪري ان جي تصديق ڪئي ويندي آهي. هن منصوبي طرفان جيڪا فارمولا فيڊ ناهي ويئي آهي ان ۾ لحميات (CP) 18 سيڪڙو کان وڌيڪ شامل ڪئي ويئي آهي ۽ ڪل هاضميدار خوراڪي جزا (TDN) 72 سيڪڙو کان وڌيڪ شامل ڪيا ويا آهن ۽ انهن ۾ بنيادي ضروري وٽامن ۽ معدنيات پڻ شامل ڪئي ويئي آهي. منصوبي جي ٽيم طرفان هر مثالي پاڳي وٽ ٻن ڪير وارن جانورن تي فارمولا فيڊ جا 2 سال ۽ 8 مهينن تائين تجربا ڪيا ويا. انهن تجربن جا نتيجا ٽيبل 3-4 ۾ ڏيکاريل آهن.

ٽيبل 3-4 فارمولا فيڊ جي تجربن جا نتيجا

روزانو سراسري ڪير جي پيداوار	سراسري ڪير جي پيداوار (305 ڏينهن ۾)	ڪيترن ڪير وارن جانورن تي ٽرائل تجربا ڪيا ويا
8.8 kg	2,672 kg	45 ڪير واريون مينهنون جن کي فيڊ ڪارائين ويئي
4.7 kg	1,443 kg	18 ڪير واريون مينهنون جن کي فيڊ نه ڪارائين ويئي

	<table border="1"> <caption>Milk Yield (Kg) over 10 Days</caption> <thead> <tr> <th>Day</th> <th>Trial Formula Feed (Kg)</th> <th>No Formula Feed (Kg)</th> </tr> </thead> <tbody> <tr><td>1</td><td>8.2</td><td>4.9</td></tr> <tr><td>2</td><td>9.8</td><td>5.5</td></tr> <tr><td>3</td><td>10.0</td><td>5.6</td></tr> <tr><td>4</td><td>10.1</td><td>5.3</td></tr> <tr><td>5</td><td>9.7</td><td>5.1</td></tr> <tr><td>6</td><td>9.3</td><td>4.7</td></tr> <tr><td>7</td><td>8.7</td><td>4.6</td></tr> <tr><td>8</td><td>7.4</td><td>4.1</td></tr> <tr><td>9</td><td>6.9</td><td>3.8</td></tr> <tr><td>10</td><td>6.3</td><td>3.2</td></tr> </tbody> </table>	Day	Trial Formula Feed (Kg)	No Formula Feed (Kg)	1	8.2	4.9	2	9.8	5.5	3	10.0	5.6	4	10.1	5.3	5	9.7	5.1	6	9.3	4.7	7	8.7	4.6	8	7.4	4.1	9	6.9	3.8	10	6.3	3.2
Day	Trial Formula Feed (Kg)	No Formula Feed (Kg)																																
1	8.2	4.9																																
2	9.8	5.5																																
3	10.0	5.6																																
4	10.1	5.3																																
5	9.7	5.1																																
6	9.3	4.7																																
7	8.7	4.6																																
8	7.4	4.1																																
9	6.9	3.8																																
10	6.3	3.2																																
<p>تصوير نمبر 3-13 خوش ٽيندڙ پائلٽ فارمر</p>	<p>شڪل نمبر 3-1 نيري لائين انهن مينهن جي پيداوار کي ظاهر ڪري ٿي جن کي فارمولا فيڊ ڪارائي ويئي انهن جي پيداوار بيٺ کان به مٿي حاصل ٿي ۽ ڳاڙهي لائين انهن مينهن جي پيداوار کي ظاهر ڪري ٿي جن کي فارمولا فيڊ نه ڪارائي ويئي. فيڊ نه ڪائيندڙ مينهن جي پيداوار تمام گهٽ رهي.</p>																																	

3.2 ويامڻ کان اڳ، ويامڻ دوران ۽ ويامڻ کان پوءِ چاري جو انتظام ڪرڻ

3.2.1 ويامڻ کان اڳ واري عرصي دوران چاري جو انتظام ڪرڻ

ويامڻ کان اڳ پنهنجي جانور کي فارمولا فيڊ ڪرائڻ شروع ڪريو. اهڙي خوراڪ واري طريقي کي پري فيڊنگ چيو وڃي ٿو

ويامڻ کان ٽي هفتا اڳ پنهنجي جانور کي فارمولا فيڊ ڪرائڻ شروع ڪريو ته جيئن جانور فارمولا فيڊ ڪائڻ جو عادي ٿي وڃي. جانور جي اوجھري ۾ مختلف قسمن جا بيڪٽيريا ۽ پروٽوزوئا ٿين ٿا جيڪي جانور جي هاضمي جي نظام ۾ داخل ٿيندڙ خوراڪي شين کي ٽوڙڻ ۽ خوراڪي جزن کي جذب ٿيڻ ۾ مدد ڪن ٿا. ويامڻ کان پھرين جانور کي فارمولا فيڊ ڪرائڻ سان هاضمي ۾ مدد ڪندڙ جراثيم نئين تبديل ٿيندڙ خوراڪ کي هضم ڪرڻ لاءِ متحرڪ ٿين ٿا ۽ جانور جي ويامڻ تائين هاضمي جي نظام کي صحيح نموني سان هلائڻ لڳن ٿا. فارمولا فيڊ روزانه هڪ يا ٻه ڪلو کان شروع ڪجي ۽ ان جو مقدار ٿورو ٿورو ڪري وڌائجي. جيڪڏهن جانور تمام گهڻو ڪمزور هجي ته فيڊ جو مقدار تن ڪلو تائين وڌائجي. اهو ياد ڪرڻ گهرجي ته فيڊ جو مقدار تن ڪلو کان مٿي نه ڏيڻ گهرجي ۽ اهو مقدار جانور جي ويامڻ تائين ساڳيو ڏيڻ گهرجي. معياري ڪير جي پيداوار وٺڻ لاءِ ويامڻ کان پھرين جانور کي فارمولا فيڊ ڪرائڻ گهرجي.



ٽيبل 3-5 فارمولا فيڊ ڪارائٽ (ويامڻ کان پهرين واري عرصي دوران)

ڪمزور يا اڀرو جانور	نارمل صحت	متارو جانور	جانور جي جسماني صحت جو عرصو	جانور جي پيداواري حالت
3 ڪلو	2 ڪلو	1 ڪلو	3 هفتا ويامڻ کان پهرين	خشڪ ڍڪي

3.2.2 ويامڻ جي دوران جانور جي سار سنڀال ۽ چاري جو انتظام ڪرڻ

ويامڻ کان پهرين جانور جي سار سنڀال جي تياري ڪرڻ ضروري آهي

جيڪڏهن جانور ڏينهن جي وقت ويامي ٿو ته ان کي ڪنهن صاف، تڙي ۽ چانو واري جڳهه تي ٻڌو ۽ جيڪڏهن جانور رات جي وقت ويامي ٿو ته ان کي پاڳڻي جي گهر جي ويجهو ٻڌجڻ جو انتظام ڪجي ته جيئن ان جي سار سنڀال آساني سان ٿي سگهي. جيڪڏهن جانور کي ڪنهن علاج جي ضرورت آهي ته ان لاءِ جلد صحت جي اصول مطابق بندوبست ڪجي. جيڪڏهن ويبر سولو نه هجي ته ان لاءِ جلد فيصلو ڪجي ته ۽ ڪنهن ماهر ڊاڪٽر سان رابطو ڪجي. عام طور تي چر ويامڻ کانپوءِ 6 کان 8 ڪلاڪن جي اندر جانور ڪڍي ڇڏيندو آهي. جيڪڏهن چر 12 ڪلاڪن تائين نه ڪري ته ان جو مطلب چر اندر رهجي ويئي. ان لاءِ ڪنهن ماهر ڊاڪٽر کي گهرائڻ جو انتظام ڪجي چر جيترو جلد ممڪن ٿي سگهي ڪڍرائي ڇڏجي.

3.2.3 ويامڻ کان پوءِ چاري جو انتظام ڪرڻ (ڪير ڏيڻ وارو عرصو)

(1) چاري جو انتظام ڪرڻ

(1) ڪير واري جانور جي لاءِ سني چاري جو انتظام ڪرڻ گهرجي

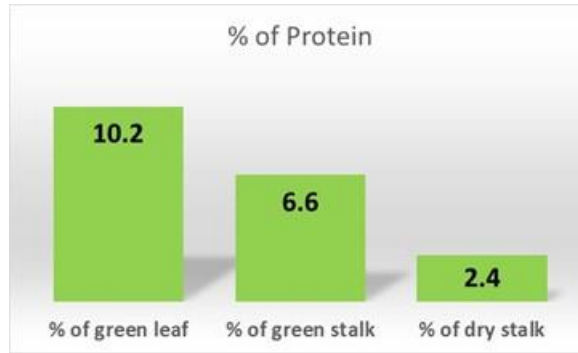
چارو اوڳر ورائيڊز جانورن لاءِ تمام ضروري آهي. جيترو ممڪن ٿي سگهي ڪير واري جانور کي سني خاصيت وارو چارو ڏيڻ گهرجي

اهو تمام ڏکيو آهي ته سنڌ صوبي ۾ ڪير وارن جانورن کي سني خاصيت وارو چارو ۽ مناسب چاري جو مقدار پوري ڪير ڏيڻ واري عرصي دوران ڏيئي سگهجي. ليڪن اها ڪوشش ڪري سگهجي ٿي ته جيترو ممڪن ٿي سگهي ڪير وارن جانورن کي سني خوراڪي سگهه وارا ساوا چارا ڏجن. قدرتي گاهن ۾ چير ۽ توپ گاهه وغيره جنهن ۾ ساوا پن گهڻا ٿين ٿا ۽ ان ۾ خوراڪي سگهه بهتر آهي ڪارائتي سگهجن ٿا. سياري جي موسم ۾ ساون چارن جي خاصيت متاثر ٿئي ٿي. ان لاءِ مالونڊن کي هدايت ڪجي ٿي ته اهي لوسڻ يا برسيم سان خشڪ چارا ڪتر ڪري ملائي ڪارائين ته جيئن ان سان ڪير وارن جانورن کي گهربل توانائي ۽ لحميات مهيا ٿي سگهي.

ساوا ۽ گھڻن پنن وارا چارا کير وارن جانورن کي ڏجن چاڪاڻ ت ساون پنن ۾ لحميات وڌيڪ ٿئي ٿي

ساون پنن ۾، ساون ٽارين ۾ ۽ سڪل کانن ۾ موجود لحميات جي تناسب کي ڏسنداسين ته پهرين نمبر تي ساون پنن ۾ وڌيڪ هوندي آهي ان کانپوءِ ٻئي نمبر تي ساون ٽارين ۾ ۽ آخر ٽئي نمبر تي سڪل کانن ۾ لحميات هوندي آهي. سٺي چاري جو مطلب ساڻو گاهه جنهن ۾ تمام گهڻا پن هجن. هيٺ ڏنل گراف جي تصوير 2-3 ۾ ڏيکاريل آهي ته بوليويا ملڪ جي هڪ گاهه نالي بريچياريا ڊيڪمبينس ۾ لحميات جو سيڪڙو 10.2 ساون پنن ۾، 6.6 سيڪڙو ساون ٽارين ۾ ۽ 2.4 سيڪڙو خشڪ ٽارين ۾ ليبارٽري چڪاس ذريعي معلوم ڪيو ويو.

شڪل 2-3 قدرتي سائي گاهه جي مختلف حصن ۾ موجود لحميات جو تناسب سيڪڙي ۾



حوالو: گوشت واري گهڻون جي بهتري وارو منصوبو ملڪ بوليويا، (ڊاڪٽر هيڊيو ٽوميناگا)

مسلسل ساون چراگاهن ۾ جانورن کي چارڻ سان جانور ساوا پن ۽ ٽاريون گهڻو کائين ٿا جنهن سان کاڌل چاري جي خوراڪي سگهه وڌيڪ رهي ٿي.

مسلسل ساون چراگاهن ۾ جانورن کي چارڻ جو مطلب جانورن کي واري ڦيري سان مسلسل ساون چراگاهن جي ٻارين ۾ چارجي. جيڪڏهن ان کي ائين جاري رکبو ته ساون پنن جي واڌ هر ٻاري ۾ وڌندي ۽ پنن ۽ ٽارين ۾ لحميات جو مقدار پڻ وڌندو. ساون چراگاهن جي ٻاري مان هڪ چورس ميٽر ۾ موجود گاهه کي کڻيو ويو ۽ ان کي ساون پنن، ساون ٽارين ۽ سڪل ٽارين ۾ الڳ الڳ ڪيو ويو. ان کانپوءِ هر حصي جو وزن ڪيو ويو. هيٺ ڏنل تصوير 3-14 ۾ ڏسو ته ساڻو گاهه گهڻو پيل آهي. انهن حصن ۾ سائي گاهه جو سيڪڙو 86.2 هو، ساين ٽارين جو سيڪڙو 8.3 هو ۽ سڪل ٽارين جو سيڪڙو 5.5 هو.

<p>Intensive Grazing</p> <ul style="list-style-type: none"> 86% % of green leaf 8% % of green stalk 6% % of dry stalk 	
<p>شڪل 3-3 ساون چراگاهن ۾ سائي گاهه، سائين تارين ۽ سڪل تارين جو سيڪڙو گراف ۾ ڏيکاريل آهي</p>	<p>تصوير نمبر 3-14 ساون چراگاهن ۾ سائي گاهه، سائين تارين ۽ سڪل تارين جو سيڪڙو</p>

حوالو: گوشت واري گئون جي بهتري وارو منصوبو بوليويا ملڪ، (ڊاڪٽر هيڊيو توميناگا)

اهڙن چراگاهن ۾ جتي ساوا گاهن جو ڦوٽهڙو گهٽ رهي ٿو اتي جانورن کي چرڻ لاءِ پن گهٽ ۽ سڪل تاريون وڌيڪ ملن ٿيون جن ۾ خوراڪي سگهه گهٽ هوندي آهي.

اهڙن چراگاهن ۾ جتي جانور مسلسل ساڳين ٻارين ۾ چرن ٿا اتي ساون پنن جو سيڪڙو گهٽجي وڃي ٿو ۽ تارين جي اوچائي وڌي وڃي ٿي ۽ هن حالت ۾ گاهه جو وزن وڌي وڃي ٿو، جن ۾ تارين جو وزن 75.5 سيڪڙو ٿي وڃي ٿو ۽ ساون پنن جو وزن جن ۾ لحميات وڌيڪ هوندي آهي گهٽجي 17.5 سيڪڙو ٿي وڃي ٿو ۽ سڪل تاريون 8.9 سيڪڙو وڃي رهن ٿيون.

	<p>Extensive Grazing</p> <ul style="list-style-type: none"> 17% % of green leaf 75% % of green stalk 8% % of dry stalk
<p>تصوير نمبر 3-15 ساڳئي ٻارين ۾ مسلسل چرندڙ جانورن جي نتيجي ۾ تارين جو سيڪڙو، ساون پنن جو سيڪڙو ۽ سڪل تارين جو سيڪڙو</p>	<p>شڪل نمبر 3-4 ساڳئي ٻارين ۾ مسلسل چرندڙ جانورن جي نتيجي ۾ تارين جو سيڪڙو، ساون پنن جو سيڪڙو ۽ سڪل تارين جو سيڪڙو گراف ۾ ڏيکاريل آهي.</p>

حوالو: گوشت واري گئون جي بهتري وارو منصوبو بوليويا، (ڊاڪٽر هيڊيو توميناگا)

گهٽي خوراڪي سگهه وارا چارا (3)

<p>تصوير نمبر 3-18 مڪئي سائو گاهه جنهن ۾ لحميات وڌيڪ هوندي آهي</p>	<p>تصوير نمبر 3-17 جانور چير مزي سان کائي رهيا آهن</p>	<p>تصوير نمبر 3-16 قدرتي گاهه چير</p>
<p>تصوير نمبر 3-21 وونڻن جا پن ۽ تاريون جن ۾ لحميات گهٽي هوندي آهي</p>	<p>تصوير نمبر 3-20 ڪٽائي ڪيل برسير</p>	<p>تصوير نمبر 3-19 برسير جنهن ۾ لحميات گهٽي هوندي آهي مالوندان جي ڪٽائي ڪري رهيا آهن</p>

گهٽ خوراڪي سگهه وارا چارا

<p>تصوير نمبر 3-24 ڪمند جا پوتا</p>	<p>تصوير نمبر 3-23 ڪڻڪ جو بوه</p>	<p>تصوير نمبر 3-22 مڪئي جا ڪانا</p>

**(2) جانورن کي فارمولا فيڊ ڪارائڻ.**

جيڪڏهن فارمولا فيڊ ڪارائڻ سان ڪير جي پيداوار وڌي ۽ خرچ جي پيٽ ۾ وڪرو ٿيندڙ ڪير مان منافعو وڌيڪ ملي ته پوءِ سمجهو اوهان فائدي ۾ آهيو. منصوبي جي ٽيم مالونڊن مان اها اميد رکي ٿي ته مستقبل ۾ مالونڊ فارمولا فيڊ پنهنجي خرچ سان وڌيڪ ڪير وارن جانورن کي ڪارائتي ڪير جي پيداوار وڌائيندا ۽ وڌ کان وڌ منافعو حاصل ڪندا.

فارمولا فيڊ ڪيتري ڪارائڻ گهرجي

فارمولا فيڊ جي مقدار جو دارومدار ڪير واري جانور جي جسماني حالت ۽ ڪير جي پيداوار تي آهي. صحتمند ڪير واري جانور کي فارمولا فيڊ جو مقدار هيٺ ڏنل ٽيبل جي وچين ڪالم ۾ تجويز ڪيل آهي. جيڪڏهن جانور گهڻو متارو آهي ته پوءِ فارمولا فيڊ جو مقدار هيٺ ڏنل ٽيبل جي پهرين ڪالم ۾ تجويز ڪيل آهي، جڏهن ته ڪمزور جانور کي فارمولا فيڊ جو مقدار هيٺ ڏنل ٽيبل جي آخري ڪالم ۾ تجويز ڪيل آهي.

ٽيبل 3-6 ويامڻ کانپوءِ ڪير وارن جانورن کي فارمولا فيڊ ڪارائڻ جي ترتيب

جانور جي جسماني صحت جي حالت			جانور جي ڪير جي پيداوار	جانور جي پيداواري حالت
اپرو جانور	صحتمند جانور	متارو جانور		
1.5	1	1	ڪير جي پيداوار 2 لٽر تائين	ڪير وارا جانور
2.5	2	1.5	ڪير جي پيداوار 2.1 لٽر کان 4 لٽر تائين	
3.5	3	2.5	ڪير جي پيداوار 4.1 لٽر کان 6 لٽر تائين	
4.5	4	3.5	ڪير جي پيداوار 6.1 لٽر کان 8 لٽر تائين	
5.5	5	4.5	ڪير جي پيداوار 8.1 لٽر کان 10 لٽر تائين	
6	5.5	5	ڪير جي پيداوار 10 لٽر کان مٿي	

	
<p>تصوير نمبر 3-26 جانور کي ڏوهائي واري وقت تي فارمولا فيڊ ڪرائي پئي وڃي</p>	<p>تصوير نمبر 3-25 فارمولا فيڊ ڪرائڻ بابت پروجيڪٽ جو ڪارڪن مثالي ڀاڱي جي رهنمائي ڪري رهيو آهي</p>

(3) کير ورن جانورن کي فارمولا فيڊ ڪرائڻ بابت فيصلو چاري جي خاصيت ۽ وزن کي ڏسي ڪجي

سڀ کان پهرين اهو ڏسڻ گهرجي ته چاري جي خاصيت ۽ وزن ڪيترو آهي.

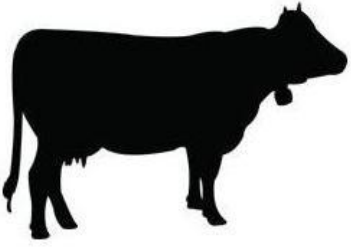


اهو ممڪن ناهي ته اسان چاري جي واڌ ويجهه جي حالت کي هڪ وقت بيهاري سگهون (جهڙوڪ شروعاتي وڌندڙ حالت، گل نڪرڻ واري حالت ۽ ميوي جهلڻ واري حالت) جيڪا هر موسم ۽ هر فارم تي مختلف هوندي آهي تنهنڪري هر چاري جي صحيح طريقي ۽ چاري جي قسم مطابق ان جي خاصيت ۽ موجود وزن کي ڏسي ترتيب ڏني وڃي. ان لاءِ منصوبي جي ٽيم طرفان فارم تي موجود چاري جو وزن ۽ ان جي خوراڪي خاصيت مطابق هيٺيون تي حالتون ترتيب ڏنيون آهن:

1) سني خاصيت وارو چارو مقدار جي ججهي موجودگي جي حالت ۾ (2) وچولي خاصيت وارو چارو مقدار جي ٿوري ڪوت جي حالت ۾ ۽ (3) گهٽ خاصيت وارو چارو مقدار جي گهڻي ڪوت جي حالت ۾. اچو ته کير ورن جانورن کي فارمولا فيڊ سائي گاه جي موجودگي جي حالتن ۽ ان جي خاصيتن کي نظر ۾ رکي ڪارايون.

1) کير ورن جانورن لاءِ چاري جو انتظام ڪرڻ جڏهن اهو سني خاصيت وارو هجي ۽ ججهي مقدار ۾ موجود هجي.

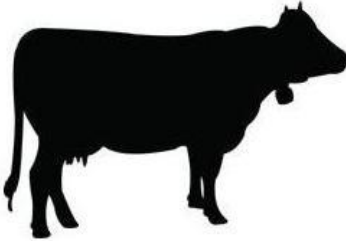


کير وارا جانور انهن چارن مان 100 سيڪڙو توانائي پنهنجي صحتمند جسم جي طبعي حالت کي برقرار رکڻ لاءِ ۽ 50 سيڪڙو توانائي کير جي پيداوار ڏيڻ لاءِ حاصل ڪن ٿا.

ان حالت ۾ جڏهن چارو سني خاصيت وارو ۽ وافر مقدار ۾ موجود هجي ته کير وارن جانورن کي فارمولا فيڊ گهريل چاري جي وزن جو $1/3$ حصو ڏيڻ گهرجي جيڪو پوئين صفحي ۾ ڏيکاريل ٽيبل 3_6 مطابق مناسب آهي. مثال طور صحتمند طبعي حالت رکندڙ کير وارو جانور جيڪو 5 ڪلو روزانه کير ڏيئي ٿو ان لاءِ 3 ڪلو فارمولا فيڊ مناسب آهي. جڏهن ته ساڳئي جانور جنهن کي ضرورت مطابق گهريل وزن جو سني خاصيت وارو سائو چارو مهيا ڪيو پيو وڃي ان لاءِ فارمولا فيڊ جي وزن جو $1/3$ حصو يعني 3 ڪلو جو 33 سيڪڙو جيڪو هڪ ڪلوگرام جي برابر ٿيندو مناسب هوندو.

سائو چارو مهيا ڪرڻ	سني چارن مان 100 سيڪڙو توانائي جانور پنهنجي صحتمند جسم جي طبعي حالت کي برقرار رکڻ لاءِ حاصل ڪري ٿو	سني چارن مان توانائي جو ڪجهه حصو جانور کير جي پيداوار ڏيڻ لاءِ حاصل ڪري ٿو	$1/3$ ڪلو فارمولا فيڊ مٿين ٽيبل ۾ تجويز مطابق ڏجي
1. سني خاصيت وارو 2. ججهي مقدار ۾ موجود			

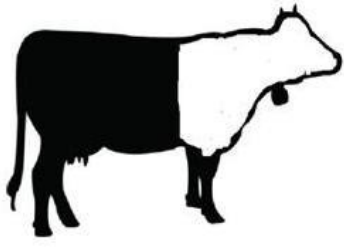


2) کير وارن جانورن لاءِ چاري جو انتظام ڪرڻ جڏهن اهو وچولي خاصيت وارو هجي ۽ ان جي ٿوري ڪوٽ به هجي.

اهڙي صورتحال ۾ جانور پنهنجي جسم جي واڌ ويجهه کي برقرار رکڻ لاءِ 100 سيڪڙو توانائي وچولي خاصيت واري سائي چاري مان حاصل ڪري سگهي ٿو. ليڪن کير جي پيداوار لاءِ گهريل 100 سيڪڙو توانائي لاءِ فارمولا فيڊ مان پورائو ڪرڻو پوندو. تنهنڪري مٿي ڏنل ٽيبل جي وچين ڪالم ۾ تجويز ڪيل دائيڊار خوراڪ ڏيئي پوندي جنهن مطابق هڪ صحتمند جانور جيڪو 5 ڪلو روزانه کير جي پيداوار ڏيئي ٿو ان کي 3 ڪلو فارمولا فيڊ جي ضرورت هوندي.

<p>سائو چارو مهيا ڪرڻ</p>	<p>وچولي چارن مان 100 سيڪڙو توانائي جانور پنهنجي صحتمند جسم جي طبعي حالت کي برقرار رکڻ لاءِ حاصل ڪري ٿو</p>	<p>جانور کير جي پيداوار ڏيڻ لاءِ گهربل توانائي حاصل نٿو ڪري سگهي</p>	<p>فارمولا فيڊ مٿين ٽيبل جي وچين ڪالم ۾ تجويز ڪيل وزن مطابق ڏجي</p>
<p>1. وچولي خاصيت وارو 2. چاري جي ٿوري ڪمي موجود</p>			

3) کير وارن جانورن لاءِ چاري جو انتظام ڪرڻ جڏهن اهو گهٽ خاصيت وارو هجي ۽ ان جي تمام گهڻي ڪوٽ هجي.

اهڙي صورتحال ۾ جانور پنهنجي جسم جي واڌ ويجهه کي برقرار رکڻ لاءِ صرف 50 سيڪڙو توانائي گهٽ خاصيت واري چارو ڪارائتو مان حاصل ڪري سگهي ٿو ۽ بقايا 50 سيڪڙو توانائي جانور پنهنجي جسم جي صحتمند طبعي حالت کي برقرار رکڻ لاءِ ۽ کير جي پيداوار لاءِ گهربل 100 سيڪڙو توانائي لاءِ فارمولا فيڊ مان پورائو ڪرڻو پوندو. تنهنڪري مٿي ڏنل ٽيبل جي آخري ڪاٺي پاسي واري ڪالم ۾ تجويز ڪيل داڻيدار خوراڪ ڏيڻي پوندي جنهن مطابق هڪ صحتمند جانور جيڪو 5 ڪلو روزانه کير جي پيداوار ڏيئي ٿو ان کي 3.5 ڪلو فارمولا فيڊ جي ضرورت هوندي.

<p>سائو چارو مهيا ڪرڻ</p>	<p>گهٽ خاصيت وارن چارن مان جانور پنهنجي صحتمند جسم جي طبعي حالت کي برقرار رکڻ لاءِ ٿوري توانائي حاصل ڪري سگهي ٿو</p>	<p>جانور کير جي پيداوار ڏيڻ لاءِ گهربل توانائي حاصل نٿو ڪري سگهي</p>	<p>ڪمزور کير وارن جانورن لاءِ اضافي فارمولا فيڊ جيڪڏهن ضروري هجي مٿين ٽيبل جي آخري ڪاٻي ڪالم ۾ تجويز ڪيل وزن مطابق ڏجي</p>
<p>1. گهٽ خاصيت وارو 2. چاري جي گهٽي ڪمي موجود</p>			

4) کير واري جانور کي ويامڻ کان اڳ ۾ (پري فيڊنگ) ۽ ويامڻ کان پوءِ کير جي پيداوار ڏيڻ دوران (ليڊ فيڊنگ) خوراڪ ڏيڻ

اچو ته کير وارن جانورن جي ڍڪڻ جي آخري مهيني ۽ ويامڻ کان اڳ واري عرصي دوران دائيڊار خوراڪ جي انتظام (پري فيڊنگ) ۽ ويامڻ کانپوءِ کير ڏيڻ واري عرصي دوران دائيڊار خوراڪ جي انتظام (ليڊ فيڊنگ) بابت سکون ته جيئن دائيڊار خوراڪ ڏيڻ جي اهڙي ترڪيب جو کير جي پيداوار تي بهتر اثر ڏسي سگهون.

اهو غير روايتي طريقو توهان کي ٿورو عجيب لڳندو ليڪن جيڪڏهن توهان چاهيو ته اهو ڪري سگهو ٿا.

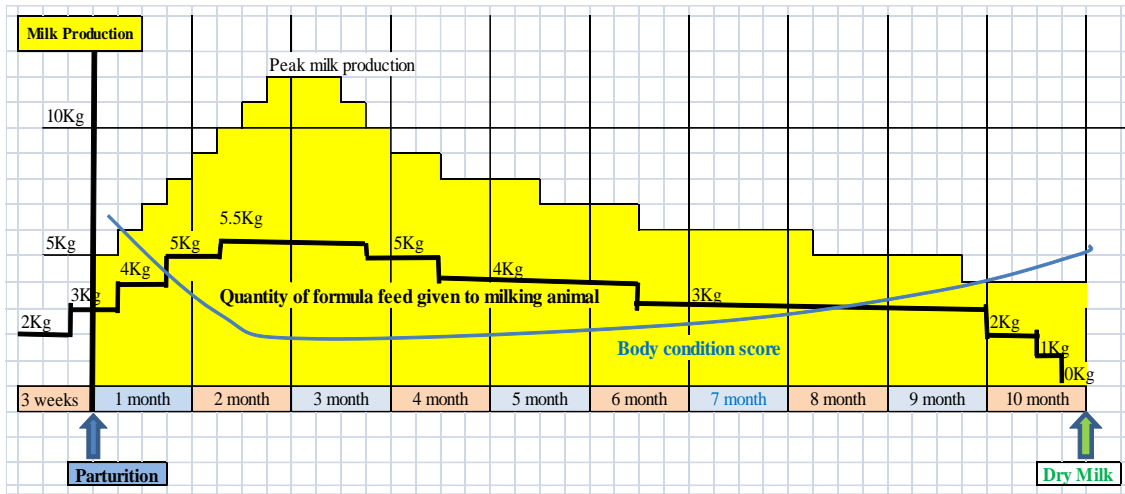
کير وارن جانورن کي ويامڻ کان هڪ مهينو پهريان چاري ڏيڻ (پري فيڊنگ) ۽ ويامڻ کان پوءِ کير ڏيڻ جي عرصي دوران چارو ڏيڻ (ليڊ فيڊنگ) جي شروعات کان پهرين اچو ته معياري کير جي پيداوار جي آخري حد کي سمجهون

کير وارن جانورن کي معياري خوراڪ ڏيڻ بابت تصوير 3-5 ۾ ڏيکاريل آهي. هيٺين گراف ۾ جانور جي کير جي پيداوار، دائيڊار خوراڪ جي ڏنل وزن ۽ جانور جي جسماني طبعي صحت جي حالت جي وچ ۾ سڌو تعلق ڏيکاريو ويو آهي. هيٺين گراف ۾ 10 مهينن جي کير جي پيداوار ڏيکاريل آهي (ڪالمر ۾ 4 ننڍا خانا هڪ مهيني کي ظاهر ڪن ٿا). جنهن ۾ ويامڻ جي ٻن مهينن کانپوءِ جانور کير جي پيداوار جي اوچي حد کي رسي ٿو.



جانور جي کير جي پيداوار، مهيا ڪيل دائيڊار خوراڪ ۽ جانور جي جسماني طبعي صحت جي حالت جي وچ ۾ جائزو تصوير نمبر 3_5 ۾ ڏيکاريل آهي. تصوير ۾ پيلو حصو کير جي پيداوار کي ظاهر ڪري ٿو.

جڏهن ڊيري فارم جي معياري چاري ڏيڻ جي انتظام مطابق مناسب دائيڊار خوراڪ ڏني ته کير ڏيندڙ مينهنون پنهنجي مڪمل پيداواري صلاحيت مطابق کير جي پيداوار ڏيئي معياري کير جي پيداواري گراف جي اوچي حد کي رسي سگهنديون جئن تصوير نمبر 3_5 ۾ ڏيکاريل آهي.



شڪل 3-5 کير وارن جانورن کي معياري خوراڪ ڏيڻ

1) ويامن کان پهرين فارمولا فيڊ ڪرائڻ (پري فيڊنگ)

مينهن ۽ ڊگين کي ويامن کان گهٽ ۾ گهٽ 3 هفتا پهرين فارمولا فيڊ ڪرائڻ شروع ڪرڻ گهرجي. ويامن کان پهرين جانور کي فارمولا فيڊ ڪرائڻ سان هاضمي ۾ مدد ڪندڙ جيوڙا نئين تبديل ٿيندڙ خوراڪ کي هضم ڪرڻ لاءِ متحرڪ ٿين ٿا ۽ جانور جي ويامن تائين هاضمي جي نظام کي صحيح نموني سان هلائڻ لڳن ٿا. تنهنڪري مالونڊن کي اهو تجويز ڪجي ٿو ته اهي پنهنجي جانورن کي دائيڊار خوراڪ 2 ڪلو روزانه ڏيڻ کان شروع ڪجن ۽ آهستي آهستي وڌائيندا رهن ۽ آخري حد 3 ڪلو روزانه ڏيڻ تائين رکن.

2) ويامن کان پوءِ فارمولا فيڊ ڪرائڻ (ليڊ فيڊنگ)

مينهن ۽ ڊگين جي ويامن کان پوءِ کير جي پيداوار آهستي آهستي وڌندي آهي. تنهنڪري فارمولا فيڊ آهستي آهستي کير جي پيداوار وڌڻ سان وڌائجي. تنهنڪري دائيڊار خوراڪ ڪرائڻ جي هن ترڪيب کي ليڊ فيڊنگ چئبو آهي. مينهن ۽ ڊگين جي ويامن کان پوءِ کير جي پيداوار آهستي آهستي وڌندي آهي ۽ 2 کان 3 مهينن بعد اها مٿاهين حد تي پهچي ٿي. انهي عرصي دوران کير وارو جانور وڌندڙ کير جي پيداوار لاءِ گهريل توانائي جو پورا ٿو.



صرف چاري مان نٿو ٿي سگهي. تنهنڪري اهڙي حالت ۾ کير وارا جانور وڌندڙ کير جي پيداوار لاءِ گهربل توانائي جسم ۾ گڏ ٿيل خوراڪي جزن مان حاصل ڪندا آهن، جنهن جي نتيجي ۾ کير وارن جانورن جو وزن ڏينهن ڏينهن گهٽجندو ويندو آهي. تصوير نمبر 10 ۾ نيري لڪير جو گراف کير وارن جانور جي صحتمند جسماني طبعي حالت ۾ تبديلي ان جي جسماني وزن جي وڌڻ يا گهٽجڻ سان ڏيکاري ويئي آهي ۽ انهي تبديلي سان نيري لڪير جو گراف هيٺ مٿي ٿئي ٿو. جانور جي ويامڻ کان پوءِ جانور جي جسماني حالت ٿورو گهٽجڻ لڳندي آهي جنهن سان نيري لڪير جو گراف پڻ ڪرڻ لڳندو آهي جيڪو تصوير نمبر 3_5 ۾ ڏيکاري ٿو آهي. جڏهن جانور جي کير جي پيداوار وڌي پيداوار جي مٿين حد تي پهچڻ کانپوءِ ڍڪڻ سبب گهٽجڻ لڳندي آهي ت ان عرصي دوران جانور جو وزن آهستي آهستي وڌڻ لڳندو آهي ۽ نيري لڪير جو گراف پڻ وڌندو آهي، هن مرحلي تي فامولا فيڊ جو مقدار گهٽائڻ گهرجي.

3.2.4 خشڪ عرصي دوران جانورن جي لاءِ چاري جو انتظام ڪرڻ

جانورن جو خشڪ عرصي وارو عرصو اوهه جي کير وارن غدودن جي واڌ ويجهه لاءِ تمام ضروري آهي جيڪو گهٽ ۾ گهٽ 30 ڏينهن جو هجڻ ضروري آهي.

جڏهن جانور جي کير جي پيداوار پوئين عرصي ۾ آهستي آهستي گهٽجڻ لڳي ته فارمولا فيڊ جي خوراڪ به ٿوري ٿوري گهٽائڻ گهرجي. آخر ۾ صرف ساڻو چارو ڏيڻ گهرجي ۽ کير جي ڏوهائي ڪجهه ڏينهن لاءِ جاري رکجي. جڏهن کير جي پيداوار تمام گهٽجي ويندي ته جانور جو اوهه به سڪڙجي نديو ٿي ويندو. هي مناسب وقت آهي جانور مان کير جي ڏوهائي بند ڪجي ۽ جانور کي خشڪ رهڻ ڏجي. کير وارن جانورن لاءِ خشڪ عرصو تمام اهم آهي، هن عرصي دوران جانور جي اوهه کي ساهي ملي ٿي ۽ کير وارن غدودن جي گهرڙن کي ايندڙ کير ڏيڻ واري عرصي لاءِ نئين ٿيڻ جو وقت ملي ٿو.

3.3 کير جي پيداوار وڌائڻ لاءِ ٻيون مشڪلاتون

کير واري جانور جو کير جي پيداوار وڌڻ جي مٿين حد تي گهڻو عرصو رهڻ انهي ڳالهه جو ثبوت آهي ته توهان جي جانور سٺي پيداواري صلاحيت ڏيکاري آهي. هاڻ انهي ڳالهه کي مڃڻو پوندو ته جانور جو کير جي پيداوار جي مٿين حد تي رهڻ لاءِ سٺي خاصيت وارو فارمولا فيڊ کير جي پيداوار مطابق ڏيڻو پوندو. کير جي پيداوار جو مٿاهين حد تي رهڻ لاءِ رڳو سٺي کاڌ خوراڪ ڪافي نه آهي پر ان کان سواءِ ٻيا عنصر پڻ آهن جيڪي کير جي پيداوار تي اثر انداز ٿين ٿا. اچو ته اهڙن عنصرن تي نظر وجهون ۽ انهن کي بهتر ڪرڻ جي ڪوشش ڪريون.



3.3.1 کير ڏيندڙ جانور لاءِ گهربل پاڻي مهيا ڪرڻ

ڇا توهان جون کير ڏيندڙ ڍڳيون ۽ مينهنون گهربل تازو پاڻي پيئن ٿيون؟
اهو تمام ضروري آهي ته کير ڏيندڙ ڍڳين ۽ مينهنن کي ججهي مقدار ۾ گهربل تازو پاڻي ڏيڻ گهرجي ڇاڪاڻ ته ان جو سڌو اثر کير جي پيداوار تي پوي ٿو.

(1) جانور کي پيئڻ لاءِ گهربل صاف پاڻي جو مقدار

جانورن کي روزانه گهربل تازي پاڻي جي مقدار جو دارومدار گرمي جي درجه حرارت، جانور جي نسل ۽ کير جي پيداوار تي آهي.

ماهرن جي ڪيل تحقيق جي مطابق مختلف نسلن جي ڍڳين جي موسم مطابق گهربل پاڻي جي مقدار جو تفصيل هيٺ ڏجي ٿو. اهو ضروري آهي ته جانورن کي ان جي گهرج مطابق ججهي مقدار ۾ تازو پاڻي ڏيڻ گهرجي.

هولسٽن نسل جون ڍڳيون: 60 لتر (سياري ۾ 100 لتر ۽ گرمين ۾ 150 لتر)
يورپ جي ڍڳين جو ڪراس نسل: 60 کان 80 لتر
ايشيا جي ڍڳين جو نسل: 60 کان 80 لتر
هڪ ڪلو کير جي پيداوار لاءِ 6 کان 10 لتر پاڻي جي ضرورت پوندي آهي.

(2) جانورن کي پيئڻ لاءِ پاڻي ڏيڻ جو طريقو

پاڻي پيارڻ جا 2 طريقا آهن جهڙوڪ جانورن جي هر وقت پاڻي تائين آزاد پهچ ۽ جانورن جي پاڻي تائين محدود پهچ.

(1) جانورن جي هر وقت پاڻي تائين آزاد پهچ

جيڪڏهن توهان جانورن جي پيئڻ لاءِ پاڻي جا وڏا آهرا يا ڊرم رکندا ته اهي جانور هڪئي وقت نه پي سگهندا، توهان جانورن کي ججهي مقدار ۾ پاڻي مهيا ته ڪري ڏيندا پر ان جا ڪجهه نقصان به آهن. جهڙوڪ جيڪڏهن توهان اهڙن وڏن آهن جي روزانه صفائي نه ڪندا ته پاڻي گندو ٿي ويندو جيڪو جانورن جي صحت لاءِ نقصانڪار ٿيندو. آهن جي صفائي جو دارومدار انهن جي سائيز ۽ موسم تي آهي. اهو تمام ضروري آهي ته ان جو فيصلو ڪرڻ گهرجي ته پاڻي جي آهن جي ڌولائي ۽ صفائي پابندي سان ڪرڻ گهرجي. وڏن آهن جي نقصانن کي مد نظر رکندي ترقيافتہ ملڪن ۾ پاڻي جا 30 سينٽيميٽر ڊائيميٽر سائيز جا پيالا ٺاهيا ويا آهن، جنهن ۾ ننڍا اڀار لڳل آهن، جانور انهن کي مٿي يا منهن جي زور سان دبائيندو ته انهن مان پاڻي پاڻي نڪرڻ لڳندو اهڙي طرح جانورن کي هر وقت تازو ۽ صاف پاڻي مهيا هوندو. جيڪڏهن توهان وٽ واٽر سپلائي جي لائين آهي ته ان ۾ اهي پيالا آساني سان لڳائي سگهجن ٿا ۽ اهي پيالا ايترا مهانگا به ناهن.

		
تصوير نمبر 3-29 پاڻي جو پيالو	تصوير نمبر 3-28 پاڻي لاءِ سيمنت جا آھرا	تصوير نمبر 3-27 پاڻي جا پلاسٽڪ ڊرم

(2) محدود پاڻي مهيا ڪرڻ

بھراڙين ۾ مالوند پنھنجي جانورن کي ڏينھن ۾ ٽي دفعا محدود پاڻي پيارين ٿا، اھي عام طور تي صبح، منجھند ۽ شام جو پنھنجي جانورن کي پاڻي پياريندا آھن. اھو تجويز ڪيو وڃي ٿو تہ مالوند پنھنجي جانورن کي رات جو سمھڻ کان پھرين ھڪ دفعو وڌيڪ پاڻي ضرور پيارين.

3.3.2 چاري جي آھرن جي صفائي

جانورن طرفان آھرن ۾ بچيل چاري کي روزانہ صاف ڪري باھر اڇلائڻ گھرجي ۽ اھو بچيل گاهہ وري نہ ڏيو

اھو تمام ضروري آھي تہ جانورن طرفان آھرن ۾ بچيل چاري (سائو گاهہ ۽ داڻيدار خوراڪ) کي روزانہ صاف ڪري باھر اڇلائڻ گھرجي ۽ جانور کي نئون تازو گاهہ ڏيڻ گھرجي ۽ اھو پڻ ضروري آھي تہ روزانہ انھي جي جاچ ڪرڻ گھرجي تہ جانور ڪيترو کائي سگھي ٿو تہ جيئن جانور کي ان جي ضرورت مطابق چارو ڏجي ۽ اضافي چاري کي ضايع ٿيڻ کان بچائجي.

			
تصوير 3-33 سينوارييل ماني ۽ ڊبل روٽي	تصوير 3-32 جانورن طرفان بچيل سڙيل چارو تري ۾ پيل آھي	تصوير 3-31 جانورن جي آھرن ۾ بچيل خراب کاڌي سان تازو چارو گڏائڻ	تصوير 3-30 بچيل چاري جي لتاڙ

چاري جي ڊيگهه

3.3.3

اهو تمام ضروري آهي ته جانور جو چارو اهڙي نموني سان تيار ڪجي جو هو آساني سان چٻائي ۽ کائي سگهي. سائي چاري جي ڊيگهه يا ان جي ڪتر جي ڊيگهه جانورن جي کائڻ ۽ هضم ڪرڻ تي اثر انداز ٿيندي.

جيڪڏهن توهان وٽ ڪتر جي مشين آهي ته چاري جي ڪتر جي ڊيگهه 1-2 سينٽي ميٽر رکڻ گهرجي. جيڪڏهن توهان وٽ ڪتر واري مشين نه آهي ته پوءِ گاهه کي ڪهاڙي سان ڪٽڻ گهرجي ۽ ان جي سائيز 5 سينٽي ميٽر رکڻ گهرجي.

	
<p>تصوير نمبر 3-34 ڪتر واري مشين جو اثرائتو استعمال</p>	<p>تصوير نمبر 3-35 چاري جي ڪتر جي ڊيگهه ايتري هجي جو جانور سولائي سان کائي سگهي.</p>

گرمي کان بچاءَ لاءِ اپاءَ وٺڻ

3.3.4

اهو تمام ضروري آهي ته جتي جانور کي ٻڌجي اها جڳهه چانو واري ۽ هوادار هجي ۽ جانور جي جسم کي تڏو رکڻ لاءِ ان کي وهنجارڻ جو بندوبست ڪجي ۽ اهو پڻ ضروري آهي ته مينهن کي گرمي جي موسم ۾ ٻاهر اس ۾ نه ٻڌڻ گهرجي.

جانور جي اوجھري ۾ ڪيترائي ننڍڙا جراثيم ۽ بيڪٽيريا هجن ٿا. جيڪي چاري جي ريشن کي هضم ڪرڻ ۾ مدد ڪن ٿا. ڍڳين ۽ مينهن جي اوجھري ۾ پاڻي جي گنجائش 200 لٽرن تائين آهي. اوجھري چاري کي ڳارڻ ۽ هضم ڪرڻ جي مشين آهي جيڪا هاضمي جي عمل دوران گرمي خارج ڪري ٿي. انهي ڪري گرمي جي موسم ۾ ڍڳين ۽ مينهن تي گرمي جو اثر وڌيڪ رهي ٿو. اهڙي صورتحال ۾ ڍڳيون ۽ مينهن پنهنجي پيداواري صلاحيت مطابق کير جي پيداوار نه ڏيئي سگهنديون آهن.

(1) وٽاڻ جي جڳهه چانو واري ۽ هوادار هجي

هر موسم ۾ هوا جي رخ کي جاچڻ گهرجي. گرمين جي موسم ۾ توهان پنهنجي ڍڳين ۽ مينهن کي اهڙي جڳهه تي نه ٻڌو جتي هوا جي سامهون وڏي ديوار يا ٻي ڪا رکاوٽ هجي.

وڻن جي چانو جي صورت ۾: ويڪري ۽ گهاتن پنن وارن وڻن جهڙوڪ انبن جا وڻ ٻيڙ جي وڻن کان وڌيڪ بهتر آهن ڇاڪاڻ ته اهي جانورن کي وڌيڪ چانو مهيا ڪن ٿا.

سادي چيري جي چانو جي صورت ۾: چيري جي اوچائي مٿي رکجي ۽ هوادار هجي. پراڻي چيري کي بهتر ڪجي يا نئون ٺاهجي. جيڪڏهن چيرو پائين جو ٺاهجي ته پوءِ پوئين پائين جي اوچائي 2.5 ميٽر رکجي ۽ اڳين پائين جي اوچائي 2.5 ميٽرن کان مٿي رکجي ان سان هوا جو گذر بهتر ٿيندو.

<p>تصوير نمبر 3-38 چيرو جنهن ۾ هوا جو گذر بهتر آهي</p>	<p>تصوير نمبر 3-37 وڻن جي چانو ۽ هوادار جڳهه تي جانور ٻڌڻ</p>	<p>تصوير نمبر 3-36 انبن جا وڻ</p>

2) جانورن کي وهنجارڻ

مينهن ۾ گرمي خلاف برداشت ڏيکين جي پيٽ ۾ گهٽ هوندي آهي، تنهنڪري انهن کي وهنجارڻ جي وڌيڪ ضرورت هوندي آهي. تنهنڪري مينهن مان ڪير جي پيداوار ۾ پائيداري آڻڻ لاءِ ضروري آهي ته انهن کي روزانه وهنجارڻ گهرجي.

وهنجارڻ شاور جي پيٽ ۾ وڌيڪ بهتر آهي ڇاڪاڻ ته هن سان مينهن جي جسم کي آساني سان ٿڌو ڪري سگهجي ٿو. وهنجارڻ لاءِ ننڍن ڊٻن جي پيٽ ۾ اونهون تلاءُ وڌيڪ بهتر آهي. تنهنڪري جانورن کي وهنجارڻ لاءِ ڍنڍن يا تلاءُن ڏي ڪاهي وڃڻ گهرجي. جيڪڏهن پاڻي جا تلاءُ تمام پري هجن جتي پهچڻ لاءِ 30 منٽ لڳي وڃن ته ان صورت ۾ جانور کي پري ڪاهي نه وڃي ڇاڪاڻ ته ان سان ان جي جسم جي توانائي ضايع ٿيندي.

	
<p>تصوير نمبر 3-40 پاڻي جي تلاءَ ۾ جانور وهنجي رهيا آهن جنهن ۾ جانور جو سڄو جسم ٻڏل آهي</p>	<p>تصوير نمبر 3-39 پاڻي جي ننڍي دٻي ۾ مينهن وينل جنهن سان ان جو سڄو جسم نٿو پسي.</p>

(3) جانورن کي ڦوهاري سان وهنجارڻ

جانورن کي وهنجارڻ جي لاءِ ڪا مناسب جڳهه نه هجي يا اها تمام پري هجي ته جانور جي جسم کي ٿڌو ڪرڻ لاءِ ڦوهاري جو استعمال ڪرڻ گهرجي. گهڻي گرمي وارن ڏينهن ۾ جانورن کي ڦوهاري سان به ٿي پيرا وڃي ۽ وڃي سان وهنجارڻ گهرجي.

ڦوهاري سان وهنجارڻ جا ٻه طريقا آهن. هڪڙو طريقو سڌو ٽانڪي سان لڳل پائپ سان وهنجارڻ ۽ ٻيو طريقو بالٽي سان وهنجارڻ. مينهن کي انهن جي ڪلي تي نه وهنجارڻ گهرجي، ڇاڪاڻ ته ان جاءِ تي گپ ٿيندي ۽ ان جاءِ تي ويهڻ سان جانور جي صحت متاثر ٿيندي. وهنجارڻ واري جڳهه الڳ هجي ۽ پاڻي جي نڪال جو نظام هئڻ گهرجي. وهنجارڻ واري جاءِ سرن جي هجي يا سيمنٽ واري بلاڪن جي هجي. جيڪڏهن ڪلي تي ٻڌل جانور کي ڦوهارو ڪرڻو هجي ته ان لاءِ زرعي دوائن ۾ استعمال ٿيندڙ اسپري پمپ استعمال ڪرڻ گهرجي جنهن سان ڪلي واري جاءِ تي گپ نه ٿيندي.

		
<p>تصوير نمبر 3-43 زرعي دوائن ۾ استعمال ٿيندڙ اسپري پمپ سان ڦرن کي وهنجارڻ</p>	<p>تصوير نمبر 3-42 وهنجارڻ واري جاءِ سرن يا سيمنٽ بلاڪن جي هجي</p>	<p>تصوير نمبر 3-41 ٽانڪي سان لڳل پائپ سان وهنجارڻ</p>

3.3.5 ڊيري فارم لاءِ گهربل جايون ٺاهڻ

(1) ڪير جي ڏهائي واري جڳهه تي وٽاڻ ٺاهڻ

پروجيڪٽ طرفان ڪير جي ڏهائي واري جڳهه تي اير ايس پائپ جي استعمال سان وٽاڻ ٺاهيو ويو. اير ايس پائپ جي مضبوطي کي نظر ۾ رکندي وٽاڻ جي چت لاءِ وزني لڪڙن بدران هلڪو سامان استعمال ڪيو ويو. فرش لاءِ پروجيڪٽ طرفان ڊيزائن ڪيل سيمينٽ جا سليب استعمال ڪيا ويا (حوالو صفحو نمبر 17).

(1) سامان ۽ ان جي قيمت

ڪير جي ڏهائي واري جڳهه تي 4 مينهن لاءِ سادو وٽاڻ جيڪو تصوير نمبر 3-7 کان تصوير نمبر 3-10 ۾ ڏيکاريل آهي، جنهن لاءِ جيڪو سامان استعمال ڪيو ويو ان جو تفصيل هيٺ ٽيبل نمبر 3-7 ۾ ڏنو ويو آهي.

ٽيبل نمبر 3-7 کير جي ڏهائي واري جڳهه تي سادو وٽاڻ ٺاهڻ لاءِ گهريل سامان ۽ ان جي قيمت

سامان جو نالو	سامان جي سائيز	گهريل تعداد	قيمت في يونٽ رپيه	جملي قيمت رپيه
اير ايس پائپ (ڏسو تصوير 3_44)	ڊايا ميٽر 48 اير اير موتائي 03 اير اير گيچ 10 ڊيگهه 20 فوٽ	18	2400	43000
يونيورسل ڪريمپ	ڏسو تصوير 3_45	34	285	9690
فڪسڊ ڪريمپ	ڏسو تصوير 3_45	21	285	5985
فرس لاءِ سيمنٽ جا سليب	ڊيگهه 100 سينٽي ميٽر ويڪر 50 سينٽي ميٽر	30	350	10500
کير جي ڏهائي واري جڳهه تي 4 مينهن لاءِ سادو وٽاڻ ٺاهڻ لاءِ ڪل خرچ رپيه جنوري 2018 ۾				
69175				

	
تصوير نمبر 3-45 فڪسڊ ڪريمپ ساڄي پاسي فليڪسيبل ڪريمپ کاڻي پاسي	تصوير نمبر 3-44 اير ايس پائپ

2. شيد جو رُخ

جيڪڏهن توهان کير جي ڏوهائي لاءِ ويڪرو وٽاڻ ٺاهڻ چاهيو ٿا ته ان لاءِ بهتر آهي ته کير جي ڏوهائي لاءِ وٽاڻ جي پاسي جو طرف اوڀر ۽ اولهه هٿ ڳهرجي جيئن سج جي تپش کي گهٽائي سگهجي جيئن تصوير نمبر 3-6 ۾ ڏيکاريل آهي ته جيئن سج جي روشني يا تپش سڌو وٽاڻ ۾ داخل نه ٿئي. جيڪڏهن ڏکڻ ۽ اتر طرف ٺاهڻ چاهيو ٿا ته اولهه طرف کان اوهان کي وڻ لڳائڻا پوندا جيئن شام جو لهندڙ سج جي تپش کي گهٽ ڪري سگهجي جيئن تصوير نمبر 3-7 ۾ ڏيکاريل آهي.

<p>شکل نمبر 3-7 کير جي ڏهائي لاءِ وٽاڻ جي اولهه طرف کان سج جي تپش کي روڪڻ لاءِ وڻ لڳائڻ</p>	<p>شکل نمبر 3-6 کير جي ڏهائي لاءِ وٽاڻ جو صحيح رُخ</p>

3) کير جي ڏهائي لاءِ هن ماڊل جي وٽاڻ جا فائدا

کير جي ڏهائي لاءِ هن ماڊل جا وٽاڻ ٺاهڻ تمام آسان آهن. ٺاهڻ جو طريقو هيٺ ڏيکاريل آهي. کير جي ڏهائي لاءِ هن ماڊل جي وٽاڻن ۾ هر هڪ کير واري جانور کي چارو ۽ فارمولا فيڊ ڏيڻ آسان آهي کير جي ڏهائي لاءِ هن قسم جي وٽاڻن ۾ کير واري جانور جي ڏهائي صفائي سان صاف فرش تي ۽ ڇت جي چانوري هيٺ آساني سان ڪري سگهجي ٿي.

<p>تصوير نمبر 3-46 کير جي ڏهائي لاءِ وٽاڻ جو چيرو</p>	<p>شکل نمبر 3-8 کير جي ڏهائي لاءِ وٽاڻ جي پاسي جو منظر</p>

<p>شکل نمبر 10-3 پاسي وارو منظر</p>	<p>شکل نمبر 9-3 فرير ورک جو غير معمولي نقشو</p>

2. جانورن کي ٻڌڻ جو طريقو

جانورن کي قطار ۾ ٻڌڻو: کير وارن جانورن جهڙوڪ ڍڳين ۽ مينهن کي هڪ قطار ۾ ٻڌڻ گهرجي. هر کير واري جانور اڳيان چاري وارو آهرو ۽ هر ٻن جانورن جي وچ ۾ پاڻي پيڻ لاءِ آهرو هئڻ گهرجي جيئن ٻه جانور آسانيءَ سان چارو کائي سگهن ۽ پاڻي پي سگهن.

جيڪڏهن کير وارن جانورن کي ٻڌڻ لازمي هجي ته پوءِ انهن کي ڪنڌ ۾ رسو ٻڌجي يا مچي ٻڌجي جنهن سان جانور کي ٻڌي آساني سان کير جي ڏهائي ڪري سگهجي ۽ چارو ڏيئي سگهجي.

<p>تصويرن نمبر 48-3 سيمينٽ جي ٻن سليبن جي وچ ۾ سرن جي هڪ قطار لڳائڻ گهرجي</p>	<p>تصوير نمبر 47-3 پاڻي پيڻ لاءِ پلاسٽڪ جي آهرن تائين جانورن پهچ آسان</p>	<p>شکل نمبر 11-3 چئن جانورن کي هڪ قطار ۾ ٻڌڻ</p>

2) جانورن جي جسم جي ڪهڙي حصي کي ٻڌجي:

ڪنڌ ۾ رسو ٻڌڻ يا مچي ٻڌڻ: ڪنڌ ۾ رسو ٻڌڻ يا مچي ٻڌڻ سان جانور جي صحت تي گهٽ دٻاءُ پوي ٿو. هن سان جانور کي خوراڪ ڪارائڻ، پاڻي پيارڻ ۽ ان کي سنڀالڻ ۾ آساني ٿئي ٿي ۽ پاسي واري جانورن کي هڪٻئي سان وڙهڻ کان روڪي سگهجي ٿو. ڪنڌ ۾ ٻڌڻ واري

رسي يا لوهي سنگهر/زنجير کي کاڻ جي کلي يا سيمنت جي آهري ۾ لڳل چلي ۾ ٻڌڻ گهرجي. ڪنڌ واري رسي يا لوهي سنگهر يا زنجير کي ڪنهن ڪمزور يا ننڍي کلي سان ٻڌڻ مناسب ناهي ڇاڪاڻ ته جانور جي ست ڏيڻ سان اهي نڪري ويندا. ڪنڌ واري رسي يا لوهي سنگر جي ڊيگهه مناسب هجي ته جيئن جانور سولائي سان چاري واري ۽ پاڻي واري آهري تائين پهچي کائي پي سگهي.



	
<p>تصوير نمبر 3-50 ڪنڌ ۾ ٻڌل رسي واري مينهن</p>	<p>تصوير نمبر 3-49 مچي ٻڌل گئون</p>

(3) کليل وٽاڻ:

اسان جي هن منصوبي جانورن جي لاءِ کليل وٽاڻ جا ٻه نمونا ٺاهيا هڪ بانس جي لڪڙن جو ۽ ٻيو لوهه جي پائپن جو. منصوبي جي ماهرن انهن وٽاڻن جي اثرائتي هئڻ جو جائزو ورتو ۽ سفارش ڪئي.

ٻنهي ماڊلن جي خوبين جو تفصيل هيٺ ڏجي ٿو:

- ✓ کليل وٽاڻ ۾ جانور آساني سان گهمي ڦري سگهن ٿا ۽ جيڏي مهل چاهين پاڻي جي تانڪي يا پلاسٽڪ جي ٽب مان پاڻي پي سگهن ٿا.
- ✓ کليل وٽاڻ ۾ پاڳيو آساني سان وهر ۾ آيل جانور جي جانچ لهي سگهي ٿو ڇاڪاڻ ته وهر ۾ آيل جانور جيڪڏهن کليل آهي ته هو وهر جي صورت ۾ هڪٻئي مٿان ٽپندا آهن.
- ✓ کليل وٽاڻ ۾ وهر ۾ آيل مادي جانورن سان گڏ جيڪڏهن سانھ آهي ته هو وقت تي ڦرجي سگهن ٿا ۽ جانورن ۾ ڳيڄڻ جو تناسب وڌندو.

	
<p>تصوير نمبر 3-52 کليل وٿاڻ ۾ جانور آساني سان گهمي ڦري رهيا آهن</p>	<p>تصوير نمبر 3-51 بانس جي لڪڙن جو ٺهيل کليل وٿاڻ</p>

جانورن کي ٻاهر ٻنين ۾ چارڻ: 3.3.6

جانورن کي ٻنين ۾ چارڻ جا ڪيترائي فائدا آهن جهڙوڪ جسم جي واڌ ويجهه ۾ بهتري اچڻ، وهر ۾ اچڻ جي جلد خبر پوڻ، ٻنين مان گاه ڪري وٿاڻ تي ڪرائڻ جي خرچ ۾ گهٽتائي وغيره. ان کانسواءِ جانور ٻنين ۾ مختلف قسمن جا قدرتي گاه کائين ٿا جن ۾ معدني جزا شامل هوندا آهن جيڪي وٿاڻ ۾ ٻڌل جانورن کي ملندڙ چارن ۾ گهٽ هوندا آهن.

ڪير وارن جانورن کي گرمي جي موسم ۾ چارڻ لاءِ گهڻو پري نه وٺي وڃڻ گهرجي جتي قدرتي گاه گهٽ هجن ڇاڪاڻ ته ان حالت ۾ ڪير وارن جانورن جو پري وڃڻ ۽ اچڻ سان ان جي جسم جي توانائي گهڻو خرچ ٿئي ٿي جنهن سان ان جي ڪير جي پيداوار گهٽجي ويندي آهي.

ڪجهه مالوند پنهنجن جانورن کي چارڻ لاءِ پري ڪاهي وڃن ٿا ۽ هن ڪري جانورن جي اچ وڃ ۾ ڪافي وقت (تقريبن هڪ ڪلاڪ) لڳي وڃي ٿو. جيڪڏهن جانور کي ٻاهر چارڻ لاءِ اڌ ڪلاڪ کان وڌيڪ وقت لڳي ته اهو ڪير ڏيندڙ جانور لاءِ مناسب نه آهي ان سان ڪير جي پيداوار گهٽجي ٿي.

جڏهن جانور گهڻي گاه واري ٻني ۾ چرن ٿا ته اهي قدرتي گاه کائڻ کان پوءِ آهستي آهستي اوڳر ورائيندا آهن ۽ ٿورڙي گاهن واري ٻني ۾ جانور گاه جي تلاش ۾ گهڻو هلندا آهن جنهن سان انهن جي جسم جي توانائي ضايع ٿيندي آهي.

<p>تصوير 3-55 وونئڻ واري بني ۾ چونڊي کانپوءِ جانور چرن پيا</p>	<p>تصوير 3-54 ٿورڙي گاهن واري بني ۾ جانور چرن پيا</p>	<p>تصوير 3-53 مالوند پنهنجن جانورن کي چارڻ لاءِ پري ڪاهي وڃن ٿا جنهن سان انهن جي توانائي ضايع ٿئي ٿي</p>

3.3.7 گرن جي ڪٽائي

جيڪڏهن جانورن کي ٻاهر مناسب وقت لاءِ چارڻ لاءِ نٿا وٺي وڃو ته انهن جا ڪر وڌي ويندا تنهنڪري لازم آهي ته مالوند پنهنجي جانورن جا وڌيل ڪر هر ڇهين مهيني ڪاريگر کان ٺهرائين.

ميهنن ۽ ڍڳين جي ڪر جي ڪٽائي جو مناسب انتظام مٿي تجويز ڪيل طريقي مطابق ڪرڻ سان انهن جا ڪر نه وڌندا. جيڪڏهن جانورن کي روزانه ان ڪلاڪ ٻاهر چرائڻ لاءِ وٺي وڃجي ته پوءِ انهن جا وڌندڙ ڪر هلڻ دوران پاڻهي گسي ويندا ۽ صحيح حالت ۾ رهندا آهن. اهڙن جانورن جي ڪر جي ڪٽائڻ جي ڪا ضرورت نه پوندي آهي.

هڪ مهيني ۾ ڪر جي سراسري واڌ ٿوري فرق سان 5 ملي ميٽر ٿيندي آهي. ڪر جي واڌ نسل، فارم تي انفرادي طور جانور جي سار سنڀال جو انتظامي معيار جو ڪر جي واڌ ويجهه تي اثر رهي ٿو. ڪر جي هر مهيني 5 ملي ميٽر واڌ سان ڪر سال ۾ 6 سينٽي ميٽرن تائين وڌي سگهن ٿا. اهڙا جانور جيڪي ٻاهر چرڻ لاءِ نٿا وڃن يا ٻاهر چرڻ لاءِ تمام گهٽ وڃن ٿا انهن جي ڪر جي واڌ ويجهه هيٺ ڏنل تصوير ۾ ڏيکاريل آهي.

جانورن جي ڳري جسم جو ٻار چئني تنگن تي هوندو آهي. ڍڳهن ڪر جي ڪري جانورن جي تنگن تي دٻاءُ پوي ٿو جنهن جي ڪري انهن جي گوڏن تي سوڄ ٿئي ٿي ۽ جانور هلڻ ۾ منڊڪائيندو آهي جنهن جو منفي اثر کير جي پيداوار تي پوندو آهي. تنهنڪري وڌندڙ ڪر جي ڪٽائڻ تمام ضروري آهي.

<p>تصوير نمبر 3-57 وڌيل ڪر ۽ ڪاريگر کان ڪٽرائڻ بعد ڪرڻ جو ڏيک</p>	<p>تصوير نمبر 3-56 تصوير ۾ ڪاريگر وڌيل ڪرڻ کي ڪٽي رهيو آهي</p>

(1) معياري جسماني ڏيک

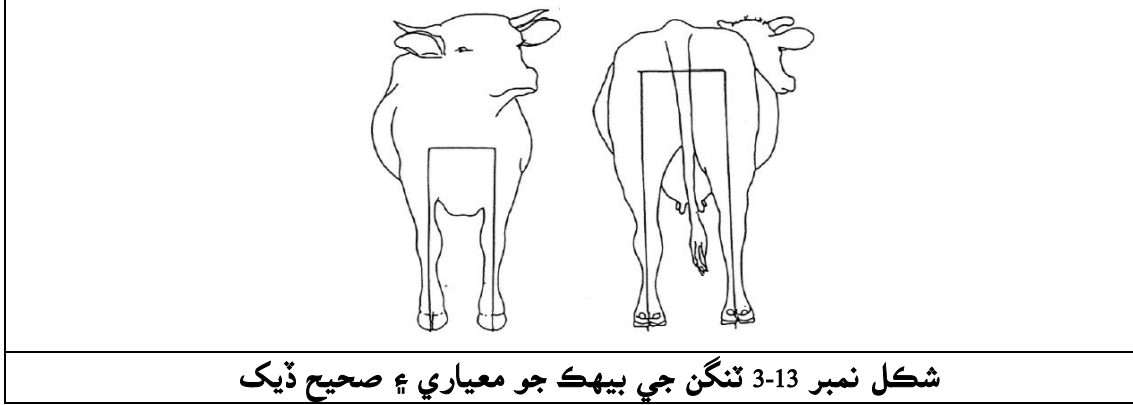
هيٺ ڏنل تصوير ۾ جانور جي سٺي بيھڪ ڏيکاري وئي آهي. سڌيون تنگن جن تي جانور جي جسم جو بار/ وزن آهي.

<p>اڳين تنگن جو ڏيک</p>	<p>تنگن جو پاسي کان ڏيک</p>	<p>پوئين تنگن جو ڏيک</p>

شڪل نمبر 3-12 معياري جسماني ڏيک

ٽنگن جي بيهڪ جو معياري ڏيک

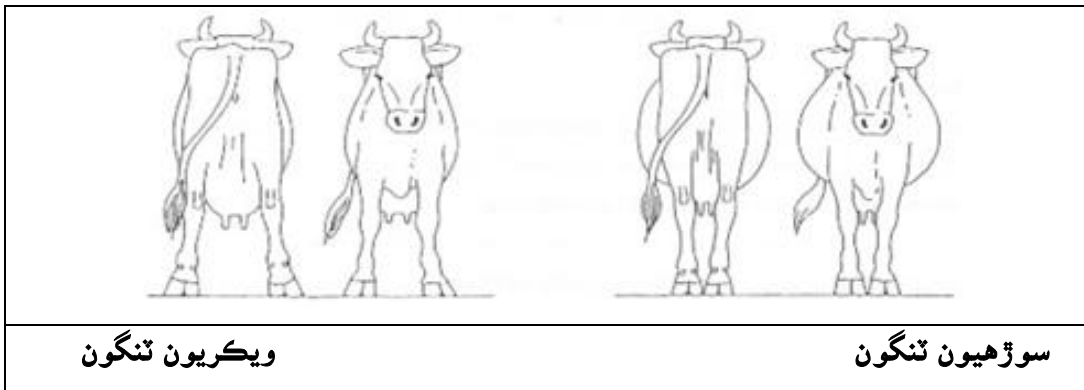
جانور جي صحيح ۽ سٺي بيهڻ واري ڏيک لاءِ اهو ضروري آهي ته اڳيون ۽ پويون چار ٽنگن ڏسڻ ۾ سڌيون ۽ مضبوط هئڻ گهرجن



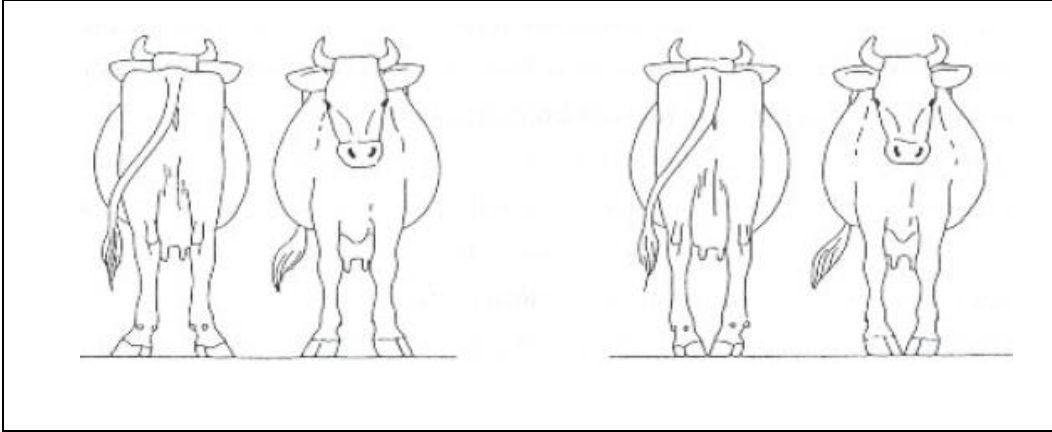
بيهڻ دوران جانور جي ٽنگن جي معياري بيهڪ ۽ صحيح ڏيک لاءِ ضروري آهي ته اڳيون ۽ پويون چارئي ٽنگون ڏسڻ ۾ سڌيون نظر اچن. اڳين ڪرن جي وچ واري فاصلي جي ويڪر 2 کان 2.5 پير هئڻ گهرجي ۽ پوين ڪرن جي وچ واري فاصلي جي ويڪر 3 پير هئڻ گهرجي.

(2) ٽنگن جي بيهڪ جو غير معياري ڏيک

ٽنگن جي بيهڪ کي سامهون ۽ پوئين پاسن کان ڏسڻ گهرجي.



شڪل 3-14 ٽنگن جي بيهڪ جي غير معياري ڏيک جو پهريون نمونو

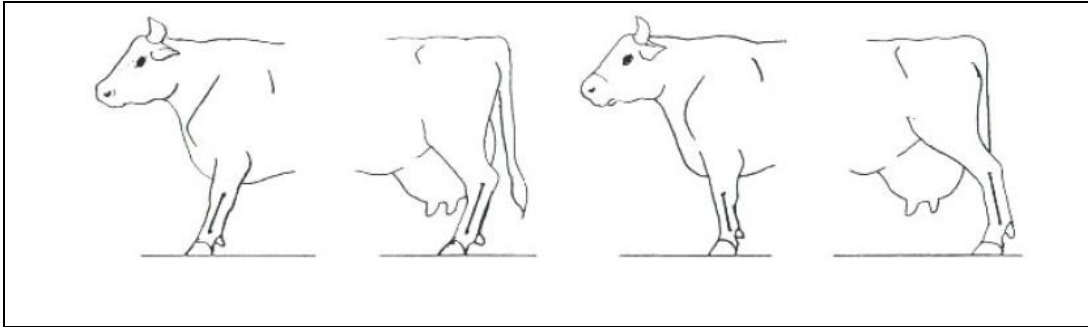


ڪر ٻاهرين طرف ورييل

ڪر اندر طرف ورييل

شڪل 3-15 ٽنگن جي بيهڪ جي غيرمعياري ڏيک جو ٻيون نمونو

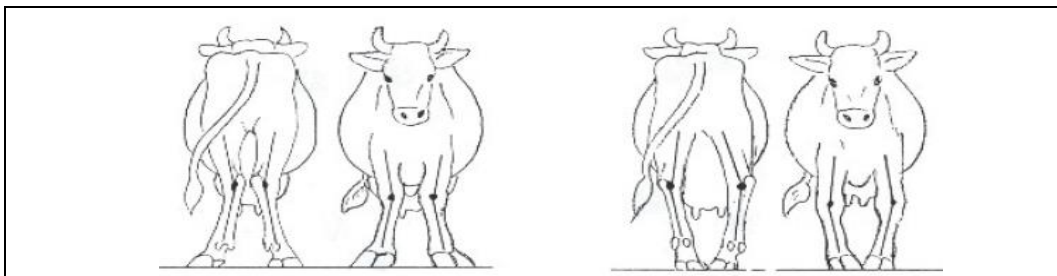
ٽنگن جي بيهڪ کي پاسن کان ڏسڻ گهرجي



ٽنگن اڳتي وڌيل

ٽنگون پوئتي وڌيل

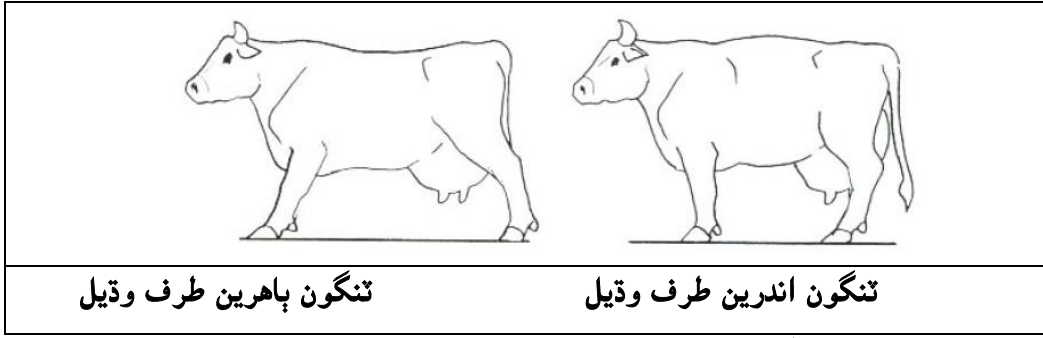
شڪل 3-16 ٽنگن جي بيهڪ جي غيرمعياري ڏيک جو ٽيون نمونو



گوڏا گڏيل ۽ ڪر ٻاهر نڪتل

گهگهي نما ٽنگن جو ڏيک

شڪل 3-17 ٽنگن جي بيهڪ جي غيرمعياري ڏيک جو چوٿون نمونو



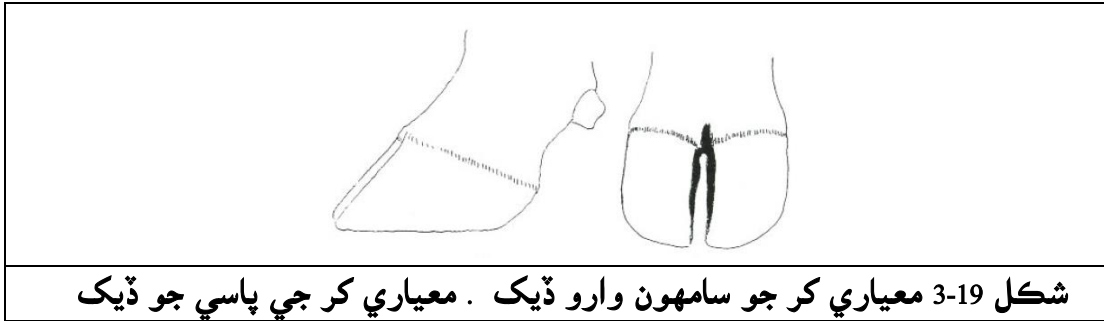
ٺنگون ٲاهرين طرف وڌيل

ٺنگون انڊرين طرف وڌيل

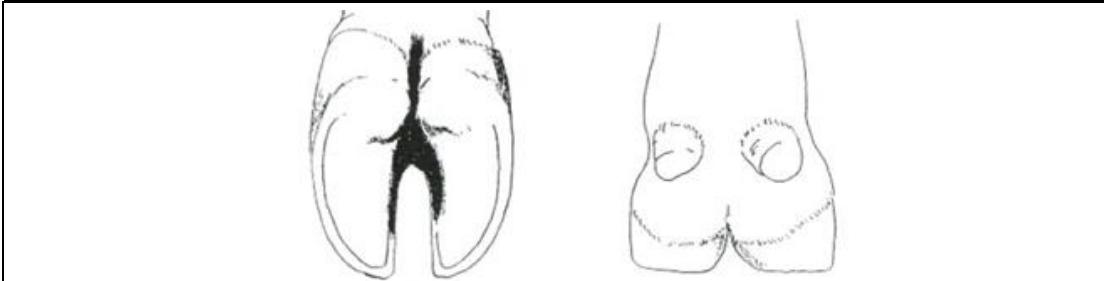
شڪل 3-18 ٺنگن جي بيهڪ جي غيرمعياري ڏيک جو پنجون نمونو

(3 معياري ۽ غير معياري ڪر

(1 معياري ڪر: هر هڪ ڪر جا ٻئي پاسا جسم جو هڪ جيترو وزن برابر برداشت ڪن ٿا (50 سيڪڙو - 50 سيڪڙو)

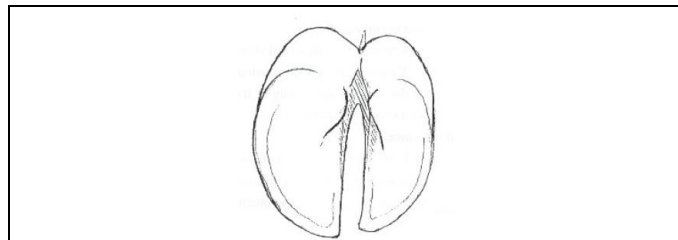


شڪل 3-19 معياري ڪر جو سامهون وارو ڏيک . معياري ڪر جي پاسي جو ڏيک

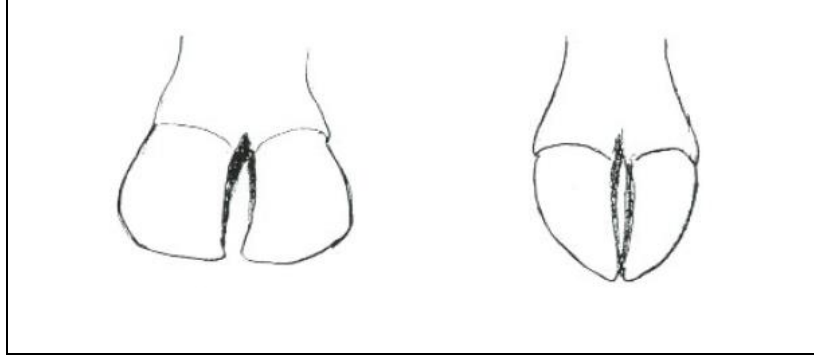


شڪل 3-20 معياري ڪر جو پٺين پاسي جو ڏيک معياري ڪر جي تري يا هيٺين پاسي جو ڏيک

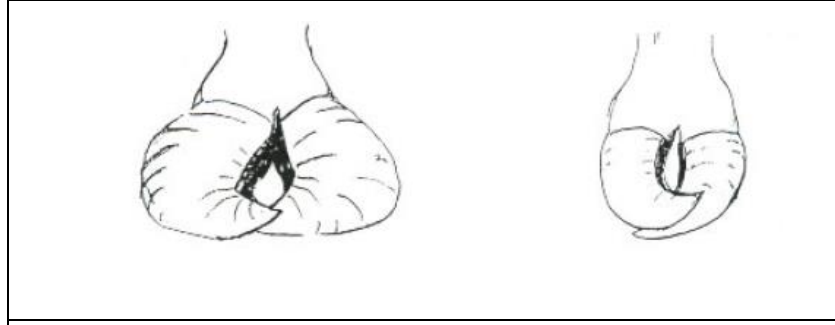
(2 غير معياري ڪر



شڪل 3-21 غير معياري اڻ برابري وارا ڪر



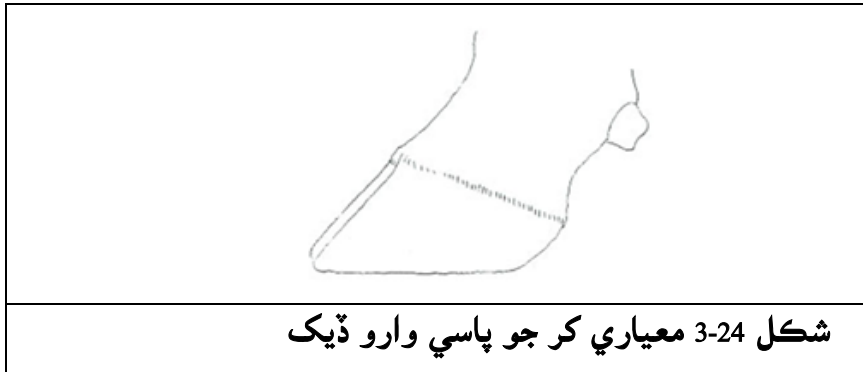
شکل 3-22 گھٹاسوڙها ڪر ۽ گھڻا وڪرا ڪر



شکل 3-23 سوڙها ڪينچي نما ۽ وڪرا ڪينچي نما ڪر

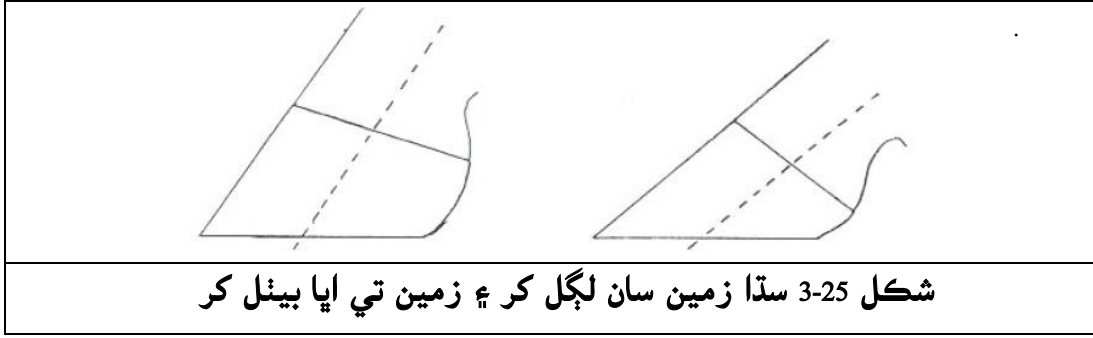
(4) معياري ڪر جو پاسي وارو ڏيک:

1. معياري ڪر جي زمين تي بيھڪ 45 ڊگري هئڻ گھرجي

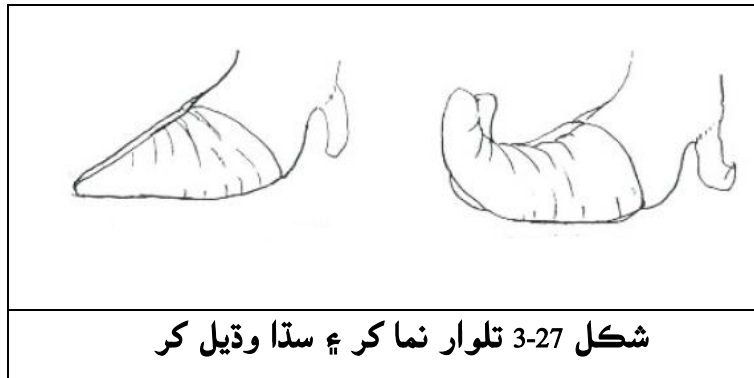


شکل 3-24 معياري ڪر جو پاسي وارو ڏيک

2. غير معياري کر



تنگن جو ڏيک گهڻو ڪري ڪرن جي بيهڪ سبب متاثر ٿي سگهي ٿو. ڪرن جي صحيح بيهڪ سان ئي جانور زمين تي صحيح بيٺل نظر ايندو. ان جي برعڪس جيڪڏهن ڪر تمام گهڻا وڌيل يا ننڍا هوندا ته تنگن تيڙيون ۽ ڪمزور ٿينديون



ڏهاڻي جو صحيح طريقو:

3.3.8

<p>شڪل 3-30 سڀ کان پهرين ڦر کي ڏانهن لاءِ ڇڏيو ته جيئن کير ٿڌن ۾ پرچي اچي انڪابو ٿڌن کي ڀڄوڙيل ٿول سان صاف ڪريو جيڪڏهن اوه خراب هجي ته انکي پهرين ڏوئي پوءِ ٿول سان صاف ڪريو</p>	<p>شڪل 3-28 ۽ 3-29 چار لٽر پاڻي ۾ 2 سي سي ڪلورين يا ڊٽول جا وجهو پوءِ ان ۾ هڪ ننڍو ٿول وجهي سٺي نموني ڀڄوڙي ڪيو</p>
<p>شڪل 3-32 ۽ 3-33 هاڻ کير جي ڏهاڻي شروع ڪريو. ڏهاڻي کان پهرين ۽ ڏهاڻي کان پوءِ پنهنجا هٿ ضرور ڏوئيندا</p>	<p>شڪل 3-31 هاڻي جانور کير جي ڏهاڻي لاءِ تيار آهي</p>
<p>شڪل 3-36 هاڻي ٿول کي اس تي سڪايو ڇو ته اس جي روشني ۾ ٿول تي لڳل سڀ جراثيم مري ويندا</p>	<p>شڪل 3-34 ۽ 3-35 کير جي ڏهاڻي ختم ڪرڻ کانپوءِ ٿول ۽ ٻالٽي کي صابن سان ڏوئي صاف ڪريو</p>

**ڪنڊي مينهن جي جسماني حالت جي ماپ جو جائزو**

3.3.9

اچو ته جانور جي جسم جي 5 صحتمند طبعي حالتن جي باري ۾ سکون. جانور جي جسماني حالت مختلف عرصن دوران تبديل ٿيندي رهندي آهي. جيئن پهرين ڪير ڏيڻ جي عرصي دوران، ڪير جي پيداوار جڏهن عروج تي پهچي ٿي ان عرصي دوران، ڪير ڏيڻ جي پوئين عرصي دوران ۽ جڏهن جانور خشڪ ٿي وڃي ان عرصي کانپوءِ. صحتمند جسماني طبعي حالت جي معيار جي ماپ جي انگ اندازو 2.5 ۽ 3.5 جي وچ ۾ رهي ٿو. صحتمند طبعي حالت جي ماپ جو انگ 2.5 کان گهٽ هوندو ته جانور گهٽ وزن وارو ليکيو ويندو ۽ ان لاءِ اضافي خوراڪ جي انتظام جي ضرورت پوندي. جسماني طبعي حالت جي ماپ جو انگ جڏهن 3.5 کان وڌي وڃي ته اهو جانور گهڻي وزن وارو يعني ٿلهو ليکيو ويندو ۽ ان جي لاءِ خوراڪ ٿورو گهٽائڻ جي ضرورت پوندي. تمام ٿلهي ۽ تمام اڀري جسماني طبعي حالت سبب جانورن ۾ ڪير جي پيداوار ۽ ڳيڻ جي عمل تي منفي اثر پون ٿا.

مينهن ۽ ڳڻن جي جسماني طبعي حالت جي معيار جي ماپ جو سڌوسنئون تعلق انهن جي لاءِ مناسب کاڌ خوراڪ جو انتظام، توليدي عمل لاءِ مناسب انتظام، جانورن جي صحت کي بهتر ڪرڻ ۽ وڇڙندڙ بيمارين کان بچاءَ جي انتظام، ۽ نسل کي بهتر ڪرڻ جي انتظامن سان آهي. جسماني طبعي حالت جي معيار جي ماپ کي جانورن جي سار سنڀال جي ڪيترن ئي شعبن ۾ استعمال ڪري سگهجي ٿو.

خاص طرح جڏهن جانورن خشڪ عرصي دوران گهڻا متارا ٿي وڃن (يعني جسماني طبعي حالت جي معيار جي ماپ جو انگ 4.0 کان مٿي ٿي وڃي) ته اهڙا جانور ڪيترن ئي پراڻين بيمارين جهڙوڪ جيري تي چرڻي چڙهڻ (Fatty liver Disease) چاري ۾ نشاستي جي ڪمي سبب رت ۾ ڪيٽون جو جمع ٿيڻ (Ketosis) سوتڪ جي بيماري (Hypocalcemia) ڇاڪاڻ ته جانور ويمڻ کان پوءِ پنهنجو وزن تيزي سان گهٽائي ٿو ۽ جسم جي چرڻي مان گهڻي مقدار ۾ فيٽي ائسڊ رت ۾ جمع ٿين ٿا.

جسماني طبعي حالت ظاهر ڪري ٿي ته جسم جي چمڙي اندران چرڻي ڪيتري جمع ٿيل آهي جڏهن ته جسماني طبعي حالت جي معيار جي ماپ ظاهر ڪري ٿي ته چمڙي جي اندران جمع ٿيل چرڻي جي حد جي ماپ ڪري ان کي انگ ڏنا وڃن. جسماني طبعي حالت جي ماپ آساني سان جانور جي جسم کي ڏسڻ ۽ هٿ لائڻ سان وٺي سگهجي ٿي. اچو ته جانور جي جسماني طبعي حالت جي ماپ وٺڻ بابت سکون.

ٿلهي ليکي جسماني طبعي حالت جي ماپ عام طور تي انگ 2.0 مان مراد ڏيو، 2.5 مان مراد اڀرو، انگ 3.0 مان مراد سپرو، 3.5 مان مراد متارو ۽ انگ 4.0 مان مراد ٿلهو آهي. منصوبي طرفان جسماني طبعي حالت جي هي ماپ جو طريقو ڪنڊين مينهن لاءِ ترتيب ڏنو ويو آهي. ماپ جو هي طريقو ٻين نسل جي جانورن جهڙوڪ ايشيا ۽ يورپ جي نسل جي ڳڻن ۽ گاڏڙ نسل جي ڳڻن لاءِ پڻ استعمال ٿي سگهي ٿو.

(1) جسماني حالت جي ماپ جو اندازو ڪيئن لڳائجي.

- 1) بنيادي طرح جسماني حالت جي ماپ ڪاٻي پاسي کان بيهي ڏسڻ ۽ هٿ لڳائڻ سان ڪري سگهجي ٿي. ڇاڪاڻ ته ڪاٻي پاسي واري چمڙي ڍري ۽ لچڪدار هوندي آهي.
 - 2) جسماني حالت جي ماپ جو اندازو انگ 0.5 وڌائڻ سان لڳائي سگهجي ٿو. جيئن 2.0، 2.5، 3.0، 3.5 ۽ 4.0. جڏهن ته جسماني حالت جي ماپ جو اندازو بنيادي طور 0.25 جي انگ سان وڌي ٿو پر آساني لاءِ 0.5 جو انگ وڌائي استعمال ڪري سگهجي ٿو.
 - 3) ڏسڻ ۽ هٿ لڳائي جانچڻ _ سڀ کان پهرين ڍاڪ واري هڏي ۽ ڌڌ وارين هڏين کي ڏسڻ ۽ هٿ لڳائي چڪاسڻ گهرجي ته ان جاءِ جي ڪل اندران چرٻي آهي يا نه. ان کان پوءِ ڪڪ وٽان پاسرائين واري حصي، ۽ ڪرنگهي واري هڏي جي ٻنهي پاسن، ڍاڪ واري هڏين جي وچين حصي ڌڌ وارين هڏين جي پاسن کي ڏسي هٿ لڳائي جانچ ڪجي. جيڪڏهن انهن جاين تي چرٻي نظر نه اچي ته اهو ڏسو ته انهي جاءِ جون هڏيون صاف نظر اچن پيون يا نه. جيڪڏهن انهن جاين تي چرٻي جمع ٿيل هوندي ته اسان کي هڏيون نظر نه اينديون ۽ چرٻي جي موجودگي ڪري اتي گولائي نظر ايندي.
- جيڪڏهن جانور تمام گهڻو متارو آهي ته توهان کي چمڙي جي اندران چرٻي جي ٿلهي تهه سبب چمڙي لچڪدار محسوس ٿيندي ان لاءِ اوهان پچ جي پاڙ يا ان جي پاسن کي هٿ لڳائي محسوس ڪري سگهو ٿا.

<p>Visual inspection and Palpation</p>  <p>تصوير 3-58 جسماني حالت جي ماپ جو اندازو لڳائڻ لاءِ جانور کي چڪاسڻ جون جايون</p>	<p>Side view</p>  <p>Figure of LIAJ</p> <p>شکل 3-37 جسماني حالت جي ماپ ڪرڻ لاءِ جانور جي پوئين حصي جون جڳهون</p>	 <p>Photo of LIAJ</p> <p>شکل 3-38 جسماني حالت جي ماپ جو اندازو لڳائڻ لاءِ جانور جي ڍانچي ۽ هڏين جي جوڙجون جڳهون</p>
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<p>تصوير 3-61 متاري جانور جي پچ جي پاڙ ۽ جسمر جي پنهي پاسن کان چرپي جا گڏ ٿيل ته</p>	<p>تصوير 3-60 اڀري جانور جي پچ جي پاڙ جي پنهي پاسن کان نظر ايندڙ ڪڏون</p>	<p>تصوير 3-59 هڏين جي جوڙ جون جايون جتي هٿ لڳائي جسماني حالت جي ماپ جو لڳائجي ٿو</p>

	<p>تصوير نمبر 3-62 پچ جي پنهي پاسن جي حصن کي آگر سان زور لڳائي محسوس ڪندا ته توهان کي ڪل لچڪدار لڳندي جيڪا ڪل جي اندران چرپي جي گڏ ٿيل ٿلهي ته سبب آهي.</p>
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(4) جسماني طبعي حالت جي ماپ جو اندازو لڳائڻ

(جسماني طبعي حالت جي ماپ جو انگ 3.0)

جيڪڏهن جانور جي ڌڙ ۽ ڍاڪ وارين هڏين تي چرپي جي موجودگي هجي پوءِ پلي اها گهٽ هجي ان جانور جي جسماني طبعي حالت جي ماپ جو انگ 3.0 سمجهنداسين. جڏهن ته ڪڪ، پاسراتين، ڪرنگهي وارين، ڍاڪ ۽ ڌڙ وارين هڏين کي ڏسڻ سان اندازو لڳائي سگهجي ٿو. جسماني طبعي حالت جي ماپ جو انگ 3.0 صحيح کاڌ خوراڪ جي انتظام کي ظاهر ڪري ٿي. جيڪڏهن جسماني طبعي حالت جي ماپ جو انگ 3.0 کان گهٽ هجي ته ان صورت ۾ توهان پاسراتين وارين هڏين جو جائزو وٺو، جيڪڏهن جسماني طبعي حالت جي ماپ جو انگ 3.0 کان مٿي هجي ته ان صورت ۾ پاسراتين، ڪرنگهي وارين هڏين ڍاڪ ۽ ڌڙ وارين هڏين جو جائزو وٺو.

**(جسماني طبعي حالت جي ماپ جو انگ 3.5)**

جيڪڏهن جانور جي ڌڙ واري هڏي ۽ ڍاڪ واري هڏي جي ڪل اندران ٿورڙي چرٻي ۽ ماس جو ته نظر اچي ته اها جسماني طبعي حالت جي ماپ جو انگ 3.0 ٿيندو. جيڪڏهن توهان کي پاسرائين جي هڏين جون لائينون صاف ظاهر نظر نه اچن ۽ ڌڙ واريون هڏيون ٿوري گولائي سان هجن ته ان جانور جي جسماني طبعي حالت جي ماپ جو انگ 3.5 ٿيندو.

(جسماني طبعي حالت جي ماپ جو انگ 4.0)

جڏهن جانور جي ڌڙ واري هڏي ۽ ڍاڪ واري هڏي جي ڪل اندران چرٻي موجود هجي پاسرائين جون هڏيون بلڪل نظر نه اچن ۽ ڪرنگهي واري هڏي، پني ۽ ڌڙ واريون هڏيون گولائي واري شڪل ۾ نظر اچن ته ان جانور جي جسماني طبعي حالت جي ماپ جو انگ 4.0 ٿيندو. هن جانور جي پچ جي پاسي وارن ۽ هيٺين حصن تي زور ڏيندو ته توهان کي لچڪدار چمڙي ۽ ماس محسوس ٿيندو ڇو ته اتي ڪل اندران چرٻي جو چڱو ته موجود هوندو آهي.

(جسماني طبعي حالت جي ماپ جو انگ 2.5)

جيڪڏهن جانور جي ڍاڪ وارين هڏين جي ڪل هيٺان چرٻي جي موجودگي نه هجي پر ڌڙ وارين هڏين جي ڪل اندران چرٻي جو ٿورو ته هجي ته ان جانور کي جسماني طبعي حالت جي ماپ جو انگ 2.5 ٿيندو. جيڪڏهن جانور جي ڌڙ ۽ ڍاڪ وارين هڏين تي ٿوري چرٻي جي موجودگي هوندي ته ان جانور جو جسماني طبعي حالت جي ماپ جو انگ 3.0 ٿيندو. جيڪڏهن جانور جي ڌڙ ۽ ڍاڪ وارين هڏين تي چرٻي جو ڪو ته نه هجي ته ان جانور جو جسماني طبعي حالت جي ماپ جو انگ 2.0 ٿيندو. جيڪڏهن ڪڪ، پاسرائين، ڪرنگهي واريون ۽ ڌڙ وارين هڏيون ٿورو گولائي ۾ نظر اچن ته ان جانور جو جسماني طبعي حالت جي ماپ جو انگ 2.5 ٿيندو پر جيڪڏهن پاسرائين، ڪرنگهي وارين هڏين، ڪڪ ۽ ڌڙ وارين هڏيون ٿورو گولائي ۾ نظر اچن ته ان جانور جو جسماني طبعي حالت جي ماپ جو انگ 2.5 ٿيندو.

(جسماني طبعي حالت جي ماپ جو انگ 2.0)

جيڪڏهن جانور جي ڌڙ وارين هڏين ۽ ڍاڪ وارين هڏين جي ڪل هيٺان چرٻي جي موجودگي نه هجي ۽ ڪڪ، پاسرائين، ڪرنگهي واريون ۽ ڌڙ وارين هڏيون واضح نظر اچن ته ان جانور جو جسماني طبعي حالت جي ماپ جو انگ 2.0 ٿيندو.

(2) جسماني حالت جي ماپ هر کير ڏيڻ واري عرصي لاءِ

صحتمند کير ڏيندڙ جانور جي وڃڻ کانپوءِ ان جي جسماني حالت جي ماپ 3.5 هجڻ گهرجي ۽ جڏهن جانور ڀرپور کير ڏيڻ واري مرحلي تي پهچي ته ان جي صحتمند جسماني حالت جي ماپ جو انگ 3.0 هجڻ گهرجي ۽ جڏهن جانور کير ڏيڻ جي آخري مرحلي ۾ داخل ٿئي

يعني ڍڪيٽ سبب خشڪ ٿيڻ لڳي ت ان وقت ان جي صحتمند جسماني حالت جي ماپ جو انگ 3.5 هجڻ گهرجي.




BCS each period

Period	Average
Cows at calving	3.5
Peak of lactation (50 ~60 days)	3.0
Mid lactation (100 ~200 days)	3.25
Late lactation (200 ~305 days)	3.5
Dry period	3.5

ٽيبل 3-8 جسماني حالت هر کير ڏيڻ واري عرصي لاءِ

(3) مختلف جسماني حالتن جون تصويرون

 <p>تصوير 3-65 جسماني حالت 2.5</p>	 <p>تصوير 3-64 جسماني حالت 2.5</p>	 <p>تصوير 3-63 جسماني حالت 2.0</p>
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 <p>تصوير 3-68 جسماني حالت 4.0</p>	 <p>تصوير 3-67 جسماني حالت 3.5</p>	 <p>تصوير 3-66 جسماني حالت 3.0</p>
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تصوير 3-69 جسماني حالت 4.0

3.4 جانور کي قابو ڪرڻ لاءِ جهنگلو ٺاهڻ

منصوبي طرفان ٽن قسمن جا جهنگلا مثالي فارم تي لڳايا ويا. انهن جهنگلن ۾ جانور کي قابو ڪرڻ سان ڪيترن ئي قسمن جا ڪم آساني سان ڪري سگهجن ٿا جهڙوڪ جانور جو وزن ڪرڻ، جانور جو ڍڪيڻ چڪاس ڪرڻ، علاج ڪرڻ، بچاءُ جا ٽڪا لڳائڻ ۽ پيٽ جي ڪيڙن جي دوا پيارڻ وغيره. منصوبي طرفان انهن جهنگلن جي ڊزائن کي وڌيڪ تبديل ڪري بهتر ڪيو ويو جئن اهو وڌيڪ مالونڊن کي استعمال ڪرڻ ۾ اثرائتو ۽ محفوظ هجي. منصوبي جي ٽيم طرفان مالونڊن کي اهڙي قسم جا جهنگلا ٺاهي ڏنا ويا ۽ انهن تي اها زميواري پڻ رکي وئي ته اهي انهن جي سار سنڀال ۽ ضرورت وقت انهن جي مرمت پڻ ڪندا.

3.4.1 لوه جي پائپ جو ٺهيل جهنگلو

لوه جي پائپ جو جهنگلي جنهن جي ڊيگهه 240 انچ آهي. هن جهنگلي ۾ مالونڊ پنهنجا گهڙي تعداد ۾ جانور آڻي سگهن ٿا ۽ هڪئي وقت ٽن جانورن کي آساني قابو ڪري انهن کي بچاءُ جا ٽڪا يا پيو ڪو علاج بهتر طريقي سان ڪري سگهجي ٿو. هيٺ ڏنل تصوير ۾ ڏسي سگهيو ٿا ته جهنگلي ۾ بيٺل جانور جو وزن ڪرڻ، جانور جو ڍڪيڻ چڪاس ڪرڻ، علاج وغيره آساني سان ڪري سگهجي ٿو. هن قسم جا جهنگلا ڪنهن نيڪيدار کان سولائي سان ٺهرائي سگهجن ٿا.

<p>تصوير 3-70 لوهي پائپن جو ڊگهو جهنگلو</p>	<p>شڪل 3-39 لوهي جهنگلي جي ڊرائنگ</p>

ڪاٺ جو ٺهيل جهنگلو 3.4.2

هن قسم جا جهنگلا مالوند ضرورت مطابق آساني سان پاڻ ٺاهي سگهن ٿا ۽ انهن لاءِ ڪنهن خاص قسم جي جڳهه جي ضرورت نه پوندي آهي. ڪاٺ جي جهنگلن لاءِ سامان آساني سان ڳولڻ ۾ مناسب آهي ٿي ملي سگهي ٿو.

<p>تصوير 3-71 ڪاٺ جو جهنگلو</p>	<p>شڪل 3-41 ڪاٺ جو جهنگلو</p>	<p>شڪل 3-40 ڪاٺ جي جهنگلي جي ڊرائنگ</p>

اير ايس پائپ جو ٺهيل جهنگلو 3.4.3

هن قسم جا جهنگلا اير ايس پائپ مان ٺاهيا وڃن ٿا جيڪي شهرن ۾ مناسب آهي ۽ ملن ٿا. هن قسم جو جهنگلو مالوند آساني سان ٿوري وقت اندر لڳائي سگهي ٿو ۽ ضرورت وقت اتان ڪڍي بي جڳهه تي پڻ سولائي سان منتقل ڪري سگهي ٿو. هن قسم جي جهنگلي جي لاڳت مٿين لوهه جي ٻن ماڊل جي جهنگلن جي پيٽ ۾ تمام گهٽ آهي. هن قسم جي جهنگلي ۾ جانور کي داخل ڪرڻ لاءِ وي (V) جي شڪل جهڙو در آهي جنهن ۾ جانور بنا مزاحمت جي داخل ٿئي ٿو جيڪو ڪاٺ واري ماڊل ۾ ڏکيو آهي.

<p>تصوير 3-72 اير ايس پائپ جو جهنگلو</p>	<p>شڪل 3-42 جهنگلي جي ڊرائنگ</p>

سادو جهنگلو 3.4.4

سادو جهنگلو آساني سان ڪاٺ جي ٽن ٿوڻين ۽ بانس جا ٻه لڪڙا پاسي سان ٻڌي ٺاهي سگهجي ٿو. ڪاٺ جون ٿوڻيون اڳيئي وٽان ۾ لڳل هونديون آهن انهن کي استعمال ۾ آڻي سگهجي ٿو. سادي جهنگلي ۾ جانور کي قابو ڪري ان جي ڍڪڻ جي چڪاس يا علاج سولائي سان ڪري سگهجي ٿو.



تصوير 3-73 پاسي وارو ڏيک



تصوير 3-74 پويون ڏيک

جانورن کي قابو ڪرڻ جي ترڪيب 3.4.5

ڳائو مال عام طرح تاهڙ هوندو آهي. جانور اڃان به وڌيڪ تهندو آهي جيڪڏهن ان کي اهڙي جڳهه ڏانهن ڪاهي وڃو جتي هو اڳي نه ويو هجي، تنهنڪري اهو ضروري آهي ته هر اها جاءِ جيڪا جانور لاءِ نئين هجي ان جا فائدا ۽ نقصان ٻئي ٿي سگهن ٿا. اهو اسان تي منحصر آهي ته اسان ان مان فائدو ڪيئن وٺون ۽ جانور کي وقت سان نئين جاءِ ۽ ماحول جو عادي بنائڻ لاءِ ڪوشش ڪريون.

ڪاٺ جي جهنگلن جي پيٽ ۾ لوهه جي پائپن جي ٺهيل جهنگلن ۾ جانورن کي اندر آڻڻ سولو آهي. ڪاٺ جي جهنگلن ۾ جانور کي اندر آڻڻ ۾ مختلف قسمن جون ڏڪيائون پيش اچن ٿيون جهڙوڪ جانور جهنگلي کي ڏسي پڇي ويندو، جانور جهنگلي جي اندر اچڻ کان ڪيپائيندو، جهنگلي مان ٻاهر ٽپ ڏيڻ جي ڪوشش ڪندو. جانور کي ان نئين صورتحال جو عادي بنائڻ ۾ ڪجهه وقت لڳندو، ان لاءِ هيٺيان طريقا استعمال ڪري سگهجن ٿا.

ڏهه ميٽرن جو هڪ رسو ڪٽو، رسي جو هڪ چيٽو جانور جي سڱن ۾ ٻڌو ۽ ان جو ٻيو چيٽو جهنگلي جي سامهون واري ٿوڻي سان ٻڌو پوءِ آهستي آهستي رسي کي چڪيندا وڃو جيئن تصوير 3_43 ۾ ڏيکاريل آهي. ڏهه ميٽرن جو ٻيو رسو ڪٽو جيڪو جهنگلي جي پوئين حصي واري ٿوڻي ۾ ٻڌو، جيئن جانور اڳيون رسو چڪڻ سان جهنگلي جي اندر داخل ٿئي ته پويون رسو جانور جي پوئين تنگن جي ڪڙي ۽ سترن کان ڦيرائي جهنگلي جي ٻئي پوئين ٿوڻي سان ٻڌو ۽ جانور کي ٿورو اڳيان ڏڪيو جيئن جانور جهنگلي جي اندر داخل ٿئي جيئن تصوير 3_44 ۾ ڏيکاريل آهي. وڏن ۽ طاقتور جانورن جي معاملي ۾ مضبوط ڪاني

ڪڍي جانور جي پويان سٿرن سان لڳائي زور لڳايو جيئن تصوير 3_45 ۾ ڏيکاريل آهي. جانور کي جهنگلي ۾ داخل ڪرڻ لاءِ ان کي لٺ سان ڏانهن ڀرڻ ۾ ڪوشش ڪري پيار سان جانور کي ان جو عادي بنايو. جانور کي جهنگلي مان ٻاهر ڀڄڻ کان روڪڻ باوجود جانور جي ذهن ۾ جهنگلي مان ٻاهر ڀڄڻ جي سوچ هميشه رهي ٿي تنهنڪري سٿرن سان جانور کي بار بار جهنگلي ۾ داخل ڪري جهنگلي جو عادي بنائي ان مان خوف ختم ڪري سگهجي ٿو ۽ پوءِ جانور کي آساني سان جهنگلي ۾ آڻي سگهجي ٿو. مينهنون اڳيان ٽپ ڏيڻ جي ڪوشش ڪنديون آهن تنهنڪري انهن جي پٺي مٿان رسو ٻڌڻ سان انهن کي ڄمڻ ڏيڻ کان روڪي سگهجي ٿو.

<p>شڪل 3-43 جهنگلي جي اڳين ٽوڙي ۾ رسو ٻڌو</p>	<p>شڪل 3-44 رسي جو ٻيو ڇيڙو جانور جي پويان ڦيرائي ٻئي ٽوڙي ۾ ٻڌو</p>	<p>شڪل 3-45 جانور کي جهنگلي جي اندر آڻڻ لاءِ لٺ پويان لڳائي زور ڏيڻ</p>

(Drawing by Dr. Teruo Sugiwaka / Expert on Feeding management)



4. باب چوٿون قرن کي کيئن پالجي

4.1 اچو ته اهڙا قر پاليون جيڪي کائڻ پيڻ ۾ چست هجن

اهڙا قر پالجن جن کي جلدي بک لڳي ۽ اهي کائڻ پيڻ ۾ چست هجن جيئن هو تيزي سان وڏي ويجهي جلدي جوان ٿي سٺيون مينهنون ٿين جيڪي پڻ سٺي بک رکندڙ ۽ کائڻ پيڻ ۾ تيز هجن.

هڪ جوان سٺي قر واري مينهن جيڪا چاري لاءِ سٺي بک رکندڙ هوندي ته ان جو اوجھ وڏو، جسم اونھون ۽ وڏو هوندو. اهڙو جسم رکندڙ قر واري مينهن بلاشڪ ججهي کير جي پيداوار ڏيندي. کير جي سٺي پيداوار کانسواءِ اهي مينهنون جلدي ڳيچنديون ۽ پنهنجي زندگي ۾ گھڻا قر ڏينديون ۽ اهي گھڻو عرصو کير ڏهائينديون. اهڙين قر وارين مينهن جي کير ڏيڻ جي پيداواري صلاحيت جو دارومدار انهن جي ننڍي عمر دوران پرورش ۽ سار سنڀال جي نظام جي معيار تي آهي جنهن جي بنياد تي انهن جي ننڍپڻ ۾ واڌ ويجهه ٿي خاص طور انهن جي ڏاڻڻ وارو عرصو ۽ کير ڇڏائڻ وارو عرصو.

4.2 وڏن جانورن جي اوجھ

وڏن اوڳر ورائيندڙ جانورن جهڙوڪ ڍڳيون ۽ مينهنون، انهن جي معدي جا چار حصا ٿين ٿا.

وڏن جانورن جي معدي جا چار حصا ٿين ٿا جهڙوڪ ريومن، ريٽيڪيولم، اوميضم ۽ ايبوميضم. ايبوميضم جو ڪم ساڳيو ئي ماڻهو جي مادي جهڙو آهي. وڏن جانورن جي اوجھ ۾ هزارين قسم جا جراثيم (بيڪٽيريا ۽ پروٽوزوئا) رهن ٿا جيڪي جانور جي کاڌل چاري کي ٽوڙي، ڳاري انهن کي خمير ۾ تبديل ڪن ٿا ۽ اهو هضم ٿيل کاڌو جذب ٿي رت ۾ شامل ٿئي ٿو. وڏي جانور جو ريومن معدي جي 80 سيڪڙو جڳهه والاري ٿو ۽ ايبوميضم جنهن جو ڪم ساڳيو ئي ماڻهو جي مادي جهڙو آهي تمام ٿوري جڳهه والاري ٿو. ننڍي جاول قر جو اوجھ ان جي معدي جي 30 سيڪڙو جڳهه والاري ٿو، تنهنڪري اهو تمام اهم آهي ته ننڍي قر جي اوجھ جي واڌ ان جي ننڍي عمر کان ئي تيزي سان ٿئي.

<p>شڪل 4.1 مينهن جي ڦر جو اوجھ جيڪو 30 سيڪڙو جڳھ والاري ٿو</p>	<p>شڪل 4.2 جوان مينهن جو اوجھ جيڪو 80 سيڪڙو جڳھ والاري ٿو</p>

4.3 ڦرن جي اوجھ جي واڌ ويجهه ڪيئن ڪجي

4.3.1 اچو ته ڦر جي اوجھ جي واڌ ويجهه لاءِ ڪوشش ڪريون

هن حصي ۾ ٻڌايو ويو آهي ته ڦرن جو ريومين ڪيئن وڌندو آهي. ڦرن جي ڄمڻ جي ٻن هفتن کانپوءِ سٺي معيار جا ساوا گاهه ڪرائڻ شروع ڪريو. سٺو ساڻو گاهه ريشيدار ٿئي ٿو ۽ گاهه جا ريشا ڦرن جي ريومين کي وڌڻ ۾ مدد ڏين ٿا. شروع ۾ ڦر تمام گهٽ ساڻو کائيندا آهن پر اڳتي هلي آهستي آهستي سٺي مقدار ۾ ساڻو گاهه کائڻ شروع ڪندا آهن.

ڦرڙن کي سڪل گاهه ڪرائڻ

ڦرن جو ريومين ننڍو ٿيندو آهي، ساون گاهن ۾ پاڻي جو مقدار 70 سيڪڙو ٿئي ٿو. جڏهن ڦر ساڻو گاهه کائيندا آهن ته انهن جو ريومين پاڻي سان پرڄي ويندو آهي. جنهنجي نتيجي ۾ ڦرن کي ساڻو گاهه کائڻ سان گهربل خوراڪي جزا نه ملي سگهندا. سڪل گاهه ساون گاهن جو سٺو متبادل هوندو آهي. سڪل گاهه ڦرن جي نه صرف خوراڪي ضرورت پوري ڪن ٿا پر انهن کي جلابن ٿيڻ کان پڻ بچائڻ ٿا، جلاب ڦرن ۾ وڌ ۾ وڌ ٿيندڙ بيماري آهي.



4.3.2 سٺو سڪل گاهه ڪيئن تيار ڪجي

سڪل گاهه ساون گاهن مان ٺهي ٿو جنهن جو پاڻي سڪائي 15 سيڪڙو تائين بچائبو آهي. سانڌيل گاهه جانور جي انزائيم ۽ هاضمي ۾ مدد ڪندڙ جيوڙن جي حالت کي بهتر ڪندو آهي. تنهن لاءِ سڪل گاهه کي محفوظ ڪري رکو ته ان جو معيار به وڌيڪ عرصي لاءِ خراب نه ٿيندو. جهنگلي گاهه ۽ گرامائن گاهه سڪل گاهه ٺاهڻ لاءِ بهتر نه هوندا آهن. جوئر ۽ مڪئي به ڦرن لاءِ بهتر نه هوندا آهن ڇاڪاڻ جو اهي سخت هوندا آهن.

سنڌ صوبي ۾ سج جي روشني وڌيڪ تيز هوندي آهي. چپر کي هڪ کان ڏيڍ ڏينهن سج جي اس تي سڪائيندا سين ته سڪل گاهه تيار ٿي ويندو. گاهه کي صبح جي تائيم تي ڪٽيو ۽ اس تي پڪيڙي ڇڏيو ۽ هر ٻن ڪلاڪن کانپوءِ گاهه کي اٿلايو، گهم کان بچائڻ لاءِ گاهه کي رات جو ڍڪي ڇڏيو، جيڪڏهن توهان وٽ پلاسٽڪ جي شيٽ آهي ته ان سان گاهه کي ڍڪي ڇڏيو. ٻئي ڏينهن صبح جو جڏهن اس نڪري ته گاهه کي پڪيڙي ڇڏيو ۽ هر ڪجهه ڪلاڪن کانپوءِ گاهه کي اٿلايو. ٻئي ڏينهن شام تائين سڪل گاهه تيار ٿي ويندو. 5 ڪلوگرام سائي گاهه مان هڪ ڪلوگرام سڪل گاهه تيار ٿيندو آهي.

4.3.3 ڦرن کي گهربل مقدار ۾ سٺي معيار وارو سڪل گاهه ڪرائڻ

ڦرن کي 8 مهينن جي عمر تائين سڪل گاهه ڪرائي سگهجي ٿو. ڪينال وارن علائقن ۾ جتي سڄو سال پاڻي بنين ۾ فصل جي پوکي لاءِ موجود هوندو آهي، ان جو اهو فائدو آهي ته انهن علائقن ۾ قدرتي گاهه جهڙوڪ چپر ۽ ٽوپ وغيره سڄو سال موجود هوندا آهن. وڏا جانور چارو وڌيڪ کائين ٿا جڏهن ته ننڍن ڦرن کي قدرتي گاهه جي گهرج گهٽ پوندي. تنهنڪري اسان کي وڌيڪ اهميت ننڍن ڦرن کي ڏيڻ گهرجي. قدرتي گاهن کي سڪائي گهڻي عرصي تائين محفوظ ڪري رکي سگهجي ٿو، تنهنڪري اها سفارش ڪجي ٿي ته جيترو ممڪن ٿي سگهي ۽ جيترو وقت اوهان کي ملي قدرتي گاهه ڪٽي ان کي مٿين طريقي مطابق سڪائي سڪل گاهه گهڻي عرصي تائين محفوظ ڪري رکي سگهو ٿا ۽ جنهن وقت چاهيو ننڍڙن ڦرن کي ڪرائي سگهو ٿا.

		
<p>تصوير 4-3 ڦر سڪل گاهه کي شوق سان کائين پيا.</p>	<p>تصوير 4-2 گاهه کي سڪائڻ بابت ڄاڻ ڏيڻ</p>	<p>تصوير 4-1 پنين ۾ چپر هڻي مقدار ۾ موجود هوندي هي</p>

4.4 ويرا جي دوران جانورن جي سار سنڀال

جڏهن جانور ويرا جي ويجهو ٿيندو آهي ان ۾ بيچيني وڌندي ويندي آهي. جانور جو صحيح طريقي سان ويرا ڪرائڻ لاءِ ۽ ان جي مدد لاءِ ان کي پنهنجي گهر جي ويجهو ٻڌو ۽ ان کي احتياط سان ڏسندا رهو. توهان کي ڪنهن ماهر جانورن جي ڊاڪٽر سان رابطو ڪرڻ گهرجي جيڪو توهان کي ايمرجنسي جي حالت ۾ جهڙوڪ ڏکئي ويرا واري حالت ٿيڻ کان اڳ ۾ موجود هجي. جيڪڏهن جانور جو ويرا رات جي وقت ٿئي ٿو ته توهان کي جانور جي ويجهو هجڻ گهرجي جيئن ڦر نڪرڻ جي صورت ۾ جانور جي مدد ڪري سگهيو ۽ صورتحال جي وڌيڪ منجهڻ کان بچي سگهيو.

4.5 ڄمڻ دوران ۽ ان کانپوءِ ڦر جي سار سنڀال

ڦر جي ڄمڻ کان پوءِ صحتمند ڦر جي بهتر واڌ ويجهه لاءِ هر ڪم صحيح طريقي سان ڪرڻ گهرجي.

1) ڦر جي جسم کي خشڪ ڪرڻ

ڦر جي جسم کي خشڪ ڪرڻ لاءِ ان کي ماءُ جي ويجهو ڪريو ته جيئن اها ان کي چٽي خشڪ ڪري. ڦر کي چٽڻ سان ان جي ماءُ جي جسم جا غدود حرڪت ۾ اچي ويندا جيڪي اوه مان ٽٽن ۾ ڪير لاهڻ ۽ ان سان گڏوگڏ ڦر کي ٻاهر نڪرڻ ۾ مدد ڪندا.

2) دن کي جراثيم کان پاڪ ڪرڻ

دن کي 10 فيصد تنڪچر آيوڊين ساليوشن سان صاف ڪريو يا وري آيوڊين ساليوشن جي سٺي دن ۾ لڳايو.



تصوير 44 ڦر جي دن کي 10 فيصد ٽنڪچر آيوڊين ساليوشن ۾ ٻوڙيو

3) ڦر جي ماس ۾ اينٽي بايوٽڪ جي سئي لڳائڻ

اينٽي بايوٽڪ جي سئي نئين ڄاول ڦر کي ان صورت ۾ لڳائڻ گهرجي جڏهن انهي فارم جتي گهڻا ڦر هجن ۽ اتي بيماري جو خدشو هجي، برسات جي موسم جڏهن فارم تي گهڻي گڀ يا پاڻي هجي ۽ سيري جي موسم ۾. ڦرن کي 3 سي سي اوڪسي ٽيٽرا سائڪلين ايل اي گوشت ۾ هڻڻ گهرجي.

4) ڦرن جي پالڻ واري جڳهه

ڦرن کي خشڪ ۽ صاف جڳهه تي رکجي. گرمين جي موسم ۾ ڦرن کي پالڻ لاءِ اهڙي جڳهه جي چونڊ ڪريو جيڪا سٺي هوادار ۽ ڍڪيل هجي. سردين جي موسم ۾ واڙي جي فرش تي پالڻ وڃائي ڇڏيو ۽ ڦرن کي تيز هوائن کان بچايو. ڦرن جي پالڻ واري جڳهه جي روزانو صفائي ڪري ۽ ان کي صاف رکو.

5) ڪير پيئندڙ ڦرن جي سارسنپال جي نظرداري ڪريو

هڪ دفعو جيڪڏهن ڪير پيئندڙ ڦر بيمار ٿي پيا ته انهن جي حالت جلدي ۽ آساني سان بگڙي سگهي ٿي.

توهان ڦر جي هلڻ ڦرڻ تي هر وقت نظرداري ڪريو. جيڪڏهن ڦرن جون اکيون چمڪندڙ آهن ۽ هو چست آهي ۽ تڪڙو گهمي ڦري ٿو ۽ ان جي جسم جو پويون حصو صاف سترو آهي ته اهو صحتمند هوندو. اها توهان پنهنجي عادت ٺاهي ڇڏيو ته ڦر جي هر وقت نظرداري ڪجي جهڙوڪ وات، نڪ، ۽ اکين مان نڪرندڙ پاڻياڻ جي رنگ، ساهه کڻڻ جي رفتار بخار هجڻ يا نه هجڻ جي ۽ دستن جي هجڻ جي خبر هڻڻ گهرجي.



6) قرن کي پس پيارڻ

قرن کي ڄمڻ کان پوءِ 6 ڪلاڪن جي اندر يا جيترو ممڪن ٿي سگهي جلدي پس پيارجي.

قرن کي وڇڙندڙ بيمارين کان بچائڻ لاءِ ڄمڻ کان پوءِ جيترو ممڪن ٿي سگهي جلدي پس پيارجي. خاص طرح پهريون پس تمام گهڻو اثراتو آهي، ڇاڪاڻ ته ان ۾ گاما گلوبولين جو گهڻو مقدار موجود هوندو آهي. قرن کي ڄمڻ کانپوءِ پهريون پس تن ڪلاڪن جي اندر يا جيترو ممڪن ٿي سگهي جلدي پس پيارڻ گهرجي. پس جو ٻيو وزن ڦر جي ڄمڻ کان 6 ڪلاڪن بعد پيارڻ گهرجي. اهو وڌيڪ بهتر ٿيندو ته ڦر جيترو پس پي سگهي ان کي پيارجي.

ڦر جي ڄمڻ جي 6 ڪلاڪن کان پوءِ پس ۾ موجود گاما گلوبولين جسم ۾ جذب نه ٿي سگهندي. پس يا کچو کير مينهن جي ويامڻ جي 3_5 ڏينهن تائين ڦر کي پيارجي، ڇاڪاڻ ته پس يا کچو کير ۾ عام کير جي مقابلي ۾ خوراڪي جزا وڌيڪ هوندا آهن. تنهنڪري قرن کي پس يا کچو کير جيترو ممڪن ٿي سگهي اوترا ڏينهن پيارجي.

4.6 ڦر جي ماءُ ۽ ڦر کي الڳ الڳ پالڻ

ترقي يافته ملڪن ۾ يورپين ڊگين کي ويامڻ کان پوءِ انهن کي پنهنجي قرن کي ڇڏڻ لاءِ ڇڏيو وڃي ٿو، ان کانپوءِ ڦر ۽ ماءُ کي الڳ ڪيو وڃي ٿو ۽ انهن جي سار سنڀال جو الڳ انتظام ڪيو وڃي ٿو.

گرم علائقن جهڙوڪ پاڪستان جي صوبي سنڌ ۾ کير جي ڏوهائي کان پهرين ڦر کي ڇڏيو وڃي ٿو جيئن اهو ڏائي ۽ جڏهن کير ٽٽڻ ۾ پرجي وڃي ٿو ته ڏوهائي شروع ڪئي وڃي ٿي. هي کير جي ڏوهائي جو رواجي طريقو آهي جنهن سان کير واري جانور جي جسم ۾ آڪسي ٽوسن جي خارج ٿيڻ ۾ مدد ملي ٿي جيڪا ڦر جي ڏاڻڻ سان خارج ٿئي ٿي. ڳوٺن ۾ اهو تصور ڪيو وڃي ٿو ته ڦر جي ڏاڻڻ کان سواءِ کير جي ڏوهائي ڪرڻ ناممڪن آهي. جيتوڻيڪ اٽلي ۽ ٽائيلينڊ جا جديد ڀاڱيا هندستان جي موراھ نسل جون مينهنون پالين ٿا جن جي ڏوهائي قرن کي ڏاڻڻ کان سواءِ ڪئي وڃي ٿي. اڃان به وڌيڪ کير جي ڏوهائي مشين سان ڪئي وڃي ٿي. هيٺ ڏنل تصويرون ٽائيلينڊ جي هڪ فارم جون آهن جتي کير وارن جانورن ۽ قرن جي سار سنڀال جو انتظام الڳ الڳ ڪيو وڃي ٿو. جيڪڏهن اهو ممڪن هجي ته توهان به کير واري مينهن کي اهڙي صورتحال تحت پالي سگهو ٿا. سنڌ ۾ به ڪجهه ڀاڱيا ڦر کان سواءِ پاڙي تي مينهن جي ڏوهائي ٽٽڻ تي مالش ڪري کير لهرائي ڏوهائي ڪئي وڃي ٿي. سنڌ ۾ هي طريقو ڦر جي مرڻ جي صورت ۾ اختيار ڪيو وڃي ٿو. هيٺ ڏنل تصوير ضلعي مٽياري جي آهي جتي مينهن جي ڏوهائي ڦر کان سواءِ ڪئي پئي وڃي.

	
<p>تصوير 4-5 ڄمڻ کانپوءِ ڦرن کي ماءُ کان ڌار نپل ذريعي کير پياريو پيو وڃي</p>	<p>تصوير 4-6 مشين ذريعي مينهن جي کير جي ڏهائي</p>
	
<p>تصوير 4-7 ٿڻن جي مالش</p>	<p>تصوير 4-8 ٿڻن کي مالش ڪرڻ کانپوءِ ڏوهائي ڪئي پئي وڃي</p>

4.7 ڦرن کي منصوبي طرفان قائم سينٽر ۾ پالڻ

منصوبي طرفان نون ڄاول ڦرن کي ماءُ کان سواءِ پالڻ لاءِ هڪ رٿا تيار ڪئي وئي. جنهن تحت حيدرآباد جي ڪيٽل ڪالوني مان نون ڄاول ڦرن کي ڄمڻ کانپوءِ بيمارين کان بچائڻ لاءِ اتي پس پياري پوءِ اتان کڻي ڦرن جي پالڻ واري مرڪز ڏي منتقل ڪيو ويندو جيڪو منصوبي طرفان جلد قائم ڪيو ويندو.

4.7.1 ڦر کي پس پيارڻ

(1) پس جي ڏهائي

پس جي ڏهائي صاف ستري ماحول ۾ ڪرڻ گهرجي

ڏهائي کان پهرين ننڍن نالن جا 2 کان 3 ٽڪڙا صاف پاڻي ۾ ڀريو وڌيڪ بهتر ٿيندو ته پاڻي ۾ جراثيم ڪش لوشن (مثال طور ڪلورين ۽ ڊيٽول وغيره) ملائي ان ۾ توال ٻوڙي ڀريو. ڪير جي ڏهائي لاءِ ڦرن کي ڌارائڻ لاءِ جيڪا بالٽي استعمال ٿئي ٿي ان کي استعمال ڪرڻ کان پهرين ڏوئي صاف ڪرڻ گهرجي. ويامن کان اڌ ڪلاڪ پوءِ جانور جي اوه ۽ ٿڻن کي جراثيم ڪش پاڻي ۾ ٻوڙي ڀريو. تال سان صاف ڪري پوءِ پس جي ڏهائي ڪجي. ڏهائي کان پهرين ٿڻن مان به ٽي گوها ڏهي ضايع ڪجن.

(2) پس پيارڻ

ڄمڻ کان پوءِ جيترو جلد ممڪن ٿي سگهي ڦر کي گهٽ ۾ گهٽ 1.5 کان 2 لٽر پس پيارڻ گهرجي.

ڦر کي ڄمڻ کانپوءِ جيترو جلد ممڪن ٿي سگهي ڄمڻ واري هنڌ پس پياري پوءِ ڦر جي پالڻ واري مرڪز ڏانهن منتقل ڪجي. باقي پس ڦر کي سينٽر تي پياري. ڦر کي ٻيو وزن سينٽر تي آڻڻ کان پوءِ ٽن ڪلاڪن کان پوءِ پياري. ڦر کي بالٽي ۾ پس پيارڻ جي بار بار سکيا ڏجي ۽ ڦر جيترو پس پيڻ چاهي اوترو ان کي پياري.

<p>تصوير 4-9 مينهن مان پس جي ڏهائي ڪئي پئي وڃي</p>	<p>تصوير 4-10 ڦرن کي پس پياريو پيو وڃي</p>

4.7.2 ڦرن کي ٻاهران خريد ڪيل تازو ڪير پيارڻ

ان ڳالهه جي تسلي ڪرڻ گهرجي ته ٻاهران گهرايل ڪير صاف ۽ تازو هجي. ٻاهران گهرايل ڪير ڦر کي پيارڻ کان پهرين ان کي چڱي طرح سنگهڻ ۽ چڪڻ گهرجي. جيڪڏهن اوهان کي ڪنهن به قسم جي خراب بوءِ يا ڏانڦو لڳي ته اهو ڪير ڦر کي نه پياري. چاڪاڻ ته جيڪڏهن ڦر کي گهڻي بڪ هوندي ته اهو خراب ڪير به پي ويندو ۽ ان مان بدھضمي يا ٻين بيمارين جو انديشو هوندو. تنهنڪري ڪير جي خاصيت تي وڌيڪ توجه ڏيڻ گهرجي.

4.7.3 قرن کي مصنوعي طريقي سان کير پيارڻ

مصنوعي کير پيارڻ جا خاص به طريقي آھن ھڪڙو نپل/فيڊر سان پيو ٻالٽي ۾. ھر طريقي ۾ خوبيون ۽ خاميون ٽين ٿيون.

(1) ٻالٽي ۾ کير پيارڻ

قر کي کير پيارڻ لاءِ ڪنهن چڱي ٻالٽي جو بندوبست ڪريو جنهن ۾ قر جو منهن ۽ کير پيارڻ وارو پنهنجي ٻانهن سولائي سان وجهي آساني سان قر کي کير پياري سگهجي. قر پنهنجو منهن ۽ نڪ ٻالٽي ۾ پيل کير ۾ ٻوڙڻ جي ڪوشش ڪندو تنهنڪري کير پيارڻ واري ورڪر کي گهرجي ته قر جي منهن کي ٿورو مٿي رکي جيئن کير پيڻ دوران قر ساھ کڻي سگهي. ٿورن ڏينهن کانپوءِ قر کي ٻالٽي ۾ کير پيڻ جي عادت پئجي ويندي ۽ هو ورڪر جي مدد کان سواءِ پاڻي ٻالٽي ۾ کير پيڻ لڳندو.

(2) قر کي نپل ذريعي کير پيارڻ

قر جي وات ۾ آڱر وجهي ان کي آڱر چوسڻ سيکاريو پوءِ آهستي آهستي قر جي وات ۾ آرام سان نپل وجهو. جڏهن قر نپل ڏانڻ شروع ڪري لڳي ته فيڊر کي سڌو رکو ۽ ان کي نه لوڏيو. فيڊر جي اوچائي قر جي ڪنڌ جي برابر رکو. جڏهن قر ڏانڻ جي دوران ٿورو رکجي ته فيڊر کي ٿورو پوئتي ڪريو ۽ قر کي وري ڏانڻ لاءِ اڪسايو. نپل جو ڪيپ بند ڪرڻ وقت گهڻو تائيت نه ڪريو ڇاڪاڻ ته نپل کي گهڻو تائيت ڪرڻ سان نپل مان کير جي اچڻ ۾ رڪاوٽ ٿيندي. جڏهن قر کي نپل مان ڏانڻ ۾ ڏکيائي پيش اچي ته ان جي ڪيپ کي ٿورو ڍرو ڪريو. قر ٻالٽي جي پيٽ ۾ نپل مان گهٽ تيزي سان ڏانڻندو. نپل کي هر دفعي استعمال ڪرڻ کانپوءِ برش سان ڊٽرجنٽ پاڻوڊر يا لوشن ۾ چڱي طرح سان ڌوئي صاف ڪرڻ گهرجي.

<p>تصوير 4-11 پھريون دفعو قر کي ٻالٽي ۾ کير پياريو پيو وڃي</p>	<p>تصوير 4-12 قر کي نپل/فيڊر ذريعي کير پياريو پيو وڃي</p>

مارڪيٽ ۾ ڪيترن ئي قسمن جا فيڊر موجود آهن

	
<p>تصوير 4-13 ڊبي نما فيڊر</p>	<p>تصوير 4-14 بالٽي نما فيڊر</p>

ڪير پئندڙ ڦرن جي سار سنڀال 4.7.4

ڪير ڏائيندڙ ڦرن جي لاءِ ڊائيدار خوراڪ ۽ خشڪ گاهه ۽ پاڻي جو بندوبست ڦرن جي 8 ڏينهن جي عمر کان شروع ڪرڻ گهرجي. شروع شروع ۾ ڦرن کي خشڪ گاهه، ڊائيدار خوراڪ ۽ پاڻي سان ڪيڏڻ ڏيو، پوءِ ڦرن جي وات ۾ ٿورو ڊاڻو ۽ خشڪ گاهه وجهو جيئن هنن کي ان جو ڏانڦو وڻي ۽ ڦرن آهستي آهستي اهي شيون کائڻ شروع ڪري ۽ ان جو عادي بنجي وڃي. ڦرن جي سامهون تازو صاف پاڻي هر وقت موجود رکو ته جيئن اهو ڊائيدار خوراڪ، ۽ خشڪ گاهه کائيندو رهي ۽ ضرورت وقت پاڻي به پيئندو رهي. پاڪستان ۾ اهو مڃيو ويندو آهي ته ڪير ڏائيندڙ ڦرن کي پاڻي جي ضرورت نه هوندي آهي بهرحال اهو غلط تصور آهي. ڦرن کي صاف ۽ تازو پاڻي مهيا ڪرڻ لاءِ پاڻي سان ڀريل بالٽي انهن جي اڳيان هر وقت موجود رکو، ڏينهن ۾ ٻه دفعا صبح ۽ شام پاڻي تبديل ڪريو.

(1) ڦرن لاءِ ڊائيدار خوراڪ جو انتظام ڪرڻ

اچو ته ڦرن کي ڊائيدار خوراڪ ڪارايون

منصوبي جي ماهرن طرفان مارڪيٽ ۾ موجود جانورن جي خوراڪي شين مان ڦرن جي لاءِ ڏائيدار ۽ هاضميدار خوراڪ تيار ڪئي ويئي آهي جنهن مان ڦرن کي گهربل خوراڪي جزا ملي سگهندا. ڦرن ڊائيدار خوراڪ 15 ڏينهن جي عمر کان باقاعده کائڻ لڳندا آهن جنهن سان انهن جي اوجھ جي ڊاڻي کي هضم ڪرڻ جي صلاحيت بهتر ٿيندي ۽ ڦرن جو روزانه وزن تيزي سان وڌندو. اهڙي طرح انهن کي ڪير ڌارائڻ کان جلدي ڇڏائي سگهيو.

منصوبي جي ماهرن طرفان ڦرن جي ڊائيدار خوراڪ لاءِ ٻه ماڊل تيار ڪيا ويا آهن. ماڊل 1 ۽ ماڊل 2. ماڊل 2 ۾ سويابين جي ڪٽ شامل ڪئي ويئي آهي ۽ ماڊل 2 جي خوراڪ گهڻي ڏائيدار آهي ۽ ان ۾ لحميات جو تناسب ماڊل 1 جي مقابلي ۾ وڌيڪ آهي جنهن سان ڦرن جو روزانه وزن تيزي سان وڌندو



ٽيبل 4-1 ڦرن جي لاءِ دائيڊار خوراڪ جو آميزو		
مادڻ _ 2	مادڻ _ 1	
مختلف شين جو سيڪڙو	مختلف شين جو سيڪڙو	خوراڪي شين جا نالا
22	15	مڪئي جو ڌارو
28	30	ڪڻڪ جو ڌارو
0	7	ڪڪڙن جي ڪڙ
14	0	سويابين جي ڪڙ
4	0	توريئي جي ڪڙ
20	30	اٽي جو چاڻ
0	7	گوار جي ڪڙ
6	5	مڪئي جو چلڪو
5	5	ڪمند جو شيرو
1	1	هڏين جو چورو (DCP)
100	100	ڪل شيون
70.6	68.7	ڪل هاضميڊار غذائي جزا (TDN)
18.8	18.4	لحميات (CP)

(2) ڦر کان 60 ڏينهن جي اندر ڪير ڇڏائڻ

مصنوعي طريقي سان ڦر پالڻ جي رٿا تحت ڦرن کي ڪير پيارڻ جو عرصو 60 ڏينهن آهي. هن عرصي دوران ڦر کي تازو ڪير، دائيڊار خوراڪ، سڪل گاهه ۽ صاف تازو پاڻي پابندي سان ڏيڻ گهرجي.

بن مهينن ۾ ڦر وڌي ويجهي سٺي قدبت ۽ وزن وارو ٿي وڃي ٿو ۽ ان ۾ چاري لاءِ بڪ لڳڻ ۽ ان جي اوجھ ۾ دائيڊار خوراڪ ۽ سڪل گاهه کي هضم ڪرڻ جي صلاحيت وڌي بهتر ٿي وڃي ٿي. تنهنڪري اهو مناسب وقت هوندو ته ڦرن کي ڪير پيارڻ بند ڪيو وڃي.

منصوبي طرفان ڦرن کان ڪير ڇڏائڻ جي وقت جو هدف 60 ڏينهن آهي، روزانه واڌويجهه ۽ جسماني وزن جي وڌڻ جو هدف 0.5 ڪلوگرام روزانه آهي ۽ 60 ڏينهن کانپوءِ ڪير ڇڏائڻ وقت ڦر جي جسماني وزن جو هدف 62 ڪلو آهي.



(1) کير ڏائيندڙ ڦرن جي لاءِ کير ۽ ڏائيدار خوراڪ جو وزن

ڦر جي ڄمڻ کان پوءِ پهرين ڏينهن کان وٺي پنجين ڏينهن تائين 1.5 لٽر پس هڪ ٽائيم ڏينهن ۾ ٻه دفعا يعني ڪل 3 لٽر يا جسماني وزن مطابق روزانه پيارجي. ڦر کي تازو کير 1.5 لٽر هڪ ٽائيم ڏينهن ۾ ٻه دفعا يعني ڪل 3 لٽر روزانه پيارجي 6 ۽ 7 ڏينهن پيارجي. ٻئي هفتي کان ڦر کي تازو کير 2 لٽر هڪ ٽائيم ڏينهن ۾ ٻه دفعا يعني ڪل 4 لٽر روزانه پيارجي. ڦر کي ڏائيدار خوراڪ ۽ سڪل چارو ٻئي هفتي کان ڪرائڻ شروع ڪجي. پهرين ٿورڙو ڏائيدار خوراڪ ۽ سڪل چارو ڦر جي اڳيان رکجي ته جيئن اهو ان سان کيڏي، ان کانپوءِ ٿوري ڏائيدار ان جي وات ۾ وجهجي ته جيئن ڦر کي ڏائيدار خوراڪ ۽ سڪل چارو جو ذائقو وڻي ۽ هو روزانه ڪاٺڻ شروع ڪري. ان کانپوءِ جيئن جيئن ڦر ڏائيدار خوراڪ ۽ سڪل چارو کائيندو وڃي تيئن تيئن ڏائيدار خوراڪ ۽ سڪل چارو ڏائيدار خوراڪ ۽ سڪل چارو وڌائي. هڪ دفعو جڏهن ڦر ڏائيدار خوراڪ روزانه ڪاٺڻ لڳي ته ان کي کير ڏيڻ بند ڪجي. صاف ۽ تازو پاڻي ڦر جي اڳيان 24 ڪلاڪ موجود هجي، جڏهن ان جي دل چوي ۽ جيترو چاهي هو آساني سان پي سگهي.

ٽيبل 4-2 ڦرن کي 2 مهينن جي عرصي دوران خوراڪ ڏيڻ جي ترتيب

روزانه پاڻي پيارڻ	روزانه خشڪ چاري جي خوراڪ جو وزن	روزانه ڏائيدار خوراڪ جو وزن	روزانه کير جي خوراڪ لٽر روزانه	ڦر جو جسماني وزن	هفتي جا ڏينهن	فيڊ ڪرائڻ جو هفتو	
0	0	0	$1.5 + 1.5 = 3$	34	1 _ 5	پهريون	
			$1.5 + 1.5 = 3$		6 _ 7		
24 ڪلاڪ موجود جيترو پي سگهي	ٿورڙو	ٿورڙي	$1.5 + 1.5 = 3$	37	8 _ 14	ٻيو	
			$2 + 2 = 4$	41	15 _ 21	ٽيون	
			$2 + 2 = 4$	45	22 _ 28	چوٿون	
			$2 + 2 = 4$	48	29 _ 35	پنجون	
	جيترو کائي سگهي	0.5	0.5	$2 + 2 = 4$	52	36 _ 42	ڇهون
				$1.5 + 1.5 = 3$	55	43 _ 49	ستون
				$1 + 1 = 2$	59	50 _ 56	اٺون
				$0.5 + 0.5 = 1$		57 _ 59	نائون
0	62	60					

قرن جي کير پيٽ جي شروعاتي عرصي ۾ استعمال ٿيندڙ ٿانون ۽ شين جون تصويرون

	
<p>تصوير 4-15 دائيدار خوراک ۽ پاڻي جا ٿانو</p>	<p>تصوير 4-16 خشڪ کاھ لاءِ کاڻ جي ٽوڪري</p>

(2) قرڙن لاءِ پجرو (Calf Hatch)

قرڙي کي انفرادي طور پجري ۾ ٻن مهينن تائين کير پيٽ واري عرصي دوران رکجي. قرڙن کي انفرادي طور پجري ۾ رکڻ جو مقصد انهن کي وچڙندڙ بيمارين کان بچائڻ آهي. ان کانسواءِ قرڙي جي انفرادي طور سار سنڀال جو انتظام ڪرڻ آهي.

قرڙن جي انفرادي طور پجري ۾ سار سنڀال جي انتظام جو بنيادي مقصد اهو آهي ته قر کي سنڀاليندڙ ورڪر آساني سان روزانه قر کي پياريل کير، ڪاراييل دائيدار خوراک، سڪل چاري، پاڻي جو وزن ۽ قر جي روزانه وڌندڙ جسماني وزن جي صحيح طور ڪري سگهي. ان کانسواءِ هن طريقي موجب ورڪر سولائي سان هر قر جي روزانه نظرداري ڪري سگهي ٿو ۽ قر جي صحت جي حالت جو جائزو وٺي سگهي ٿو ۽ ڪنهن به بيماري جي صورت ۾ ترت ڊاڪٽر کي اطلاع ڏيئي سگهي ٿو. وچڙندڙ بيمارين کان بچاءُ لاءِ بيمارين جي آڳاٽي خبر، انهن جي تشخيص ۽ ترت علاج تمام گهڻو اهم آهي. منصوبي طرفان قرڙن لاءِ ٻن قسمن جا پجرا ٺاهيا ويا آهن، هڪ نمونو هڪ جڳهه تي نصب ٿيل ٻيو نمونو هڪ جڳهه کان ٻي جڳهه منتقل ڪرڻ جهڙو.

(a) هڪ جڳهه کان ٻي جڳهه منتقل ڪرڻ وارو پجرو

جنهن فارم تي جڳهه گهڻي هجي اتي هڪ جڳهه کان ٻي جڳهه منتقل ڪرڻ وارو پجرو ٺاهڻ موزون ٿيندو. قرن کي سنڀاليندڙ ورڪر اهڙي قسم جي پجري جي جڳهه روزانه مٽائي سگهي ٿو. اهڙا فارم جتي زمين جي پلاٽ تي چير پوکيل آهي اتي اهڙي قسم جا پجرا رکڻ گهرجن ۽ روزانه پجري جي جڳهه مٽائڻ سائي گاهه جي واڌ ويجهه کي بهتر ڪري سگهجي ٿي، جيڪو سڪائي ان مان قرڙن لاءِ چارو ٺاهي سگهجي ٿو.

<p>تصوير 4-17 قرن جي پڻجري کي گاه واري پلاٽ تي رکوس</p>	<p>تصوير 4-18 قرن جي پڻجري جي روزانه جڳهه مٽائڻ</p>

(b) هڪ جڳهه تي نصب ٿيل پڇرو

منصوبي طرفان ٻن قسمن جا هڪ جڳهه تي نصب ڪرڻ وارا پڇرا ٺاهيا ويا آهن. جهڙوڪ الڳ پڇرو ۽ هڪٻئي سان جڙيل پڇرا. هڪٻئي سان جڙيل پڇرا وڌيڪ موزون آهن جنهن تحت هڪ ئي وقت گهڻا ڦر پالي سگهجن ٿا. اهڙي پڇري ۾ لهوارو تختو هڻڻ گهرجي جنهن تي ڦر بيهي ۽ ويهي سگهي. ڦر تختي تي روز چيٽو ۽ پيشاپ ڪندو رهندو، تنهنڪري لهواري تختي جي صفائي روزانه ڪرڻ گهرجي.

<p>تصوير 4-19 گڻدييل پڻجرا</p>	<p>تصوير 4-20 الڳ پڻجرو</p>

**قرن کان کير ڇڏائڻ**

4.7.5

منصوبي طرفان قرن کان کير ڇڏائڻ جو هدف 60 ڏينهن جي عمر آهي. ليڪن قرن کان کير ڇڏائڻ جو مثالي وقت اهو آهي جڏهن کير پئندڙ قرن روزانه هڪ ڪلوگرام دائيدار خوراڪ کائڻ لڳي.

منصوبي طرفان ڪيل تجربي مطابق قرن کان کير ڇڏائڻ واري هدف يعني 60 ڏينهن جي عمر ۾ 5 سيڪڙو قرن اهڙا هئا جن هڪ ڪلوگرام دائيدار خوراڪ کائڻ شروع ڪئي. تنهنڪري توهان قرن کان 60 ڏينهن جي عمر ۾ کير ڇڏائي سگهو ٿا جڏهن قرن روزانه 500 کان 600 ڪلوگرام دائيدار خوراڪ کائڻ لڳي.

ٽيبل نمبر 2_4 ۾ کير پئندڙ قرن لاءِ دائيدار خوراڪ تجويز ڪئي وئي آهي. هن ٽيبل کي استعمال ڪري قرن کي روزانه گهربل دائيدار خوراڪ جو حساب لڳائي ان مطابق قرن لاءِ تازي خوراڪ ناهي سگهو ٿا. قرن جي سامهون دائيدار خوراڪ، خشڪ چارو ۽ تازو پاڻي 24 ڪلاڪ پيل هجي.

4.7.6 کير ڇڏائڻ کانپوءِ قرن جي لاءِ چاري ۽ دائيدار خوراڪ جو انتظام ڪرڻ

(1) **قرن کي چارو ڏيڻ:** کير ڇڏائڻ کانپوءِ قرن تي شديد دٻاءُ پوي ٿو. قرن کي کير ڇڏائڻ کان پوءِ هڪ هفتي تائين ساڳي دائيدار خوراڪ ڏيڻ گهرجي. کير ڇڏائڻ جي ٻئي هفتي کان پوءِ قرن جي دائيدار خوراڪ ۾ تهائين جي واڌ ويجهه وارو فارمولا فيڊ ملائي ڪرائڻ شروع ڪريو. کير ڇڏائڻ جي ٻئي هفتي کان قرن جي دائيدار خوراڪ ۾ 30 سيڪڙو فارمولا فيڊ ملايو، ٽئين هفتي ۾ 60 سيڪڙو فارمولا فيڊ ملايو ۽ چوٿين هفتي کان قرن کي مڪمل 100 سيڪڙو فارمولا فيڊ ڪرائڻ شروع ڪريو. قرن کي فارمولا فيڊ 6 مهينن جي عمر تائين ڪارايو. ٽيبل نمبر 4_6 ۾ تجويز فارمولا فيڊ جو وزن وڌندڙ قرن کي ڪارايو. وڌندڙ قرن جي اوجھه جي 6 مهينن جي عمر کانپوءِ فارمولا فيڊ ۽ خشڪ چاري کي هضم ڪرڻ جي صلاحيت بهتر ٿي ويندي ۽ تهائينون بهتر نموني سان کائي پي سگهنديون ۽ انهن جي واڌ ويجهه بهتر ٿيندي. قرن جي اڳيان خشڪ چارو 24 ڪلاڪ ججهي مقدار ۾ موجود هجي ته جيئن وڌندڙ قرن وڌ ۾ وڌ چارو کائين. قرن جي اڳيان 24 ڪلاڪ صاف ۽ تازو پاڻي موجود هجي. اهو بهتر ٿيندو ته قرن کي خشڪ چارو 8 مهينن جي عمر تائين مسلسل ڪرائجي. قرن 7 مهينن جي عمر کانپوءِ سني خاصيت واري خشڪ چاري تي بهتر نموني واڌ ويجهه ٿي سگهي ٿي. کير واري مينهن جي پيٽ ۾ وڌندڙ قرن کي سني خاصيت وارو خشڪ چارو وڌيڪ ڏيڻ گهرجي ڇاڪاڻ ته انهن کي وڏين مينهن جي پيٽ ۾ ٿوري ضرورت پوي ٿي. تنهنڪري قدرتي سائو گاهه يا خشڪ چارو ڏيڻ لاءِ وڌندڙ قرن ۽ تهائين کي وڌيڪ اهميت ڏيو.



ٽيبل 3-4 ڦرن کي انهن جي عمر جي مطابق کاڌ خوراڪ ڏيڻ
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روزانه پاڻي پيارڻ	روزانه سائي چاري جي خوراڪ جو وزن	روزانه خشڪ چاري جي خوراڪ جو وزن	روزانه سراسري فارمولا فيڊ ڪارائڻ جو وزن	روزانه سراسري داڻيدار خوراڪ جو وزن	روزانه سراسري ڪير جي خوراڪ لتر روزانه	ڦر جو جسماني وزن	مهيني جا ڏينهن	فيڊ ڪارائڻ جو مهينو
24 ڪلاڪ موجود جيترو پي سگهي		ٿورڙو		0.2	3.5	45	1 _ 30	پهريون
		0.5		0.5	3.0	62	31 _ 60	ٻيو
		1	0.5	1.0		77	61 _ 90	ٽيون
		1.5	1.5			92	91 _ 120	چوٿون
		1.7	2.0			107	121 _ 150	پنجون
		2	2.0			122	151 _ 180	ڇهون
	2	2				137	181 _ 210	ستون
	9	1				152	211 _ 240	اٺون
15					167	241 _ 270	نائون	

(3) وڌندڙ تهائين کي فارمولا فيڊ ڪارائڻ

منصوبي جي ماهرن طرفان وڌندڙ تهائين کي فارمولا فيڊ ڪارائڻ جا ٻه نمونا تيار ڪيا ويا آهن. پهرين نموني ۾ اهي خوراڪي شيون شامل ڪيون ويون آهن جيڪي علائقي جي مارڪيٽ ۾ دستياب آهن ۽ جنهن سان ڦرن جون غذائي ضرورتون پوريون ٿي سگهن. تنهنڪري پهرين نموني تحت فيڊ ٺاهڻ آسان آهي. ٻئي نموني جي فيڊ ۾ لحميات جو اضافو ڪيو ويو ته جيئن اها وڌندڙ تهائين کي ڪارائتي انهن جي واڌ ويجهه ۽ روزانه وڌندڙ وزن ۾ اضافو آڻي سگهجي. ٻئي نموني ۾ سويابين جي کڙ، تورئي جي کڙ، ۽ مڪئي جو چلڪو شامل ڪيو ويو جيڪو وڏن شهرن جي مارڪيٽ ۾ دستياب آهي.

ٽيبل 4-4 وڌندڙ ٽهاڻين جي لاءِ دائيدار خوراڪ جو آميزو

مادل _ 2	مادل _ 1	
مختلف شين جو سيڪڙو	مختلف شين جو سيڪڙو	خوراڪي شين جا نالا
30	10	مڪئي جو ڌارو
15	10	ڪڻڪ جو ڌارو
0	5	ڪڪڙن جي کڙ
17	0	سويابين جي کڙ
5	0	توريئي جي کڙ
25	62	اٽي جو چاڻ
0	5	گوار جي کڙ
5	0	مڪئي جو چلڪو
2	7	سورج مڪي جي کڙ
1	1	هڏين جو چورو (DCP)
100	100	ڪل شيون
70.4	68.7	ڪل هاضميدار غذائي جزا
20.0	16.7	لحميات (CP)

(4) ڪليو وٽاڻ

ڪير کا ڇڏايل ڦرڙن کي 60 ڏينهن کانپوءِ گڏيل طور ڪليل وٽاڻ ۾ پالڻ شروع ڪرڻ جو انتظام ڪجي. گڏيل طور وٽاڻ ۾ گروپ جي صورت ۾ ڦرڙن کي پالڻ جي انتظام ڪرڻ سان اهو فاعدو ٿيندو ته ڦرڙا آزادي سان گهمي ڦري سگهندا، انهن جو جسم ۽ تنگن مضبوط ٿينديون ۽ انهن جي واڌ ويجهه بهتر ٿيندي. گروپ ۾ رهڻ سان ڦرڙا کائڻ پيئڻ ۾ ريس ڪندا ۽ ان سان انهن جي چاري کائڻ جو شوق وڌندو.



تصوير 4-21 ڪير کان ڇڏايل ڦرن جو ڪليل وٽاڻ

**وڌندڙ ڦرڙن ۽ تهائين لاءِ اضافي خوراڪ جي ضرورت**

4.7.7

وڌن جانورن جي پيٽ ۾ ننڍن ڦرڙن ۽ وڌندڙ تهائيون گهٽ ڪائين ٿيون. تنهنڪري ڦرڙن ۽ ننڍن تهائين کي جيترو ممڪن ٿي سگهي اوترو وڌيڪ قدرتي ۽ پوکيل ساوا گاهه ڪارائجن.

ڪيترن ئي قسمن جا قدرتي ساوا گاهه سنڌ جي بئراجي علائقن ۾ ملن ٿا. گرمي جي موسم جي پيٽ ۾ سياري جي موسم ۾ قدرتي گاهه جو ڦوٽهڙو ۽ واڌ گهٽ ٿئي ٿي. ننڍن ڦرڙن ۽ وڌندڙ تهائين کي جيترو ممڪن ٿي سگهي قدرتي ساوا گاهه وڌيڪ ڪارائجن ته جيئن انهن جو وزن تيزي سان وڌي سگهي. سياري جي موسم شروع ٿيڻ کان پهرين ۽ پوءِ قدرتي ساون گاهن جي گهٽ ڦوٽهڙي سبب ڦرڙن ۽ تهائين لاءِ قدرتي ساون گاهن جو انتظام ڏکيو ٿي پوي ٿو، جنهن سبب ڦرڙن ۽ تهائين جي واڌ ويجهه رڪجي سگهي ٿي ۽ انهن جو وزن به گهٽجي سگهي ٿو. ڦرڙن ۽ ننڍن تهائين جي صحتمند واڌ ويجهه کي جاري رکڻ لاءِ قدرتي گاهن جي ڪوت واري عرصي دوران علائقي جي مارڪيٽ ۾ موجود دائيدار خوراڪ جي شين جو آميزو تيار ڪري ڦرڙن ۽ تهائين کي ڪارائڻ سان انهن جي واڌ ويجهه ۾ بهتري آڻي سگهجي ٿي. ان لاءِ وڌندڙ تهائين کي 2 ڪلوگرام دائيدار خوراڪ روزانه ڏيڻ مناسب ٿيندو.

ننڍي پيماني تي ڦرن جي پالنا ڪرڻ

4.7.8

ڦرڙن کان جلدي ڪير ڇڏائڻ وارو طريقو جيڪو ڦرڙن جي پالڻ واري سينٽر تي عمل ۾ آندو ويو آهي اهڙي قسم جو طريقو ننڍي پيماني تي ڦرڙا پالڻ واري فارم تي عمل ۾ آڻڻ ڏکيو ٿيندو. ننڍي پيماني تي ڦرڙا پالڻ واري ورڪر لاءِ نين مهارتن ۽ ترڪيبين جهڙوڪ مناسب طريقي سان ڦر کي ڪير پيارڻ، ڦر جي لاءِ دائيدار خوراڪ ۽ خشڪ چاري جو انتظام ڪرڻ، ڦر جي لاءِ 24 ڪلاڪ صاف ۽ تازي پاڻي جو بندوبست ڪرڻ، ۽ ڦر کي آزاد رکڻ ته جيئن هو اهي شيون جڏهن بڪ يا اڇ لڳي ته کائي پي سگهي، کي سکڻ، سمجهڻ ۽ ان کي عمل ۾ آڻڻ لاءِ وقت گهرجي. منصوبي جي ماهرن طرفان انفرادي طور ڦر کي پالڻ لاءِ فيڊنگ يونٽ متعارف ڪرايو ويو آهي جنهن جي تحت ننڍي پيماني تي ڦر کان جلدي ڪير ڇڏائڻ وارو طريقو عمل ۾ آڻي سگهجي ٿو. هن قسم جي فيڊنگ يونٽ جي استعمال سان ڦر جي اڳيان سڀني شين جهڙوڪ دائيدار خوراڪ، خشڪ چارو ۽ صاف پاڻي جي 24 ڪلاڪ موجودگي کي عمل ۾ آڻي سگهجي ٿو.



تصوير 4-22 منصوبي طرفان ننڍي پيماني تي ڦر پالڻ وارن کي فيڊنگ يونٽ ڏنا ويا

4.7.9 ڦرن کان 4 مهينن جي عمر ۾ کير ڇڏائڻ

ڦرڙن پالڻ واري سينٽر تي ڦرن کان 60 ڏينهن جي عمر ۾ کير ڇڏايو وڃي ٿو. ليڪن ننڍي پيماني تي ڦر پالڻ واري طريقي تحت ڦر کان 60 ڏينهن جي عمر ۾ کير ڇڏائڻ ممڪن نه ٿيندو ڇو ته ڳوٺن ۾ رواجي طريقي تحت کير، خشڪ چاري، دائيدار خوراڪ ۽ 24 ڪلاڪ تازي ۽ صاف پاڻي جي موجودگي تي عمل ڪرڻ يقينن نه هوندو. تنهنڪري منصوبي جي ماهرن طرفان ننڍي پيماني تي ڦر پالڻ جي طريقي لاءِ ڦر کان کير ڇڏائڻ جي عمر 4 کان 5 مهينا تجويز ڪئي وئي آهي. ڇاڪاڻ ته ڳوٺن ۾ رواجي طور ڦرن کان کير ڇڏائڻ جي عمر 4 کان 5 مهينا آهي. ڦرڙن کان 4 مهينن جي عمر ۾ کير ڇڏائڻ جي طريقي جو تفصيل هيٺ ڏجي ٿو.

(1) کير پيئڻ واري عرصي دوران ڦر لاءِ کاڌ خوراڪ جو انتظام ڪرڻ

ڦر کي کير پيارڻ جو مقدار ساڳيو رهندو جيڪو آڳاٽي کير ڇڏائڻ واري طريقي ۾ تجويز ڪيو ويو آهي. ڄمڻ کان پوءِ ڦر کي 1 کان 5 ڏينهن تائين پس پيارجي. ڦر کي هر وييلي تي 1.5 ڪلو پس پيارجي يعني روزانه ٻه دفعا پس پيارجي مطلب روزانه ڪل 3 ڪلو پس پيارجي. 6 ۽ 7 ڏينهن ڦر کي هر وييلي تي 1.5 ڪلو کير پيارجي يعني روزانه ٻه دفعا کير پيارجي مطلب روزانه ڪل 3 ڪلو کير پيارجي. ٻئي هفتي کان وٺي 8 هفتي تائين ڦر کي هر وييلي تي 2 ڪلو کير پيارجي يعني روزانه ٻه دفعا کير پيارجي مطلب روزانه ڪل 4 ڪلو کير پيارجي. 9 هفتي کان پوءِ کير جو مقدار گهٽائجي ڦر کي هر وييلي تي 1.5 ڪلو کير پيارجي يعني روزانه ٻه دفعا کير پيارجي مطلب روزانه ڪل 3 ڪلو کير پيارجي. 13 هفتي کان پوءِ کير جو مقدار اڃان به وڌيڪ گهٽائجي هاڻ ڦر کي هر وييلي تي 1 ڪلو کير پيارجي يعني روزانه ٻه دفعا کير پيارجي مطلب روزانه ڪل 2 ڪلو کير پيارجي. 17 هفتي کان ڦر جو کير بند ڪجي.



ٽيبل 4-5 ننڍي پيماني تي ڦر پالڻ دوران ڦر کي ڪير پيارڻ جي
ترڪيب

روزانه ڪير جي خوراڪ لٽر روزانه	ڦر جو جسماني وزن	ڏينهن	هفتا	فيڊ ڪارائڻ جو مهينو
پس 3 = 1.5+1.5	34	1_5	1	پهريون
ڪير 3 = 1.5+1.5		6_7		
ڪير 3 = 1.5+1.5	37	8_14	2	
ڪير 4 = 2+2	41	15_21	3	
ڪير 4 = 2+2	45	22_28	4	
ڪير 4 = 2+2	48	29_56	5_8	ٻيو
ڪير 3 = 1.5+1.5	77	57_84	9_12	ٽيون
ڪير 2 = 1+1	92	85_91	13_16	چوٿون
ڪير 1 = 0.5+0.5		113_118	17	
ڪير بند ڪريو	107	120		

ڦرن جي اڳيان دائيدار خوراڪ ۽ خشڪ چارو 24 ڪلاڪ موجود هجي. اهو مثالي ٿيندو جيڪڏهن ڦر 3 مهينن جي عمر ۾ هڪ ڪلو دائيدار خوراڪ کائڻ لڳي. ڦر جي اڳيان 24 ڪلاڪ صاف ۽ تازو پاڻي موجود هئڻ گهرجي. چوٿين مهيني کانپوءِ وڌندڙ تهائين جي فارمولا فيڊ ڦرن جي دائيدار خوراڪ ۾ ملائي ڪارائڻ گهرجي ۽ آهستي آهستي ڦرن جي دائيدار خوراڪ جي جڳهه تي فارمولا فيڊ ڪارائڻ جي. چوٿين مهيني جي آخر ۾ وڌندڙ تهائين کي دائيدار خوراڪ جي بدران فارمولا فيڊ ڪارائڻ گهرجي ۽ ڦرن کي ڪير ڏيڻ بند ڪجي.



(2) وڌندڙ تهائين کي سندن وڌندڙ عمر مطابق دائيڊار خوراڪ ۽ خشڪ چاري ڏيڻ جي ترتيب

ٽيبل 4-6 نئين تهائين لاءِ سندن وڌندڙ عمر مطابق دائيڊار خوراڪ ۽ خشڪ چاري ڏيڻ جي ترتيب								
روزانه پاڻي پيارڻ	روزانه سائي چاري جي خوراڪ جو وزن	روزانه خشڪ چاري جي خوراڪ جو وزن	روزانه سراسري فارمولا فيڊ ڪارائڻ جو وزن	روزانه سراسري دائيڊار خوراڪ جو وزن	روزانه سراسري کير جي خوراڪ لٽر روزانه	قر جو جسماني وزن	مهيني جا ڏينهن	فيڊ ڪارائڻ جو مهينو
24 ڪلا ڪ موجود جيترو پي سگهي		ٿورڙو		0.2	3.5	45	1 _ 30	پهريون
		جيترو ڪائي سگهي		0.5	1.0	62	31 _ 60	ٻيو
			0.5	1.0	77	61 _ 90	ٽيون	
			1.5		92	91 _ 120	چوٿون	
			2.0		107	121 _ 150	پنجون	
			2.0		122	151 _ 180	ڇهون	
	2					137	181 _ 210	ستون
	9	ٿورڙو				152	211 _ 240	اٺون
	15					167	241 _ 270	نائون

4.8 چاري جو معيار ۽ قرن جي جسماني حالت کي ڏسي فيصلو ڪرڻ

اچو ته قرن جي جسماني حالت مطابق ڪاڌ خوراڪ جي چئن انتظامي معيارن بابت سکون

معيار چوٿون _ ٿلهو چرپي وارو جانور: چرپي واري جانور جو سڄو جسم ٿلهو چرپي سان ڀريل هوندو آهي. جانور جي ڍاڪ واريون هڏيون ۽ پاسرائين واريون هڏيون گوشت ۽ چرپي سان ڍڪيل هونديون ۽ اهو حصو گولائتو نظر ايندو. ٿلهن قرن کي جسماني طبعي حالت جي صحت جا مسئلا درپيش اچي سگهن ٿا. تنهنڪري انهي ڳالهه جي ضرورت آهي ته اهڙن قرن جي ڪاڌ خوراڪ ۾ دائيڊار خوراڪ جي ڪمي ڪئي وڃي.

معيار ٽيون _ سپرو قرن: هي معيار ظاهر ڪري ٿو ته قرن کي مناسب ڪاڌ خوراڪ ملي رهي آهي. قرن جي ڍاڪ وارين هڏين ۽ پاسرائين تي ٿورڙي چرپي ۽ گوشت چڙهيل هوندو. پري کان ڏسبو ته اهڙن قرن جون پاسرائيون ۽ ڍاڪ واريون هڏيون ڍڪيل نظر اينديون.

معيار ٻيو _ اڀرو قرن: هي معيار ظاهر ڪري ٿو ته قرن کي مناسب ڪاڌ خوراڪ نه ملي رهي آهي. قرن جي ڍاڪ وارين هڏين ۽ پاسرائين تي تمام ٿورڙي چرپي ۽ گوشت چڙهيل هوندو. پري کان ڏسبو ته اهڙن قرن جون پاسرائيون ۽ ڍاڪ واريون هڏيون ڍڪيل نظر نه اينديون.

اهڙن ڦرن جي کاڌ خوراڪ ۾ داڻيدار خوراڪ جو اضافو ڪرڻ گهرجي ۽ انهن کي پيٽ جي ڪيڙن جون دوائون، چمڙي جي بيماري جون سيون ۽ وچڙندڙ بيمارين کان بچاءَ جا ٽڪا پابندي سان وقت تي لڳائڻ گهرجن.

معياري پهريون - ڏهرو ڦر: هي معيار ظاهر ڪري ٿو ته ڦرن کي مناسب کاڌ خوراڪ نه ملي رهي آهي يا هي ڦر ڪنهن بيماري جو شڪار آهن جهڙوڪ پيٽ جي ڪيڙن جون بيماريون يا پراڻو بخار وغيره. جانور جي ڍاڪ وارين هڏين ۽ پاسرائين تي چرپي ۽ گوشت چڙهيل نظر نه ايندو. پري کان ڏسبو ته اهڙن جانورن جون پاسرائيون ۽ ڍاڪ واريون هڏيون صاف ظاهر نظر اينديون ۽ اهڙن جانورن جو پيٽ وڌيل هيٺ لٿل نظر ايندو. اهڙن ڦرن جو سڀ کان پهرين ڪنهن ماهر جانورن جي ڍاڪڙن کان طبعي معائنو ڪرايو ۽ ان جي تجويز ڪيل مشوري تي عمل ڪريو. جيڪڏهن ڪنهن علاج جي ضرورت هجي ته اهو ترت ڪرايو. اهڙن ڦرن جي کاڌ خوراڪ تي خاص توجهه ڏيو انهن کي سٺي خاصيت واري سائي چاري کانسواءِ فارمولا فيڊ ڏيو ۽ انهن کي پيٽ جي ڪيڙن جون دوائون، چمڙي جي بيماري جون سيون ۽ وچڙندڙ بيمارين کان بچاءَ جا ٽڪا پابندي سان وقت تي لڳائڻ گهرجن.



4.9 ڦرن کي گرمي کان بچائڻ لاءِ احتياطي اپاءَ وٺڻ

ڦرن کي گرمي جي اثرن کان بچائڻ لاءِ حفاظتي اپاءَ وٺڻ جي اهميت

ڦرن کي 6 مهينن جي عمر کان وهنجارڻ شروع ڪجي. گرمي جي موسم ۾ ڦرن کي گرمي کان بچائڻ لاءِ اپاءَ وٺڻ تمام ضروري آهي. ڦرن کي هوادار ۽ چانو واري جڳهه تي رکڻ جتي ڦر کي رکيو ويو آهي گرمي جي شدت کي گهٽائڻ لاءِ ان جڳهه جي چوڌاري چٽڪار ڪريو. گهڻي گرمي جي حالت ۾ هر اڌ ڪلاڪ کانپوءِ ڦر جي جسم تي پاڻي جو ڦوهارو ڪريو ته جيئن ڦر جي جسم تان گرمي جا اثرات گهٽائي سگهجن.



تصوير 4-27 ڦرن تي پاڻي جو ڦوهارو ڪرڻ

4.10 ڦرن کي جلابن کان بچائڻ لاءِ احتياطي اپاءَ وٺڻ

ڦرن ۾ جلاب ٿيڻ جا ٻه وڏا سبب آهن

- (1) غير مناسب کاڌو ۽ خوراڪ جو صحيح انتظام نه هجڻ
 - (2) جراثيمن ۽ پيٽ جي اندرين ڪيڙن سبب
- ڦرن کي جلابن کان بچائڻ لاءِ ڦرن جلابن کان بچاءَ جي طريقن جهڙوڪ وقت تي بيماري جي تشخيص ۽ ان جو ترت علاج ڪرڻ ۽ بچاءَ بابت تفصيل هيٺ ڏجي ٿو.



جسماني جلاب ۽ عارضي جلاب

اهڙي قسمن جي جلابن جي حالتن ۾ ڪنهن به قسم جي علاج جي ضرورت نه پوندي آهي. انهي قسمن جي جلابن جون ڪجهه نشانيون هيٺ ڏجن ٿيون.

- ڏينهن ۾ هڪ دفعو جلاب اچڻ
- جلابن جو رنگ اڇو يا پيلو هئڻ
- ڦر جو پيچ هلڻ دوران مٿي رهندو
- (1) جڏهن ڦر سست نظر اچي

هن صورت ۾ هيٺين ڳالهين کي ضرور جانچڻ گهرجي

- جسم ۾ پاڻي جي حالت کي جانچڻ گهرجي
- ڦر جي ڪنڌ جي ڪل کي ٿورو مٿي چڪي چڪاس ڪريو. جيڪڏهن چمڙي سخت ۽ ان ۾ ڪا لچڪ نه هجي، اڪيون اندر طرف ويڃڻ لڳن ته اهي جسم ۾ پاڻي جي ڪمي جون نشانيون آهن.

- جسم جي درجه حرارت جي چڪاس ڪرڻ

ڦرن جي جسم جو درجه حرارت وڌڻ جانورن جي پيٽ ۾ وڌيڪ ٿئي ٿو. ڦرن ۾ جسماني درجه حرارت جي عام حد 101.5 _ 102 فارن هائيٽ (38.1 _ 39.2) جيڪڏهن تپاسن سان درجه حرارت عام حد کان وڌيڪ هجي ته سمجهبو ڦر کي بخار آهي.

- (2) جسم ۾ پاڻي جي ڪمي جو علاج

اهو تمام ضروري آهي ته ڦر جي جسم کي آلو رکجي. جيڪڏهن ڦر پوءِ به سختي ظاهر ڪري ته ڦر جي جسم جو پاڻي وڌائڻ لاءِ ان کي اليڪٽرولائيٽ محلول (ORS) پيارجي. پوءِ به ڦر سست لڳي ته جانورن جي ماهر ڊاڪٽر کي گهرائي نبض ذريعي رنگس محلول يا نارمل سيلائين (NaCl) جي ڊرپ لڳائجي.

1. جسماني پاڻياٺ جي ڪمي ۽ ان جو علاج

اهو تمام ضروري آهي ته ڦرن ۾ جسماني پاڻياٺ جو تناسب صحيح هجڻ گهرجي. دستن هجڻ جي باوجود جيڪڏهن ڦر ڏسڻ ۾ سگهو متارو هجي ته انکي صرف جسماني نمڪيات پوري ڪرڻ لاءِ او آر ايس (ORS) پاڻي ۾ ملائي جيترو جلد ٿي سگهي پيارجي، جيڪڏهن جانور بلڪل سست هجي ته انکي (رنگر ساليوشن يا نارمل سيلائن) جي ٿيلهي ڊاڪٽر جي هدايت مطابق لڳرائجي.

2. جراثيمن وسيلي ٿيندڙ دستن ۽ بخار جو علاج

جراثيمن وسيلي ٿيندڙ دستن ۽ بخار جو علاج جراثيم ڪش دوائن سان ڪرڻ گهرجي.



3. قرن جي مناسب نرسنگ ۽ سارسنپال جو طريقو
- (1) بيمار ڦر کي صحتمند قرن کان الڳ رکيو وڃي.
- (2) قرن جي ويهڻ ۽ سمهڻ واري جڳهه صاف ۽ خشڪ هجي.
- (3) وٽاڻ جو فرش، استعمال ٿيندڙ ٿانوءَ، رسا ۽ حفاظتي جاري جراثيم کش دوا سان چڱي طرح صاف ڪرڻ گهرجن.

ان صورت ۾ جڏهن ڦر جلابن جي ڪري بيمار ٿي پوي ته ان جي شدت جي تشخيص هيٺين ٽيبل ۾ ڏنل حوالن کي ڏسي فيصلو ڪريو

جلابن جي شدت جون ٽي ڪيفيتون آهن.

جلابن جي پهرين ڪيفيت _ رتن وارا جلاب: جلابن جي هن ڪيفيت ۾ ڇيٽي جو رنگ ڪارو هوندو آهي جنهن ۾ رت شامل هوندو آهي. ان قسم جي جلابن مان انديشو ڪري سگهجي ٿو ته شايد هن ڦر کي ڪاڪسيڊيوسس جراثيمي بيماري آهي.

جلابن جي ٻي ڪيفيت _ پٽڙا ۽ سوپ وانگر: هن قسم جا جلاب پڪي پٽ تي ڪرڻ سان نه ڦهلندا آهن.

جلابن جي ٽين ڪيفيت _ پاڻي جهڙا جلاب: هن قسم جا جلاب تمام گهڻا پٽڙا ٿين ٿا جيڪي پڪي پٽ تي ڪرڻ سان ڦهلجي ويندا آهن

هر هڪ قسم جي جلابن کي وري ٻن ڪيفيتن ۾ ورهايو ويو آهي. هر وقت ڦر جي حالت جاچڻ گهرجي جيڪڏهن ڪنهن ڦر کي جلاب ٿين ته انهن جو علاج مناسب طريقي سان ڪرڻ گهرجي جيڪڏهن قرن جي صحت وڌيڪ خراب ٿئي ته انهن جو ترت علاج ڪرڻ تمام ضروري آهي. ڪجهه ضروري دوائون جيڪي آبدن ۽ معدني جي خرابي لاءِ استعمال ٿين ٿيون جلابن کي بند ڪرڻ لاءِ استعمال ٿين ٿيون جهڙوڪ او آر ايس (ORS)، اينٽي بائيوٽڪ، اينٽي ڪاڪسيڊيوسس هر وقت پاڻ وٽ موجود هجڻ گهرجن. جڏهن هڪ دفعو بيماري جي خبر پئجي وڃي ته ان جو علاج گهٽ ۾ گهٽ 3 کان 5 ڏينهن تائين جاري رکڻ گهرجي.

ٽيبل نمبر 4-7 ڦرڙن ۾ جلابن جون ڪيفيتون

جانورن جي ڊاڪٽر طرفان علاج	پاڳڻي طرفان علاج			
<p>اهو بهتر ٿيندو ته اهڙن ڦرن کي 2 لٽر نارمل سيلائن جي ڊرپ نبض ۾ لڳائڻ گهرجي. ان سان گڏ سلفاڊيماڊين انجڪشن يا انٽي ڪاڪسيڊيم دوا جانورن جي ڊاڪٽر جي مشوري سان ڏيڻ گهرجن</p>	<p>او آر ايس سلفاڊيماڊين انجڪشن</p>	<p>ڦر بينل هوندو ڦر آهستي بي دلو ڪير پئندو يا ڪير نه پئندو</p>	<p>رت وارا جلاب ڪڏهن ڪڏهن هن قسم جي جلابن ۾ رت گڏيل هوندو آهي.</p>	<p>جلابن جي پهرين ڪيفيت</p> 
		<p>ڦر بيهي نه سگهندو ۽ ڦر ڪير به نه پئندو</p>		
<p>اهو بهتر ٿيندو ته اهڙن ڦرن کي 2 لٽر نارمل سيلائن جي ڊرپ نبض ۾ لڳائڻ گهرجي. ان سان گڏ سلفاڊيماڊين انجڪشن يا انٽي ڪاڪسيڊيم دوا جانورن جي ڊاڪٽر جي مشوري سان ڏيڻ گهرجن</p>	<p>او آر ايس اسڪوريڪس سيرپ ڏينهن ۾ 2 دفعا</p>	<p>ڦر بينل هوندو ڦر آهستي بي دلو ڪير پئندو يا ڪير نه پئندو</p>	<p>خوفائتا جلاب تمام گهڻا پٽڙا جلاب، ڦرن جو چيٽو سوپ جهڙو</p>	<p>جلابن جي ٻي ڪيفيت</p> 
		<p>ڦر بيهي نه سگهندو ۽ ڦر ڪير به نه پئندو</p>		
	<p>او آر ايس اسڪوريڪس سيرپ ڏينهن ۾ 2 دفعا</p>	<p>ڦر بينل هوندو ڦر آهستي بي دلو ڪير پئندو يا ڪير نه پئندو</p>	<p>هلڪا جلاب چيٽو تمام گهڻو نرم هوندو، جڏهن جانور چيٽو لاهيندو اهو پت تي ڪرندي ئي پڪڙجي ويندو.</p>	<p>جلابن جي ٽئين ڪيفيت</p> 
		<p>ڦر بيهي نه سگهندو ۽ ڦر ڪير به نه پئندو</p>		



4.11 ڦڙن ۾ ڦڙڙن (نمونيا) جي بيماري

ڦڙن ۾ ڦڙڙن (نمونيا) جي بيماري ڦڙن جي صحت کي متاثر ڪندڙ هڪ اهم مسئلو آهي. جيڪا مختلف جراثيمن جهڙوڪ بيڪٽيريا يا وري وائرس جي ڪري ٿيندي آهي.

نشانيون

- جانور موڳو ۽ سست هوندو آهي.
- جسماني بخار 105 فارنهائيٽ تائين هوندو آهي.
- ڦڙڙن جي متاثر هجڻ ڪري جانور تڪڙا تڪڙا ساھ ڪڍندو.
- نڪ منجهان پاڻياٺ وهندي رهندي.
- ڦڙن جا چپ خشڪ هوندا.
- ڦڙن جا ڦڙن ڪنگهندو رهندو.
- ڦڙن جا ڦڙن ڪنگهندو رهندو.

علاج

جراثيم ڪش ڊيريپا اثر واريون دوائون ۽ سوزش کي گهٽائڻ واريون دوائون ۽ ان سان گڏ پيٽ جي اندرين ڪيڙن جون دوائون تجويز ڪري سگهجن ٿيون.



5. باب پنجون توليدي عمل

5.1 توليدي کارکردگي ۾ بهتري آڻڻ

توليدي کارکردگي ۾ ٻن طريقن سان بهتري آڻي سگهجي ٿي:

1. آڳاٽي عمر ۾ پهريون ڦر ڏيڻ (تهائين ۾): فارم تي تهائين جي لاءِ کاڌ خوراڪ جو بهتر انتظام ۽ مناسب سار سنڀال سان تهائين جي واڌ ويجهه ۾ تيزي ايندي، جنهن سان انهن جو قد ۽ وزن وڌندو، ان جي نتيجي ۾ تيزي سان وڌندڙ تهائيون جلد بلوغت ۾ اچي وينديون. اهڙين تهائين کي جلد ڦرائي ڍڪڻ ۾ آڻي سگهجي ٿو. جڏهن تهائين جو جسماني وزن 300 ڪلو گرام ٿي وڃي (يا انهن جي چاتي جي ماپ 161 سينٽي ميٽر ٿي وڃي) ته اهو تهائين کي ڦرائڻ جو مناسب وقت هوندو.
2. ٻن ڦرن جي وچ ۾ وقفو گهٽائڻ: وڃڻ جي 40 ڏينهن کان پوءِ جيترو جلد ممڪن ٿي سگهي مينهن کي ڦرائي ڍڪڻ ۾ آڻجي.

5.1.1 آڳاٽي عمر ۾ پهريون ڦر ڏيڻ (تهائين ۾):

مينهن ۽ ڍڳين مان کير تڏهن حاصل ڪري سگهجي ٿو جڏهن اهي ڦرجن ۽ ويامن. سنڌ جي بهراڙين ۾ تهائيون 2.5 کان 3.0 سالن جي عمر ۾ ڦرجن ٿيون، جنهن جي نتيجي ۾ پهريون ڦر ڏيڻ وقت انهن جي عمر 3.5 کان 4.0 سال هوندي آهي. تهائين جو آڳاٽي عمر ۾ جلد وهرجڻ ۽ ڳڳڻ لاءِ ضروري آهي ته فارم تي تهائين جي لاءِ کاڌ خوراڪ جو بهتر انتظام ۽ انهن جي مناسب سار سنڀال ڪجي جنهن سان تهائين جي واڌ ويجهه ۾ تيزي ايندي، ۽ انهن جو قد ۽ وزن وڌندو. تيزي سان وڌندڙ اهڙيون تهائيون جلد بالغ (بلوغت واري عمر) ۾ اچي وينديون. وهر ۾ ايندڙ اهڙين تهائين کي جلد ڦرائي ڍڪو ڪرائي سگهجي ٿو. تحقيق مان اهو معلوم ٿيو آهي ته سنڌ جي بهراڙين ۾ ڦرن ۽ تهائين جو جسماني وزن روزانه 250 گرام سراسري وڌي ٿو. جيڪو تمام گهٽ آهي، جنهن سبب بلوغت جي عمر وڌي وڃي ٿي ۽ تهائيون دير سان ڦرجن ٿيون. تنهنڪري اهو ضروري آهي ته انهن جو جسماني وزن وڌائڻ لاءِ ڪوشش ڪجي. ڦرن ۽ تهائين ۾ روزانه سراسري جسماني وزن 500 گرام حاصل ڪرڻ لاءِ ضروري آهي ته انهن کي شروعاتي کير پيڻ واري عرصي دوران گهربل کير پيارجي ۽ کير پيارڻ واري عرصي دوران ۽ کير ڇڏائڻ کان پوءِ 8 مهينن تائين گهربل ڊائيدار خوراڪ، سٺو خشڪ چارو ۽ 24 ڪلاڪ صاف تازو پاڻي مهيا ڪجي. 8 مهينن کان وٺي بلوغت جي عمر تائين مناسب کاڌ خوراڪ جي انتظام ۽ بهتر سار سنڀال ذريعي وڌندڙ تهائين جو وزن روزانه 500 گرامن تائين حاصل ڪرڻ ممڪن ٿي سگهجي ٿو. جنهن جي نتيجي ۾ تهائيون 18 مهينن جي عمر ۾ 300 ڪلوگرام جسماني وزن تائين پهچي سگهن ٿيون، جيڪو تهائين



جي بلوغت واري وقت جو مناسب وزن آهي. انهي عمر ۽ وزن واريون تهائون اڳاڻي عمر ۾ وهرجڻ شروع ٿينديون جن کي ڦرائي ڍڪڻ ۾ آڻي بهتر نتيجا حاصل ڪري سگهن ٿا.

مينهن جو مثال

سند جي بهراڙين ۾ مينهن جي واڌ ويجهه:

- سند جي بهراڙين ۾ موجوده جانورن جي کاڌ خوراڪ جي انتظام ۽ انهن جي روايتي سار سنڀال جي طريقن موجب تهائون روزانا 0.25 ڪلوگرام وڌن ٿيون جنهن جي نتيجي ۾ اهي تن سالن جي عمر (يعني 1064 ڏينهن) ۾ گهربل جسماني وزن 300 ڪلوگرام حاصل ڪن ٿيون جيڪو انهن کي ڦرائڻ لاءِ مناسب جسماني وزن آهي. هيٺ ڏنل فارمولا تحت تهائين جو روزانه وڌندڙ وزن ۽ بلوغت وقت گهربل جسماني وزن 300 ڪلوگرام معلوم ڪري سگهجي ٿو.

پيدائشي وزن 34 ڪلوگرام + (1064 ڏينهن X 0.25 ڪلوگرام) = 300 ڪلوگرام

- مناسب کاڌ خوراڪ جي انتظام ۽ بهتر سار سنڀال جي طريقن مطابق روزانه وڌندڙ جسماني وزن 0.5 ڪلوگرام تائين حاصل ڪري سگهجي ٿو :

هن طريقي مطابق تهائون 1.5 سال جي عمر (تقريباً 532 ڏينهن) ۾ گهربل جسماني وزن 300 ڪلوگرام حاصل ڪن ٿيون جيڪو انهن کي پهريون دفعو ڦرائڻ لاءِ مناسب آهي. هيٺ ڏنل فارمولا تحت تهائين جو روزانه وڌندڙ وزن ۽ بلوغت وقت گهربل جسماني وزن 300 ڪلوگرام معلوم ڪري سگهجي ٿو.

پيدائشي وزن 34 ڪلوگرام + (532 ڏينهن X 0.5 ڪلوگرام) = 300 ڪلوگرام

(1) جسماني وزن معلوم ڪرڻ:

ڪنڊي نسل ۽ ڪنڊي جي گاڏڙ نسل جون مينهن جيڪي سنڌ ۾ عام طور تي پاليون وڃن ٿيون هر فارم تي انهن جو جسماني وزن معلوم ڪرڻ آسان ناهي. ڇاڪاڻ ته ان لاءِ جهنگلي ۽ لوڊ بار جي ضرورت پوي ٿي. ان مسئلي کي حل ڪرڻ لاءِ منصوبي طرفان مينهن جو وزن معلوم ڪرڻ لاءِ انهن جي چاتي جي چوڌاري (Heart Girth) انچ ٽيپ سان ماپ ڪري منصوبي طرفان تيار ڪيل چارٽ ۾ ماپ ڪيل انگن جي پيٽ سامهون ڏنل وزن سان ڪري معلوم ڪري سگهجي ٿو. وزن معلوم ڪرڻ جو هي طريقو نهايت آسان ۽ سولو آهي. هن طريقي موجب معلوم ڪيل وزن ۽ اصل وزن ۾ ٿورڙو فرق رهي ٿو. جسماني وزن معلوم ڪرڻ واري چارٽ ۾ چاتي جي ماپ 65 کان 255 سينٽي ميٽر تائين ۽ 40 کان 1030 ڪلوگرام جسماني وزن جي پيٽ ڪري سگهجي ٿي.

(2) چاتي ۽ پني جي چوڌاري (Heart Girth) جي انچ ٽيپ سان صحيح ماپ ڪيئن ڪجي:

- (1) جانور کي سڌي زمين تي بيهاريو ۽ ان جي ڪنڌ کي سڌو ۽ مٿي ڪريو
- (2) ٽيپ ذريعي ماپ وٺڻ لاءِ جانور جي صحيح بيهڪ هيٺ ڏنل تصوير ۾ ڏيکاريل آهي
- (3) ٽيپ کي صحيح هنڌ تان ڦيرائي ايترو سوڙهو ڪريو جو ٻن آڱرين جيترو فاصلو رهجي وڃي. اهو ئي معياري طريقو آهي.
- (4) جيڪڏهن مينهن ڪمزور هجي ته ان صورت ۾ ٽيپ کي صحيح هنڌ تان ڦيرائي ٿورو وڌيڪ سوڙهو ڪريو ۽ جيڪڏهن مينهن متاري هجي ته ٽيپ کي هلڪو سوڙهو رکيو.





ٽيبل 5-1 ترت جسماني وزن معلوم ڪرڻ ڇاتي جي ماپ ۽ وزن جي پيٽ جو چارٽ

Heart Girth	Estimated weight	Heart Girth	Estimated weight	Heart Girth	Estimated weight	Heart Girth	Estimated weight	Heart Girth	Estimated weight	Heart Girth	Estimated weight	Heart Girth	Estimated weight	Heart Girth	Estimated weight
65	40	91	62	117	120	143	214	169	344	195	510	221	712	247	950
66	40	92	63	118	123	144	218	170	350	196	517	222	720	248	960
67	40	93	65	119	126	145	223	171	355	197	524	223	729	249	969
68	40	94	67	120	129	146	227	172	361	198	531	224	737	250	979
69	41	95	68	121	132	147	232	173	367	199	539	225	746	251	989
70	41	96	70	122	135	148	236	174	373	200	546	226	755	252	1000
71	42	97	72	123	138	149	241	175	379	201	553	227	763	253	1010
72	42	98	74	124	142	150	245	176	385	202	561	228	772	254	1020
73	43	99	76	125	145	151	250	177	391	203	568	229	781	255	1030
74	43	100	78	126	148	152	255	178	397	204	576	230	790		
75	44	101	80	127	152	153	260	179	403	205	583	231	799		
76	45	102	82	128	155	154	264	180	410	206	591	232	808		
77	45	103	84	129	159	155	269	181	416	207	599	233	817		
78	46	104	86	130	162	156	274	182	422	208	606	234	826		
79	47	105	89	131	166	157	279	183	429	209	614	235	835		
80	48	106	91	132	170	158	284	184	435	210	622	236	845		
81	49	107	93	133	173	159	290	185	442	211	630	237	854		
82	50	108	96	134	177	160	295	186	448	212	638	238	863		
83	51	109	98	135	181	161	300	187	455	213	646	239	873		
84	52	110	101	136	185	162	305	188	462	214	654	240	882		
85	53	111	103	137	189	163	311	189	468	215	662	241	892		
86	55	112	106	138	193	164	316	190	475	216	670	242	901		
87	56	113	109	139	197	165	322	191	482	217	678	243	911		
88	57	114	111	140	201	166	327	192	489	218	687	244	920		
89	59	115	114	141	205	167	333	193	496	219	695	245	930		
90	60	116	117	142	210	168	338	194	503	220	703	246	940		

5.1.2 ويامڻ کانپوءِ مينهن کي جلد ڳيرائڻ

(1) ويامڻ کانپوءِ آڳاٽي توليدي عضون جي چڪاس

ويامڻ کانپوءِ مينهن جي توليدي عضون کي واپس پنهنجي اصلي حالت ۾ اچڻ لاءِ 30 کان 45 ڏينهن گهربل هوندا آهن. اهڙين مينهن کي جلد ڳيرائڻ لاءِ پاڳڻي کي ترت صحيح قدم کڻڻ گهرجي. پاڳڻي کي جانورن جي ماهر ڊاڪٽر جون خدمتون حاصل ڪرڻيون پونديون جيڪو جانور جي ويامڻ کان 30 ڏينهن پوءِ ان جي توليدي عضون جي صحيح چڪاس ڪري سگهي. جانور جي توليدي عضون ۾ ڪنهن به قسم جي مسئلي جي تشخيص ۽ ترت علاج ڪرڻ سان ان کي وري هر ۾ آڻي جلد ڳيرائي سگهجي ٿو. ٻن قرن جي وچ وارو وقفو جيترو گهٽ هوندو ان جانور مان اوترا گهڻا ڦر حاصل ڪري سگهجن ٿا ۽ ان جانور مان گهڻي ۾ گهڻو ڪير حاصل ڪري مالوند پنهنجي آمدني ۾ واڌارو آڻي سگهي ٿو.



(2) ٻن قرن جي وچ وارو وقفو گهٽائڻ:

(1) ڊگين ۾

هر سال ڊگين مان ڦر حاصل ڪرڻ ايترو سولو ناهي. ويامن کانپوءِ جلدي ڦرجي وڃڻ سان ئي ٻن قرن جي وچ وارو وقفو گهٽائي سگهجي ٿو. ان جي نتيجي ۾ هڪ ڊگي مان ان جي زندگي ۾ وڌ کان وڌ ڦرڙا ۽ ڪير حاصل ڪري سگهجن ٿا.

هڪ سال 365 ڏينهن جو ٿئي ٿو. ڊگين ۾ ڊڪيٽ جو عرصو سراسري 285 ڏينهن جو هوندو آهي. سال مان 285 ڏينهن ڪڍجن ته باقي 80 ڏينهن بچندا. ڊگي جي ويامن کانپوءِ بچيداني کي اصل حالت ۾ اچڻ لاءِ گهٽ ۾ گهٽ 30 ڏينهن گهربل هوندا آهن. 80 ڏينهن مان اهي 30 ڏينهن گهٽ ڪبا ته باقي 50 ڏينهن بچندا. جيڪڏهن ڊگي ويامن کانپوءِ انهن 50 ڏينهن ۾ ڦرجي وڃي ۽ ڊڪي ٿي وڃي ته پوءِ انهي ڊگي مان هر سال هڪ ڦر حاصل ڪري سگهجي ٿو. ڊگين ۾ وهر هر 21 ڏينهن کانپوءِ ايندو آهي. ان جو مطلب پاڳئي وٽ ڊگي کي سانھ مان ڦرائڻ يا هٿرادو نسل ڪشي ڪرائي ان کي ڊڪيٽ ۾ آڻڻ جا به موقعا هوندا.

مثال: گئون ۾ ويبر جو وقفو	
1 سال (365) ڏينهن	
80 ڏينهن	ڊڪيٽ جو عرصو 285 ڏينهن + 10 ڏينهن

شڪل 5-1 ڊگين جي ڊڪيٽ جو عرصو

(2) مينهن ۾

مينهن ۾ ڊڪيٽ جو عرصو ڊگين کان وڌيڪ هوندو آهي جنهن جي ڪري ڊگين جي پيٽ ۾ مينهن مان هر سال ڦر حاصل ڪرڻ اڃان به وڌيڪ ڏکيو آهي. ويامن کانپوءِ جلدي ڦرجي وڃڻ سان ئي ٻن قرن جي وچ وارو وقفو گهٽائي سگهجي ٿو. ان جي نتيجي ۾ هڪ مينهن مان ان جي زندگي ۾ وڌ کان وڌ ڦرڙا ۽ ڪير حاصل ڪري سگهجن ٿا.

هڪ سال 365 ڏينهن جو ٿئي ٿو. مينهن ۾ ڊڪيٽ جو عرصو سراسري 310 ڏينهن جو هوندو آهي. سال مان 310 ڏينهن ڪڍجن ته باقي 55 ڏينهن بچندا. مينهن جي ويامن کانپوءِ بچيداني کي اصل حالت ۾ اچڻ لاءِ گهٽ ۾ گهٽ 30 ڏينهن گهربل هوندا آهن. 55 ڏينهن مان اهي 30 ڏينهن گهٽ ڪبا ته باقي 25 ڏينهن بچندا. جيڪڏهن مينهن ويامن کانپوءِ انهن 25 ڏينهن ۾ ڦرجي وڃي ۽ ڊڪي ٿي وڃي جيڪو ڏکيو آهي ته پوءِ انهي مينهن مان هر سال هڪ ڦر حاصل ڪري سگهجي ٿو. مينهن ۾ وهر هر 21 ڏينهن کانپوءِ ايندو آهي. ان جو مطلب پاڳئي وٽ مينهن کي سانھ مان ڦرائڻ يا هٿرادو نسل ڪشي ڪرائي ان کي ڊڪيٽ ۾ آڻڻ جو صرف



هڪ موقعو هوندو. انهي ڪري ڊگين جي پيٽ ۾ مينهن ۾ ٻن ڏينهن جي وچ وارو عرصو وڌيڪ ٿيندو.

مثال: مينهن ۾ ويرا جو وقفو	
1 سال (365) ڏينهن	
55 ڏينهن	ڊڪيٽ جو عرصو 310 ڏينهن + 10 ڏينهن

شڪل 5-2 مينهن ۾ ڊڪيٽ جو عرصو

5.2 ڪنڊي مينهن جو وهر معلوم ڪرڻ:

هن وقت ڪنڊي مينهن ۾ وهر اچڻ جو وقت ۽ حالتن جي باري ۾ تفصيلي رڪارڊ موجود ناهي. تنهنڪري نيٺي راوي نسل جي مينهن جنهن جو اباڻو وطن پنجاب صوبو آهي ان جو رڪارڊ هيٺ ڏجي ٿو. ڊگين جي پيٽ ۾ مينهن ۾ وهر جون نشانينون ۽ ڦرائڻ جي صحيح وقت جو تعين ڪرڻ ڏکيو آهي.

5.2.1 وهر

مينهنون گهڻو ڪري (85 سيڪڙو) رات جي وقت وهر ۾ اچن ٿيون، تنهنڪري پاڳين لاءِ مينهن جي وهر جي خبر ۽ انهن کي ڦرائڻ جي صحيح وقت جو تعين ڪرڻ مشڪل ٿي پوندو آهي.

	Time	%	
The night	18:00 - 22:00	19	85
	22:00 - 02:00	40	
	02:00 - 06:00	26	
The day	06:00 - 12:00	4	15
	12:00 - 18:00	11	

% of Heat in different time

- 18:00 - 22:00: 19%
- 22:00 - 02:00: 40%
- 02:00 - 06:00: 26%
- 06:00 - 12:00: 4%
- 12:00 - 18:00: 11%

ٽيبل 5-2 نيٺي راوي مينهن ۾ وهر اچڻ جا مختلف وقت

شڪل 5-3 مختلف وقتن ۾ نيٺي راوي مينهن جي وهر ۾ اچڻ جي شرح

مينهنون پنهنجي طبيعت مطابق وهر جون نشانيون ڊگين کان ڪجهه مختلف ظاهر ڪن ٿيون جن جو تفصيل هيٺ ڏجي ٿو:

- مينهن ۾ وهر دوران ٻئي مادي جانور تي ٽپڻ گهٽ نظر ايندو آهي. وهر ۾ آيل مادي جانور تي ٻيو جانور ٽپندو آهي.
- سار مان شفاف پاڻياٺ جو وهڻ جو مطلب جانور پڪي وهر ۾ ناهي
- صرف 30 سيڪڙو مينهنون وهر دوران رنڊيون آهن
- مينهن ۾ وهر جو عرصو گهٽ هوندو آهي
- مينهنون وهر دوران گهڻو ڪري ماٺ رهنديون آهن (خاموش وهر)
- مينهن ۾ ٻين نشانين کي به وهر سان تعلق سمجهيو ويندو آهي جهڙوڪ ڪير جي پيداوار جو گهٽجڻ، چيلو کي نمائڻ، پوئين سترن تي هٿ لائڻ تي بيهي رهڻ وغيره.

<p>تصوير 5-2 سار جي ٻاهرين حصي جي سوچ</p>	<p>تصوير 5-3 سار مان پاڻياٺ جو وهڪرو اچڻ</p>	<p>تصوير 5-4 قدرتي ميلاپ</p>

5.2.2 مينهن ۾ وهر معلوم ڪرڻ جا وقت

عام طرح مينهن ۾ وهر معلوم ڪرڻ لاءِ ڏينهن ۾ ٽي دفعا جاچ ڪرڻ گهرجي جهڙوڪ صبح، منجهند ۽ شام. هر دفعي گهٽ ۾ گهٽ 10 منٽن تائين جاچ ڪرڻ گهرجي. پنهنجي ڏٺ ۾ وهر جي جاچ واڙي ۾ ۽ ٻاهر ٻني ۾ چرڻ دوران ڪرڻ گهرجي. ٻاهر چرڻ دوران جانور وهر جون نشانيون واضح ظاهر ڪندو آهي. مٿي بيان ڪيو ويو آهي ته مينهنون وهر جون نشانيون رات جي وقت وڌيڪ ظاهر ڪن ٿيون ٻين وقتن جهڙوڪ 19 سيڪڙو شام 6 بجي کان رات 10 بجي تائين ۽ 40 سيڪڙو رات 10 بجي کان صبح 2 بجي تائين. تنهنڪري هڪ دفعو وڌيڪ رات جو سمهڻ کان پهرين واڙي ۾ وڃي پنهنجن جانورن کي ڏسي وهر جي جاچ لهجي.



5.3 توليدي رڪارڊ

اچو ته پنهنجي جانورن جي توليدي ڪارڪردگي جانورن جي ماهر ڊاڪٽر جي مشوري سان بهتر ڪريون. پنهنجي جانورن جي توليدي ڪارڪردگي بهتر ڪرڻ لاءِ انهن جي توليدي حالتن کي رڪارڊ ڪرڻ هڪ اهم ۽ ضروري قدم هوندو. اچو ته هيٺ ڏنل ڪيلينڊر تي نظر ڦيريون ۽ جانور جي باري ۾ هر خبر کي ڪيلينڊر ۾ تاريخ مطابق داخل ڪرڻ سکون.

موجوده روايتي سار سنڀال جي طريقي موجب سنڌ ۾ مالوند پنهنجن انهن جانورن جيڪي گهڻي عرصي کان ڍڪا نه ٿي سگهيا انهن لاءِ خاص اپاءُ ناهن وٺندا. ڳوٺن ۾ جانورن جي توليدي بيمارين جي تشخيص ۽ انهن جي علاج لاءِ مالونڊن طرفان ڪوشش ۽ جانورن جي ڊاڪٽرن طرفان ڪو خاص انتظام يا بندوبست موجود ناهي. توليدي بيمارين جو علاج ڪندڙ ماهر ڊاڪٽرن جو تعداد نه هئڻ برابر آهي. جانورن جي توليدي ڪارڪردگي کي بهتر ڪرڻ لاءِ انهن جو هر رڪارڊ رکڻ تمام ضروري آهي. انهي رڪارڊ مان جانورن جي ڊاڪٽر کي توليدي بيمارين جي تشخيص ۽ علاج ڪرڻ ۾ مدد ملندي. اچو ته پنهنجي فارم تي جانورن جو رڪارڊ رکڻ سکون.

پهرين مرحلي ۾ مادي جانور جو نالو يا نمبر جي داخلا ڪريو. ڪنهن به سالياني ڪيلينڊر کي ان مقصد لاءِ استعمال ڪري سگهجي ٿو.

هيٺين معلومات جنهن تاريخ تي عمل ۾ اچي ان تاريخ ۾ داخل ڪريون:

- (1) ويامن جي تاريخ، حالت ۽ ماءُ جو نالو يا نمبر
- (2) وهر ۾ ايندڙ مادي جانور جي نالي يا نمبر جي ان تاريخ ۾ داخلا
- (3) ڦرجڻ جو رڪارڊ جنهن ۾ وهر ۾ ايندڙ جانور جو نالو يا نمبر، ڦرجڻ جو طريقو جهڙوڪ قدرتي يا مصنوعي ۽ سانھ جو نالو يا نمبر
- (4) ٻي معلومات جهڙوڪ تبجڻ، وڪرو ٿيڻ، ۽ مري وڃڻ وغيره

ٽيبل 5-3 توليدي رڪارڊ جو ڪئلينڊر

Sun.	Mon.	Tue.	Wed.	Thu.	Fri	Sat.
Note: NM: Natural mating A I : Artificial Insemination				1	2	3
4	5 Basir, Heat	6 Basir, NM	7	8	9	10 No.211, Died
11	12	13	14	15 Badin, Heat	16	17
18	19 Tand, Abortion	20	21	22 Memon, Delivery	23	24
25	26 Hyde, AI	27	28	29 Tand, Sold	30	31

6. باب ڇهون جانورن جي صحت

6.1 جراثيم ڪش طريقي کي هٿي وٺرائڻ

اهي سڀ اوزار جهڙوڪ سرنج ۽ ان جون سُون ۽ ٻيا اوزار جيڪي علاج لاءِ استعمال ٿيندا هجن انهن کي اڀرندڙ پاڻي ۾ وجهي جراثيم کان پاڪ ڪجي. اهي صاف ڪيل اوزار ۽ سُون ڪنهن به اسٽيل واري ڊبي يا پيتي ۾ رکجي جيڪا جراثيم کان پاڪ هجي. ۽ انهن کي علاج وغيره ۾ استعمال ٿيل اوزارن ۽ سرنجن سان گڏائي نه رکجي. الڪوحل جي بدران ڊيٽول به استعمال ڪري سگهجي ٿو، جيڪو مارڪيٽ ۾ آساني سان ملي سگهي ٿو. ڦوهاري واري بوتل جي مدد سان جانورن جي سئي لڳائڻ واري جڳهه کي جراثيم کان پاڪ ڪري سگهجي ٿو. ان کان اڳ جو جانور تاهه کائي پيئي وڃي.

سنڌ صوبي ۾ جراثيم کان پاڪ علاج جي طريقيڪار تي سنجيدگي سان عمل نه پيو ڪيو وڃي. ٽڪن لڳائڻ جون سُون، علاج لاءِ استعمال ٿيندڙ سُون ۽ بچيداني ۾ دوا رکڻ جا اوزار جراثيم کان پاڪ ڪري استعمال نه ٿا ڪيا وڃن. جانورن جا ڊاڪٽر جانورن جو ويم ڪرائڻ جي دوارن بچيداني جي اندر هٿ وجهڻ کان پهريان پنهنجن هٿ کي جراثيم ڪش دوا نٿا لڳائين. جراثيم کان پاڪ ڪري ۽ علاج لاءِ استعمال ٿيندڙ اوزارن کي پاڪ نه ڪرڻ واري رجحان جا ڪجهه سبب آهن جن جو ذڪر هيٺ ڪجي ٿو.

(1) الڪوحل جي خريداري عام طور تي ممنوع آهي. تنهنڪري ان جي خريداري لاءِ سرڪاري اجازت گهربل هوندي آهي. ڇاڪاڻ ته ماڻهن طرفان الڪوحل پاڻ واپرائڻ جو انديشو هوندو آهي.

(2) سئي لڳائڻ واري هنڌ کي جراثيم ڪش دوا لڳائڻ ضروري هوندو آهي، پر ان مهل جانور کي سوگهو ڪرڻ تمام مشڪل هوندو آهي تنهنڪري جراثيم ڪش دوا لڳائڻ جو موقعو تمام گهٽ هوندو آهي.

(3) علاج ۾ استعمال ٿيندڙ سرنجين جو گهٽ هجڻ. مٿي ٻڌايل مجبورين کي ذهن ۾ رکندي هيٺ ٻڌايل طريقن مطابق ڪم ڪرڻو پوندو ته جيئن جانورن کي هڪ ٻئي مان منتقل ٿيندڙ بيمارين کان بچائي سگهجي.



تصوير 6-1 جراثيم ڪش
ڦوهارو



تصوير 6-2 گرم پاڻي ۾ اوباري
اوزارن کي جراثيم کان پاڪ ڪرڻ
جو باڪس



6.2 بچاء واري عمل کي اهميت ڏيو

جانورن کي بيمارين کان بچائڻ تي ڌيان ڏيو.

هڪ دفعو جڏهن ننڍو جانور بيمار ٿيندو آهي ته ان جي واڌويجهه بيهي ويندي آهي. جيڪڏهن کير ڏيندڙ جانور بيمار ٿئي ٿو ته ان جي کير جي پيداوار گهٽجي ويندي آهي ۽ ساڳي پيداواري حالت ڏي موٽڻ لاءِ ڪافي وقت لڳندو آهي. ڪجهه حالتن ۾ ته ساڳي پيداوار ڪڏهن به نه ملندي آهي. جيڪو مالوند لاءِ وڏو مالي نقصان آهي. علاج جي مقابلي ۾ بيمارين کان بچاءَ جي طريقن تي عمل ڪرڻ سان خرچ گهٽ ٿيندو آهي. تنهن ڪري جانورن جي سٺي صحت کي برقرار رکڻ لاءِ وڇڙندڙ بيمارين کان بچاءَ جي طريقن تي عمل ڪرڻ تمام ضروري آهي.

جانورن کي وڇڙندڙ بيمارين کان بچائڻ جو بنيادي طريقو جانورن کي پابندي سان وقت تي وڇڙندڙ بيمارين کان بچاءَ جا حفاظتي ٽڪا لڳرائجن ۽ انهن کي انڊرين ۽ ٻاهرين ڪيڙن کان بچائڻ جي لاءِ وقت سر دوا پيارجي ۽ چمڙي واري سئي لڳرائجي. جيڪڏهن جانور ڪمزور هوندو ته انهن ۾ بيمارين جي خلاف قوت مدافعت گهٽجي ويندي. جنهن جي ڪري هو جلدي بيمار ٿي پوندو آهي. جانورن جي جسماني صحت کي برقرار رکڻ لاءِ انهن جي کاڌ خوراڪ جو انتظام ڪرڻ ۽ انهن جي بهتر سار سنڀال تمام ضروري آهي، جنهن سان جانورن کي بيمارين کان محفوظ رکي سگهجي ٿو.

6.2.1 منهن ڪر يا سامهاري جي بيماري

منهن ڪر يا سامهاري جي بيماري ڇا آهي؟

شروعات ۾ جانورن جي وات، نڪ ڪر ۽ اوھ تي ڦلڪڻا ٿين ٿا. اهي ڦلڪڻا ڦاٽي زخم بنجن ٿا ۽ اهي زخم خراب ٿي ناسور بنجن ٿا. وات جي ڦلڪڻن جي ڪري جانور کائڻ گهٽائي ڇڏيندو. ڪرڻ جي ڦلڪڻن سبب جانور مندڪائيندو آهي. ظاهري خاص نشانيون وات ۽ ڪرڻ تي ظاهر ٿينديون آهن تنهنڪري هن بيماري کي منهن ۽ ڪر جي بيماري چيو ويندو آهي. منهن ۽ ڪر جي بيماري ايڏي موتمار بيماري نه آهي پر جڏهن اها بيماري جانورن کي لڳندي آهي ته انهن جانور جو وزن ۽ کير جي پيداوار گهٽجي ويندي آهي ۽ ساڳي پيداواري حالت ڏي موٽڻ لاءِ ڪافي وقت لڳندو آهي. ڪجهه حالتن ۾ ته ساڳي پيداوار ڪڏهن به نه ملندي آهي. سامهاري جي بيماري ۾ هڪ متاثر جانور جو مرڻ بظاهر ننڍڙي ڳالهه آهي پر ان بيماري جي نتيجي ۾ پاڳڻي جو تمام گهڻو معاشي نقصان ٿيندو آهي ۽ تمام وڏي پئماني تي علائقائي ۽ ملڪي سطح جي معيشت متاثر ٿئي ٿي.



- سامهاڙي جي بيماري لاءِ جراثيم ڪش دوا: سامهاڙي جي بيماري کان مناسب بچاءُ لاءِ جراثيم ڪش دوائون جهڙوڪ ڪاسٽڪ سوڊا، سوڊيم ڪاربونيٽ، ايسٽڪ ايسڊ استعمال ڪري سگهجن ٿا. پوٽاشيم پرميگنيٽ، ٽنڪچر آيوڊين، گليسيرين، ۽ جينشن وايوليت پڻ استعمال ڪري سگهجن ٿا.
- بيماري جو هڪ جانور کان ٻئي جانور تائين ڦهلجڻ: سامهاڙي جي بيماري جو جراثيم ساهه جي ذريعي هڪ بيمار جانور مان تيزي سان ٻين جانورن ۾ پکڙجندو آهي ۽ هوا جي ذريعي هي جراثيم 50 ڪلوميٽرن جي فاصلي تائين پکڙجي سگهي ٿو.

6.2.2 گل گهوٽو/ گهٽار، گندي جي بيماري

گل گهوٽو/ گهٽار، گندي جي بيماري شديد جراثيمي (بيڪٽيريل) بيماري آهي. هن بيماري جون نشانيون شديد حالت واريون آهن جنهن ۾ جانور نشانيون ظاهر ٿيڻ کانپوءِ 8 کان 24 ڪلاڪن ۾ مري وڃن ٿا. جڏهن ته هن بيماري جي بچاءُ جي دوا سستي آهي ۽ عام ڪمري جي درجه حرارت تي رکي سگهجي ٿي. سال ۾ گهٽ ۾ گهٽ ٻه دفعا پابندي سان مقرر وقت تي پنهنجن جانورن کي اڳواٽ حفاظتي ٽڪا لڳرائي هن موتمار بيماري کان محفوظ رکي سگهجي ٿو.

گل گهوٽو/ گهٽار، گندي جي بيماري گڻن ۽ مينهن ۾ عام ٿيندي آهي. جڏهن ته مينهنون گڻون جي پيٽ ۾ وڌيڪ متاثر ٿينديون آهن. گل گهوٽو جي بيماري جي شديد حملي جي صورت ۾ بيمارين جي نشانين جي خبر گهٽ پوندي آهي ۽ تمام ٿورڙي وقت ۾ جانورن جي موت واقع ٿيندي آهي، تنهن ڪري هي شديد موتمار بيماري آهي. هن بيماري جي شروعاتي نشانين ۾ تمام تيز بخار، تڙي جي هيٺان ۽ ڇاتي تائين سوچ، وات مان مسلسل گگون وهڻ ۽ ناسن مان مسلسل ليساندار مادو خارج ٿيندو آهي. گل گهوٽو/ گهٽار، گندي جي بيماري جو جراثيم جانورن جي هڪٻئي سان سڙي يا اڻ سڙي طرح وات ۽ نڪ مان وهندڙ گگ يا ليساندار مادي جي لڳڻ سبب پکڙجندو آهي.

6.2.3 جانورن جي پيٽ جا اندريان ڪيڙا

جانورن کي پيٽ جي اندرئين ڪيڙن کان بچائڻ لاءِ سٺي اثر ڪندڙ ڪمپنين جون دوائون منصوبي جي ماهر طرفان ساليانو پيٽ جي ڪيڙن جون دوائون پيارڻ جي هيٺ ڏنل ڪيلينڊر ۾ تجويز ڪيل وقت مطابق پيارڻ گهرجن. وات جي ذريعي دوا پيارڻ نهايت ئي اثرائتي ۽ گهٽ خرچ واري آهي.

جانورن جي ڦرڙن کي پيٽ جي ڪيڙن جون دوائون پيارڻ

ننڍڙن ڄمندڙ ڦرن ۾ پيٽ جي ڪيڙن جو تعداد شروع ۾ گهٽ هوندو آهي. پر جيئن جيئن ڦرن جي عمر وڌندي آهي تيئن پيٽ جي ڪيڙن جو تعداد پڻ آهستي آهستي وڌندو ويندو آهي. ڦرن جي لاءِ کاڌ خوراڪ جو انتظام ۽ سندن مناسب سار سنڀال ڦرن جي واڌ ويجهه جي شروعاتي عرصي کان وٺي 6 مهينن جيڪڏهن بهتر رهيو ته اهڙن ڦرڙن جي جسم ۾ ڪيڙن جي خلاف سٺي قوت مدافعت پيدا ٿيل هوندي، ۽ اهڙن ڦرڙن جي جسم ۾ پيٽ جي ڪيڙن جو تعداد 6 مهينن جي عمر کانپوءِ گهٽجي ويندو. ٻي صورت ۾ اهڙا ڦرڙا جن جي لاءِ کاڌ خوراڪ جو صحيح انتظام نه ٿيو ۽ سندن مناسب سار سنڀال به نه ڪئي وئي ته اهڙن ڦرڙن جو وزن ۽ سندن واڌ ويجهه جي شروعاتي عرصي کان ئي گهٽجڻ لڳندو. ڪمزور ڦرن ۾ پيٽ جي ڪيڙن جو تعداد تيزي سان وڌندو ويندو، جنهن سبب ڦرڙن ۾ شديد جلابن ۽ نمونيا جي بيماري ٿيندي. نتيجي ۾ ڦرڙن جي جسماني سگهه ۽ وزن گهٽجي ويندو ۽ اهو عمل مسلسل هلندو رهندو.

اهو تمام ضروري آهي ته ننڍڙن ڦرڙن جي لاءِ کاڌ خوراڪ جو مناسب انتظام ڪجي ۽ انهن جي سٺي سار سنڀال لهجي ۽ گڏوگڏ ننڍڙن ڦرڙن کي ننڍي عمر ۾ ئي پيٽ جي ڪيڙن جي دوا پياري وڃي. ننڍڙن ڦرڙن کي پيٽ جي ڪيڙن جي بيماري وٽان جي گندگي مان لڳندي آهي. تنهن ڪري انهن جي پالنا صاف ستري ماحول ۽ خشڪ جڳهه تي ڪئي وڃي ته جيئن بيماري کان محفوظ رهن.



تصوير 6-3 لوهه جي
ٺهيل آئرن ريس ۾ پيٽ
جي ڪيڙن جي دوا پيارڻ



تصوير 6-4 کليل جڳهه ۾
پيٽ جي ڪيڙن جي دوا
پيارڻ



تصوير 6-5 چراگاهه تي
پيٽ جي ڪيڙن جي دوا
پيارڻ



جانورن ۾ رت جي جيوڙن جون بيماريون (پروٽوزول) 6.2.4

جانورن جي رت ۾ ٿيندڙ بيماريون (پروٽوزول) جهڙوڪ ايناپلازما، بيسيسيا، ٿيليريا ۽ ٻيون به ڪيتريون ئي بيماريون ٿين ٿيون. اهي رت جا جيوڙا جانورن ۾ بيمارين جو سبب بنجن ٿا جن جي ڪري بيماري جي دوران جانورن ۾ تمام تيز بخار ٿيندو آهي. جڏهن توهان جي جانورن کي اهڙي قسم جو تيز بخار ٿئي ته جلدي ڪنهن سٺي جانورن جي ڊاڪٽر کي گهرايو. ڊاڪٽر کي چڙيو ته هو بيمار جانور جو چڱي طرح طبعي معائنو ڪري ڏسي ته جانور کي ڪهڙي قسم جي بيماري آهي ۽ بنا دير ان جو مناسب علاج ڪري. رت ۾ ٿيندڙ بيماريون (پروٽوزول) جسم جي ٻاهرين ڪيڙن ۽ جيتن جهڙوڪ جونءَ، چچڙ، گهوڙي واري مک، وٿاڻ جي مک وغيره جي ڪري هڪ جانور کان ٻئي جانور ڏي منتقل ٿين ٿيون، تنهن ڪري انهن بيماري ڦهلائيندڙ جيتن کي مارڻ لاءِ مختلف جيت مار ۽ قوھاري وارين دوائن جو استعمال جانورن جي ڊاڪٽر جي تجويز ڪيل طريقن مطابق احتياط سان ڪيو وڃي.

ٿڻن جي سوچ واري بيماري کان بچاءُ ۽ ان جو علاج 6.2.5

اچو ته هن بيماري جي بابت تفصيلي ڄاڻ مزاحيه خاڪي ذريعي حاصل ڪريون.

Animal Health Calendar																																					
Pilot Farmer		HS Vaccine imported from Spain																																			
		Drench: 1)Velbazen :Velbozen (Drugs used in the rotation) 2)Toloxen: 3)Albensal																																			
Species	Activity	Category animal Season	Jan.	Feb.	March	Apr.	May	Jun	Jul	Aug	Sep	Oct	Nov.	Dec.																							
Buffalos & Cattle	Vaccination	Adult Animal		FMD		BQ			HS			FMD																									
		Calves		FMD									HS	Vaccination after birth from 2 weeks																							
		All Animal							2 times drenching might be enough. Will be examined again by seeing the result.																												
	Deworming			1) Drench ① Ivermectine (2 weeks after drench)					2) Drench ② Ivermectine (2 weeks after drench)			3) Drench ③ Ivermectine (2 weeks after drench)																									
Carf rearing Center																																					
		*Plan: Weaning 45 days *Plan: Distribution calves for farmers form 4th months																																			
	Month	1st Month				2nd Month				3rd Month				4th Month				5th Month				6th Month				8 Month				9 Month				10 Month			
	Week	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
	Location	Rearing in Center								Rearing in Rural																											
		Suckling Period				Group feeding																															
	Prevention of infectious	*It must drink the colostrum within 2 hours of post-partum. New calf bring to our center as possible as early moment. *1st day injection Oxiteracilin LA																																			
	Vaccination	HS	FMD											HS																							
	Deworming	1st								2nd																											
	Prevention of infectious	*1st day injection Oxiteracilin LA																																			
	Buffalo & Cattle:	HS:Hemorrhagic Septicemia								FMD: Food and Mouth Disease								BQ: Black Quarter																			

شڪل 6-1 وچڙندڙ بيمارين کان بچاءُ جي ٽڪن جو ساليانو ڪيلينڊر



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Text for Financial Analysis for Livestock Farming

January 2016

Yukio Ikeda

I. Introduction

The ultimate goal of the financial analysis of livestock farm is to consolidate the management of the farm. It involves checking the profitability and stability of the farm business and also its skill level on livestock farming. Then, the next step would be to clarify how the skill level of the farm is associated with the financial results such as sales cost, production cost, and income. Based on the evaluation on these financial results and skill levels, a plan for technical improvement of the farm would be designed in order to achieve the solid management of the livestock farm

This paper describes how to formulate financial statements of livestock farm, which will be the basis of financial analysis.

1. Why are financial management and analysis necessary?

For farmers to get profit on their farming activities, they have to manage all the features of farming activities such as production, sales, labor management, finance, and investment in appropriate ways. It is important to recognize that each of these features are intertwined, so often one cannot tackle each of them independently.

Among all these features that farmers have to manage by themselves, the financial management would be the basis of all farm management activities, as all the efforts of farming would be meaningless if they would not generate income and/or profits to the farmer.

2. What are the major tools for financial management and analysis?

There are three generally accepted financial statements used for financial management for business (including agricultural business), and they are shown in Table I-1.

Table I-1: Definitions of B/S, P/S, and C/F

Balance Sheet (B/S)	This represents the position of assets and liabilities of a business entity at point of time. This helps for fund (cash and loan) management.
Profit and Loss Statement (P/L)	This statement summarizes the revenues, costs and expenses incurred during a specific period of time. This provides

	information that shows the ability of a company to generate profit by increasing revenue and reducing costs.
Cash Flow Statement (C/F)	This statement is concerned with the flow of cash in and out of the business. This is more like a household account book (in case of small business).

*The details of the financial statement above will be discussed in the later parts of this manual.

3. What can be done with these tools?

The financial statements described above enable the farmers to do the following things.

- To grasp how much he or she is earning profit or income from his various activities of farming
- To check and evaluate the financial results of farming activities
- To take appropriate measures to increase the profitability of the farm based on the evaluation
- To make business plan based on the financial analysis

The points above can be done in the series of PDCA (Plan-Do-Check-ACT) cycle (shown in the Figure I-1), and the financial analysis using financial statements are integral parts of this cycle.

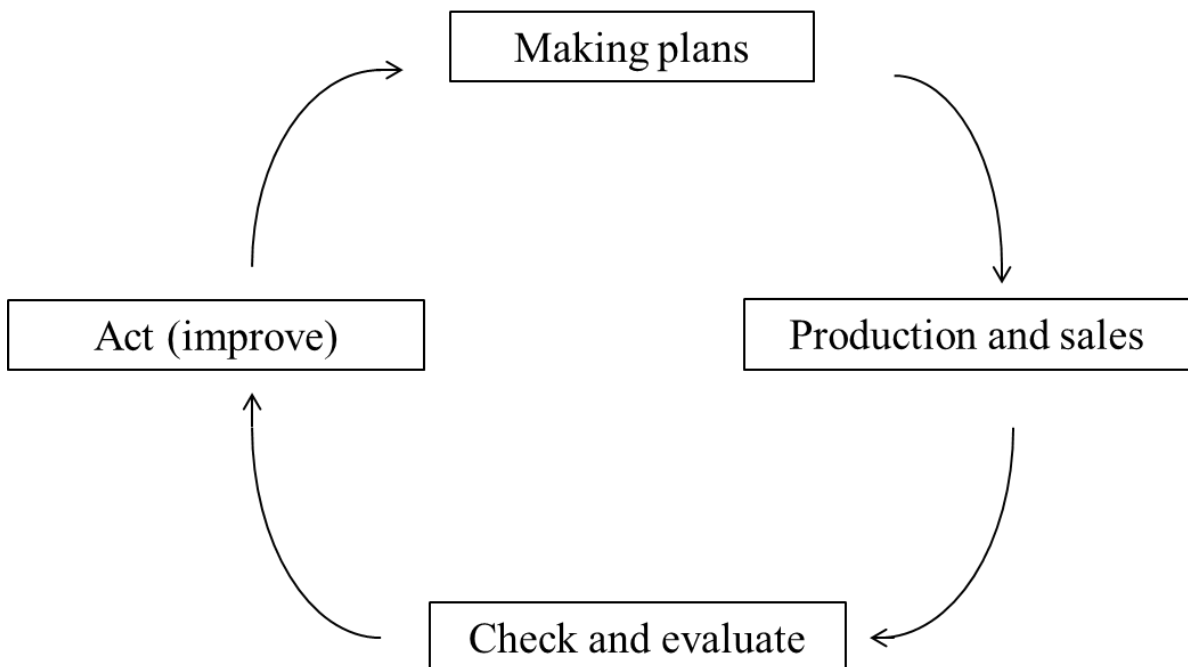


Figure I-1: PDCA Cycle

Also, for government officials who are responsible to support farmers, the financial statements help to answer such questions as follows.

- Do technical measures they take in a project lead to any financial results of the farmers, if so how much?
- What kind of technical measures and investment are appropriate for the specific farm considering the amount of funds or assets he/she has at hand?
- Is the profitability of a farm good or bad compared to other farms in the similar scale?
- Is the profitability of the farms in this area is good or bad compared to other areas?

Key terms in this section

Term	Definition
Financial management	This refers to the efficient and effective management of money (funds) in such a manner as to accomplish the objectives of the organization.
Financial analysis	This refers to an assessment of the viability, stability and profitability of a business or project. It is performed by making use of information taken from financial statements and other reports.
Financial statement	This is a formal record of the financial activities of a business. Relevant financial information is presented in a structured manner and in a form easy to understand. They typically include basic financial statements such as balance sheet, profit and loss statement, and cash flow statement.
Balance Sheet (B/S)	This refers to as a statement of financial position, reports on a company's assets, liabilities, and ownership equity at a given point in time.
Profit and Loss Statement (P/L)	This is a report on a company's income, expenses, and profits over a period of time. A profit and loss statement provides information on the operation of the enterprise. These include sales and the various expenses incurred during the stated period.
Cash Flow Statement (C/F)	This is a report on a company's cash flow activities, particularly its operating, investing and financing activities.
PDCA	This refers to a four-step model for carrying out change, which includes the activities of Plan, Do, Check, ACT. Just as a circle

	has no end, the PDCA cycle should be repeated again and again for continuous improvement.
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II. Notes for the method used in this manual

The following parts of this paper describe the way to prepare B/S, P/L, and C/F for livestock farm and to conduct financial analysis based on these statements. The method to prepare financial statements in this paper, however, does not follow the formal process of accounting, as it would take some time to learn all the bookkeeping practice to formulate these financial statements. Rather, this paper target those users who do not have formal training of accounting and uses somewhat simplified ways to enable them to formulate the financial statements which have enough information for analyzing the financial situation of livestock farmer.

The methods used in this paper do not require the recording of all the transaction and journalizing of them on a daily basis, yet the following information is needed as prerequisite to do the exercise in this paper.

- Recording of the status of livestock at the individual basis (date of birth, delivery, date of the start and the end of milking)
- Record of the amount of milk produced by individual cow or female buffalo and the unit sales price of milk on a daily basis
- Record of all the cash transaction (purchase and sales) which relates to livestock farming
- Record of total hours of labor by family member

III. Preparation of the statement for the scales of the farm

Before preparing financial statements, it is usually the case for the livestock farming analysis to summarize some important information which relate to the scales of farming. This typically includes the following items.

1. Scale of livestock holdings

This is probably the most important information for the analysis of livestock farming as livestock is the major source of income. The scale of livestock holding is typically summarized in the form of the table below, distinguishing the types of livestock (cow, heifer, calf, and bullock) at the beginning and the end of financial terms. The numbers in Table III-1 below are the results of financial analysis for Mr. Chattan, which was done during the master plan project. It is important to note that the number of livestock at end of the term can be calculated as:

$$\text{End of the term} = \text{Beginning of the term} - \text{Sold} + \text{Born} - \text{Dead}$$

Table III-1: Scale of livestock holding by Mr. Chattan (Jan 2012-Dec 2012)

	Cow or female buffalo	Heifer	Calf		Bullock
			Female	Male	
Average	3	2	1.2	1.3	2
Beginning of the term	3	2		2	2
Sold				1	
Born			3	1	
Dead				1	
End of the term	3	2	3	2	2

2. Amount of production and sale

This involves the summary of the milk production and sales and the sales of livestock during the financial period. Table III-2 below shows an example of this.

Table III-2: Production and sales of milk and livestock by Mr. Chattan (Jan 2012-Dec 2012)

Amount of milk produced (litter)	2,120
Amount of milk sold (litter)	1,079
Total value of milk sold (Rs) ¹	44,455
Total value of livestock sold (Rs)	11,000

It is often convenient if one can see the dynamics of the livestock holding and milk production status in monthly basis. Table III-3 is an example for it, which depicts the status of livestock holding and milk production at individual livestock level and monthly basis².

Table III-3: Status of livestock holding and milk production for the farm of Mr. Chattan

Sereal #	Birth year month	Year Month	2011												2012												
			1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	
4	Not known	Female buffalo	[Green bar from month 1 to 7, Sold at month 7]																								
No name	Not known	Female buffalo	[Orange bar from month 1 to 12]																								
5	Not known	Female buffalo	[Orange bar from month 1 to 12]																								
6	Not known	Female buffalo	[Green bar from month 1 to 12]																								
201	Not known	Bullock	[Blue bar from month 7 to 12, Bought at month 7]																								
202	Not known	Bullock	[Blue bar from month 7 to 12, Bought at month 7]																								
7	2009	Female buffalo	[Light blue bar from month 1 to 12]												[Light blue bar from month 1 to 12, Pregnant at month 8]												
8	2009	Female buffalo	[Light blue bar from month 1 to 12]												[Light blue bar from month 1 to 12, Pregnant at month 8]												
101	2011.7	Male buffalo	[Purple bar from month 7 to 12, Born at month 7]												[Purple bar from month 1 to 3, Sold at month 3]												
102	2011.12	Male buffalo	[Purple bar from month 11 to 12, Born at month 11]																								
103	2012.1	Male buffalo	[Purple bar from month 1 to 2, Born at month 1]												[Purple bar from month 3 to 4, Died at month 4]												
9	2012.5	Female buffalo													[Purple bar from month 8 to 12, Given at month 8]												
10	2012.5	Female buffalo													[Purple bar from month 8 to 12, Given at month 8]												
11	2012.5	Female buffalo													[Purple bar from month 8 to 12, Given at month 8]												
Number of milking buffalo			2	2	2	2	2	2	2	2	1	1	2	2	3	3	2	2	2	2	2	2	2	2	2		
Average milk production per day (Kg)			No name	2.4	3.2	4.5	4.2	3.7	3.0	3.1	3.6	1.0	1.0	1.2	1.0	1.0	1.0	3.9	4.8	5.7	4.9	4.4	4.0	3.7	3.1	2.2	2.4
			5	3.6	4.0	3.8	3.8	3.0	2.8	2.0	1.9				1.0	1.0	1.0	3.9	4.8	5.7	4.9	4.4	4.0	3.7	3.1	2.2	2.4
			6												1.0	1.4	2.1	2.6	2.4	2.8	2.4	2.4	2.4	2.8	2.0	1.8	

- Female buffalo (dry)
- Female buffalo (milking)
- Bullock
- Haifer
- Calf

Figure III-1 below is the graphical representation of milk production (individual livestock and total) at monthly basis.

¹ Sum of the total values of milk sold during the analysis period.

² Sum of the total values of livestock sold during the analysis period.

² The prerequisite for one to be able to create these table is the regular recording (daily or weekly) of milk production and the status of each livestock. So, the recoding of such items (at least) need to be done to do financial analysis).

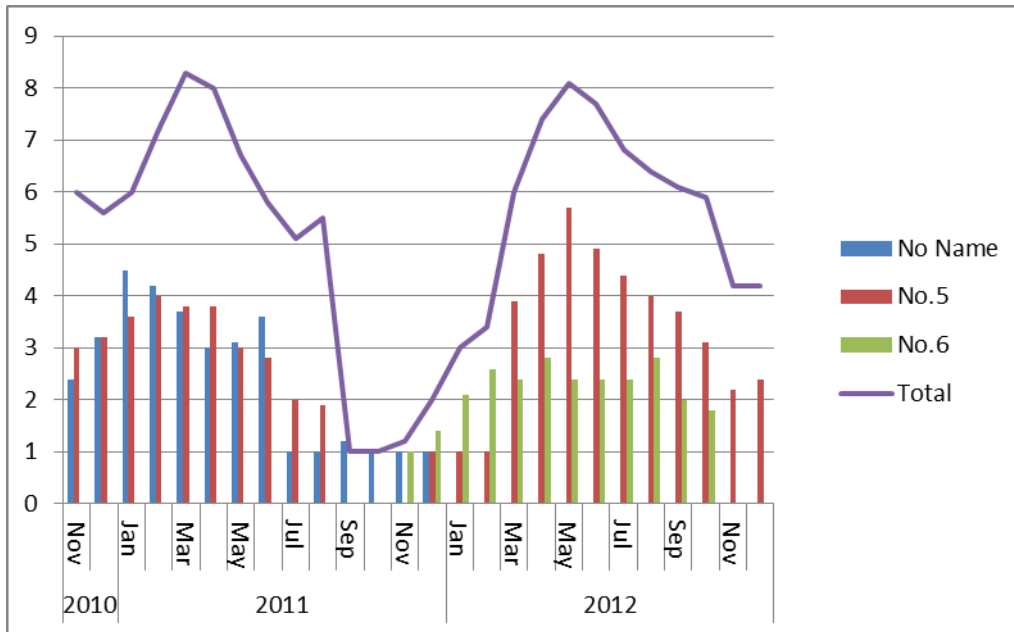


Figure III-1: Status of livestock holding and milk production for the farm of Mr. Chattan

3. Labor input

The labor works at small and medium size farming are usually done by household members. So, the status of labor by family member has to be clarified. Table III-4 below is an example of it.

Table III-4: Input of family labour at the farm of Mr. Chattan (Jan 2012-Dec 2012)

	Main Occupation	Nature of work	Working hours per day
Mr. Chattan	Management of Land Owner's farm	Management	1
Wife	House work	Milking & cleaning	2
1 st Son (12 years old)	Student	Watching on grazing & cutting grass	4
2 nd Son (6 years old)	Student	Watching on grazing	4
1 st Daughter (11 years old)	Supporting in house work	Cutting grass	1
2 nd Daughter (5 years old)	Child	Cleaning	0
Total working hours per day			12

Also, the total working hours need to be clarified (as it is necessary for preparing for P/L and is important for some financial indicators). Table III-5 below is an example of it. As depicted in Table III-4, the total working hours per day for the farm is 12. The labor work for one year is assumed to be 365 (days) * 12 (hours) = 4,380 (hours).

Table III-5: Labor work at the farm of Mr. Chattan, 2012

	Total hours of work	Number of labor
Family member	4,380	5
Hiring labor (permanent)		
Hiring labor (temporary)		

4. Areas of land holding

The area of land holding of the farmer is an important factor to evaluate the scale and the capability of the farmer. It can be summarized in the form of Table III-6 below.

Table III-6: Land holding table

Classification		Areas	
			Tenanted land
Agricultural area			
Glass land	Own land		
	Collective land		
Other			

IV. Preparation of balance sheet

1. What is Balance Sheet?

The accounting balance sheet is one of the major financial statements used by accountants and business owners. The balance sheet presents a company's financial position at the end of a specified date. Some describe the balance sheet as a "snapshot" of the company's financial position at a point in time.

Balance sheet is constituted by the three main items: asset, liability, and owner's equity. Table IV-1 below shows the description of them and the examples.

Table IV-1: Definitions of asset, liability, and profit

	Description	Examples
Asset	Any item of economic value owned by a firm (or farm), especially that which could be converted to cash.	cash securities accounts receivable inventory farm equipment real estate car livestock other property
Liability	Obligations of the firm; they are amounts owed to creditors for a past transaction and they usually have the word "payable" in their account title.	Loans notes payable salaries payable other expenses payable
Owner's Equity	Owner's equity may also be referred to as the residual of assets minus liabilities	

The definition of Owner's Equity can be rewritten as following way:

$$\text{Assets} = \text{Liabilities} + \text{Owner's Equity}$$

This equation is called balance sheet equation, and the Balance Sheet is typically shown in the sequence of this equation. An example of balance sheet is shown below.

Table IV-2: Sample Balance Sheet

Sample farm Balance Sheet 12/31/2012			
Assets	Liabilities		
Cash	200,000	Loans	150,000
Farm equipment	40,000		
Livestock assets	350,000	Owner's Equity	
Livestock inventories	200,000	Total owner's equity	665,000
Cattle Shelter	25,000		
Total Aseets	815,000	Total liabilities and Owner's equity	815,000

2. Categorizing livestock into capital assets and inventories

One important procedure of balance sheet formulation for livestock farming is the classification of livestock held by the farm into capital asset or inventory (both are considered to be assets though). The definitions of capital assets and inventory are shown below.

Capital Asset

This is generally owned for its role in contributing to the business's ability to generate profit. Furthermore, it is expected that the benefits gained from the asset will extend beyond a time span of one year.

Inventory

Inventory includes the raw materials, work-in-process, and finished goods that a company has on hand for its own production processes or for sale to customers.

Based on the definitions of capital asset and inventory described above, livestock can be classified as shown in Table IV-3 below.

Table IV-3: Categorization of livestock in balance sheet

Category	Capital asset	Inventory
Dairy cattle or buffalo	Cow or female buffalo (after	Calf, Heifer

	the first delivery)	
Beef cattle or buffalo (for fattening)	Bull	Calf, young male bull (2 years old or younger)

Categorization of shared livestock

Many of the farmers lend their livestock to another farmer or rent livestock from another farmer (so-called livestock sharing). Cow or female buffalo which are owned by the farmer but lending out is recorded as capital asset of that farmer, as the ownership of the livestock belongs to that farmer. On the other hand, the livestock which is renting is not recorded as capital stock, as the ownership of that livestock belongs to the other farmer.

For the inventories (such as calf and heifer), it is the other way around. The calf or heifer which is renting is recorded as the inventory of that farmer, as the cost of rearing it is born by that farmer. On the other hand, the calf or heifer which is lending is not recorded as the inventory of that farmer.

The categorization of the shared livestock is summarized in Table IV-5 below.

Table IV-5: Categorization for shared livestock

Category	Status of sharing	Record on the financial statement
Cow or female buffalo (after the first delivery)	Renting from another farmer	Not record as capital asset
	Lending to another farmer	Record as capital asset
Calf, Heifer	Renting from another farmer	Record as inventory
	Lending to another farmer	Not record as inventory

3. Valuation of capital asset and depreciation

The value of the capital asset recorded in financial statement (which is called book value) is equal to the acquisition cost of the asset minus accumulated depreciation.

$$\text{Book Value} = \text{Acquisition cost of the Asset} - \text{Accumulated Depreciation}$$

Acquisition cost refers to the cost of an asset at the time the asset is bought by the firm. Depreciation refers to the amount of decrease in value of the asset in a specific time period, and it is calculated as follows.

$$\text{Value of depreciation per year} = (\text{Acquisition cost} - \text{Scrap Value}) / \text{Service life (year)}$$

where scrap value is the expected or estimated value of the asset at the end of its useful life, and service life is the expected lifetime, or the acceptable period of use in service for an asset.

For example, if a farmer bought an agricultural machine which costs Rs.60,000, where its service life is 5 years and the scrap value is Rs. 10,000, then the value of depreciation per year is calculated as follows.

$$\text{Value of depreciation per year} = (60,000-10,000) / 5 =10,000 \text{ (Rs.)}$$

Then, the book value of the agricultural machine 6 months after it is bought is Rs. 55,000 (60,000-10,000*0.5), that of two year after it is bought is Rs.40,000 (60,000-10,000*2).

For the valuation of book value and depreciation for cow (or female buffalo), market value of its livestock at the time of the first delivery can be used as acquisition costs.

Table IV-4 below shows the example for the valuation of female buffalo and bullock (which are classified as capital asset) for the case of Mr. Chattan in 2012.

Table IV-5: Valuation of livestock capital assets and depreciation for Mr. Chattan in 2012 (Rs)

Type	Serial #	Acquisition costs	Scrap value	Service life (years)	Depreciation in 2012 (Rs)	Value at the bigging	Value at the end
Female buffalo	4	70,000	0	10	7,000	52,500	45,500
Female buffalo	No name	70,000	0	10	7,000	49,000	42,000
Female buffalo	5	70,000	0	10	7,000	49,000	42,000
Female buffalo	6	70,000	0	10	7,000	49,000	42,000
Bullock	201	20,000	5,000	5	3,000	18,500	15,500
Bullock	202	20,000	5,000	5	3,000	18,500	15,500
Total	—	—	—	—	34,000	236,500	202,500

4. Valuation of inventories

For the book value of the livestock which are classified as inventories (such as calf and heifer), the market values of the livestock can be used, and the depreciation is not applied for this case.

Table IV-5 below shows the example for the valuation of heifer and calf (which are classified as inventories) for the case of Mr. Chattan in 2012. The book value of each livestock was

approximate market price assuming it would be sold at the time.

Table IV-6: Valuation of livestock inventories for Mr. Chattan in 2012 (Rs)

Type	Serial #	2012	
		Value at the beginning	Value at the end
Heifer	7	30,000	60,000
Heifer	8	30,000	60,000
Male calf	101	20,000	
Male calf	102	8,000	25,000
Male calf	103		
Female calf	9		25,000
Female calf	10		15,000
Female calf	11		15,000
Total value		88,000	200,000

5. Preparation of B/L

Balance sheet for livestock farm can be formulated in the following way.

- i) Calculate the values of all the capital assets the farm hold in the way described in IV.3
- ii) Calculate the values of inventories the farm hold in the way describe in IV.4.
- iii) Put the amounts of liabilities the farm owe at the end of the financial term.
- iv) Calculate the owner's equity using the balance sheet equation.

Table IV-6 below shows the balance sheet for the farm of Mr. Chattan at the end of 2012.

Table IV-7: Balance Sheet for the farm of Mr. Chattan, at Dec. 31st, 2012

Farm of Mr. Chattan
Balance Sheet
12/31/2012

Assets	Liabilities
Capital assets	Loan 40,000
Cattle shelter 2,500	
Livestock 202,500	
Equipment 30,000	Owner's equity
Inventories 200,000	Total owner's equity 395,000
Total assets <u>435,000</u>	Total liabilities and owner's equity <u>435,000</u>

Key terms in this section

Term	Definition
Asset	Refer to IV 1.
Liability	Refer to IV 1.
Owner's equity	Refer to IV 1.
Balance Sheet Equation	Refer to IV 1.
Capital assets	Refer to IV 2.
Inventories	Refer to IV 2.
Book value	Refer to IV 3.
Acquisition cost	Refer to IV 3.
Depreciation	Refer to IV 3.
Scrap value	Refer to IV 3.
Service life	Refer to IV 3.

V. Preparation of Profit/Loss Statement

1. What is Profit/Loss Statement

Profit/Loss statement is a financial statement that summarizes the revenues, costs and expenses incurred during a specific period of time. These records provide information that shows the ability of a firm (or farm) to generate profit by increasing revenue and reducing costs.

Profit/Loss statement is constituted by the three main items: revenue, expense, and profit. Table V-1 below shows the description of them and the examples.

Table V-1: Definition of revenue, expense, and profit

	Description	Examples
Revenue	This is an income that a company receives from its normal business activities, usually from the sale of goods and services to customers.	Farming revenue Livestock revenue
Expense	Money spent or cost incurred in an organization's efforts to generate revenue, representing the cost of doing business.	Cost of seeds and seedling Utility expenses Feed cost Cost of equipment Depreciation Rent
Profit	The surplus remaining after total costs are deducted from total revenue.	

The statement of profit and loss follows a general form as seen in the example (Table V-2) below. It begins with an entry for revenue and then expenses which are various subtracts from revenue. The bottom line is profit (revenue – expense).

Table V-2: Sample farm profit/loss statement

Farm Profit/Loss Statement

For the period 1/1, 2011 to 12/31, 2011

Revenue	
Sales of milk	100,000
Sales of livestock bought for resale	25,000
Sales of raised livestock, grain, etc.	3,000
Crop sales	198,000
Other cash income	90,000
Sales of breeding livestock	30,000
a. Total Revenue	446,000
Expenses	
Car and truck expenses	50,000
Feed expense	15,000
Fertilizer	18,000
Gasoline, fuel, oil	2,000
Interest paid	5,000
Labor hired	20,000
Rent or lease payments	8,000
Depreciation	80,000
Seeds, plants	10,000
Storage, warehousing	5,000
Utilities	10,000
Other cash expenses	5,000
Livestock purchased	150,000
b. Total Cash Expenses	378,000
Profit (a - b)	<u>68,000</u>

2. Accrual basis

Accrual basis is one of the accounting principles, and it stipulates that economic events are recognized at the time in which the transaction occurs rather than when payment is made.

In this case, revenue items are recorded when they are earned, and deductions are recorded when expenses are incurred.

This principle is the basis for the recording of depreciation of asset and the value of inventory which will be described below.

3. Record of depreciation as expense

When an asset (for example, car) which costs Rs. 1 million and whose service life is 10 years, the actual consumption of that asset in the first year is only Rs.100,000 even though the expense of Rs.1 million is born in that year. In this case, according to the accrual basis, cost of Rs.100,000 is recorded as depreciation of the asset every year for 10 years.

The method of calculating the amount of depreciation was already described in IV-3. Table V-3 below shows the amount of depreciation for buffalo (as capital asset) in the case of Mr. Chattan in 2012.

Table V-3: Calculation of depreciation of buffalo for the farm of Mr. Chattan in 2012

Type	Serial #	Acquisition costs	Scrap value	Service life	Depreciation in 2012 (Rs)
Female buffalo	4	70,000	0	10	7,000
Female buffalo	No name	70,000	0	10	7,000
Female buffalo	5	70,000	0	10	7,000
Female buffalo	6	70,000	0	10	7,000
Bullock	201	20,000	5,000	5	3,000
Bullock	202	20,000	5,000	5	3,000
Total	—	—	—	—	34,000

4. Calculation of net value of inventory

According to the accrual basis, the cost of input which will be used in the next term will be carried forward to the next term. So, the expenses to produce inventories which are not sold this year are recorded to next year (or later).

Based on the principle above, the net value of inventories has to be recorded as expense. The net value of inventories can be calculated as follows.

The net value of inventories =

Total value of inventories at the beginning of the term – Total value of inventories at the end of the term

Table V-4 below shows the calculation of the net value of inventories for the case of the farm of Mr. Chattan in 2012. In this case, Rs. -112,000 will be recorded as expense in the P/L.

Table V-4: Value of inventories for the farm of Mr. Chattan in 2012 (Rs.)

Type	Serial #	Value at the beginning	Value at the end	Net Value of inventories
Female buffalo	7	30,000	60,000	-30,000
Female buffalo	8	30,000	60,000	-30,000
Male buffalo	101	20,000		20,000
Male buffalo	102	8,000	25,000	-17,000
Male buffalo	103			0
Female buffalo	9		25,000	-25,000
Female buffalo	10		15,000	-15,000
Female buffalo	11		15,000	-15,000
Total value		88,000	200,000	-112,000

5. Shared livestock

If the farmer is lending out his livestock to another farmer at the end of the period and is expected to be paid the rental fees in the future, the expected rental fee for this period is recorded as account receivable (increase in sales). For example, the farmer starts lending his livestock to another farmer in October for 1 year and its annual rental fee is Rs.1000 (which will be paid when the livestock is returned). The account receivable at the end of December is calculated as follows.

The account receivable at the end of December =

$$3 \text{ months (October to December)} / 12\text{months} * \text{Rs.1,000} = \text{Rs.250}$$

On the other hand, if the farmer is renting in livestock from another farmer at the end of the period and is expected to pay the rental fees in the future, the expected rental fee for this period is recorded as outstanding account (increase in expense). For example, the farmer starts renting his livestock to another farmer in October for 1 year and its rental fee is Rs.1000 (which he will pay when the livestock is returned). The outstanding account receivable at the end of December is calculated as follows.

The outstanding account receivable at the end of December =

$$3 \text{ months (October to December)} / 12\text{months} * \text{Rs.1,000} = \text{Rs.250}$$

6. Calculation of family labor

For most of the cases, salaries are not paid for the labor works done by family member in the cases of small scale farming. Even though the salaries are actually not paid to the family members, it is usually the case to record the family labors as expenses in P/L, assuming they are paid. The family labor costs would be calculated by using the wage level for the same or similar work multiplied by the total hours of labor work by the family member.

One advantage of recording family labor cost is that it enables to distinguish the net income and profit, which are defined as follows.

Net income = Revenue – Expenses (except family labor costs)

Profit = Net income – family labor costs

7. Calculation of revenue

In the case of family farming, parts of the agricultural products produced at the farm (such as wheat and milk) are often consumed at home. In the modern accounting system, the accounts of home and farm business have to be separated. Yet, considering the very small scale of farming and the difficulty to record the household and farm business accounting separately in the project areas, this paper recommends to record the values of the self-consumption as the parts of revenue. It would not be appropriate to exclude the values of self-consumption from the revenue as it carries economic values to the household members.

8. Preparation of P/L

P/L for livestock farm can be formulated in the following way.

- i) Calculate the values of depreciation of the assets in the way described in V.3
- ii) Calculate the net value of inventories in the way described in V.4
- iii) Calculate the family labor costs assuming it is paid. As stated in Table III-5, the total working hours for this period is 4,380 hours. The costs of family labor is assumed to be the minimum wage for agricultural labor at this time, which is Rs.100/day (or Rs.12.5/hour). The total costs of family labor is thus calculated as 4,380 (hours) * 12.5 (Rs.) = Rs.54,750.
- iv) Record any other expenses incurred for farming activities during the financial period.
- v) Record all the revenues received from farming activities during the financial period (including the values of self-consumed products)

Table V-5 below shows the P/L for the farm of Mr. Chattan at the end of 2012.

Table V-5: P/L for the farm of Mr. Chattan in 2012

<i>Accounts title</i>		<i>2012</i>	
Revenue	Sales of calves	11,000	
	Sales and consumption of milk	87,245	
	Total revenue	98,245	
Cost	Production cost	Feed	6,200
		Mineral and salt	0
		Cost for Animal health	2,010
		Other	0
		Depreciation, building	375
		Depreciation, machine and vehicle	250
		Depreciation, livestock	34,000
	Sales cost	Net decrease of inventories	-112,000
	Total cost		-69,165
Net income (Total revenue-Total cost)		167,410	
Family labor		54,750	
Net profit (Net income- Family labor)		112,660	
Total milk produced (Kg)		2,120	
Average selling price of milk (Rs. per Kg)		41.2	
Cost of feed per Kg production of milk		2.9	

Key terms in this section

Term	Definition
Revenue	Refer to V-1.
Expense	Refer to V-1.
Profit	Refer to V-1
Accrual basis	Refer to V-2

VI. Preparation of Cash Flow Statement

1. Introduction of cash flow statement

Cash flow statement (C/F) is a report which describes the cash flows into and out of the business. The record of the transaction is based on cash basis method where revenues and expenses at the time physical cash is actually received or paid out. This contrasts to the accrual basis method, which is generally used for formulating P/L statement.

C/F is a major tool for the cash flow management of firm (or farm).

2. Preparation of cash flow statement

The formulation of C/F is relatively easy (for our case), as it is consistent with the records of the cash received and paid.

The major differences in preparing C/F from P/L are as follows.

- For the records for C/F, depreciation is not considered.
- Also, net inventory value is not considered to record for C/F.
- Instead, cash expenses incurred for the purchase of capital asset and inventory are recorded as expense, and cash received by selling asset are recorded as revenue.

Table VI-1 below shows the C/F for the farm of Mr. Chattan at the end of 2012. The only difference of the C/F from the P/L (Table V-6) is that the items of deprecation and net decrease of inventories are absent in the C/F.

Table VI-1: C/F for the farm of Mr. Chattan in 2012

<i>Accounts title</i>		<i>2012</i>
Revenue	Sales of livestock	11,000
	Milk income Rs	87,245
	Total revenue	98,245
Cost	Total feed cost	6,200
	Total cost of Animal Health	2,010
	Other cost	0
	Building	0
	Livestock bought	0
	Total cost	8,210
Net Income (Total revenue-Total cost)		90,035
Family labor		50,458
Net profit (Net income- Family labor)		39,577

VII. Analysis based on the financial statements

1. Business Analysis based on the financial statements

The three financial statements described above make it possible to conduct financial analysis in extended ways. For example, using the case of the farm of Mr. Chattan in 2012, whose financial statements are summarized below, one can see that the profit is relatively large but the profit in C/F is much smaller than that. This indicates the coexistence of a sound business performance and yet a shortage of cash reserve.

When one looks at the asset position of Mr. Chattan, he can see the significant increase in value of livestock inventories in this period. This factor actually generated the increase in profit in the P/L, as the costs to support inventories (livestock) were carried out to next term. This is one of the features of accrual basis method (and thus P/L) as it assumes that the increase in inventories would lead to the increase in revenues in the future. Yet it is important to note that the potential revenue has not been realized yet. So, it would be necessary to monitor if these inventory livestock will generate cash revenues in the future, otherwise the expense for inventories will eventually become cost factor.

Table VII-1: Financial Statements for the farm of Mr.Chattan in 2012

Cash Flow Statement			Profit/Loss Statement			
<i>Accounts title</i>		<i>2012</i>	<i>Accounts title</i>		<i>2012</i>	
Revenue	Sales of livestock	11,000	Revenue	Sales of calves	11,000	
	Milk income Rs	87,245		Sales and consumption of milk	87,245	
	Total revenue	98,245		Total revenue	98,245	
Cost	Total feed cost	6,200	Cost	Production cost	Feed	6,200
	Total cost of Animal Health	2,010		Mineral and salt	0	
	Other cost	0		Cost for Animal health	2,010	
	Building	0		Other	0	
	Livestock bought	0		Depreciation, building	375	
	Total cost	8,210		Depreciation, machine and vehicle	250	
Net Income		90,035	Sales cost	Depreciation, livestock	34,000	
Family labor		50,458	Net decrease of inventories	-112,000		
Net profit		39,577	Total cost	-69,165		
Net income (Total revenue - Total cost)			167,410			
Family labor			Family labor			
50,458			50,458			
Net profit (Net income - Family labor)			116,952			
39,577			116,952			
Balance Sheet			Valuation of livestock inventories			
Farm of Mr. Chattan Balance Sheet 12/31/2012			2012			
Assets		Liabilities	Type	Value at the beginning	Value at the end	
Capital assets		Loan				
Cattle shelter	2,500		Heifer	30,000	60,000	
Livestock	202,500	Owner's equity	Heifer	30,000	60,000	
Equipment	30,000	Total owner's equity	Male calf	20,000		
Inventories	200,000	395,000				
Total assets	<u>435,000</u>	Total liabilities and owner's equity				
		<u>435,000</u>				

	Male calf	8,000	25,000	
	Male calf			
	Female calf		25,000	

2. Factor analysis

Table VII-2 below shows the P/L statements for the farm of Mr. Chattan in 2011 and 2012. One can see the significant increase in net income from 2011 (Rs.49,756) to 2012 (Rs. 167,410).

Table VII-2: P/L statements for the farm of Mr. Chattan in 2011 and 2012

<i>Accounts title</i>		<i>2011</i>	<i>2012</i>	
Revenue	Sales of calves	0	11,000	
	Sales and consumption of milk	44,625	87,245	
	Total revenue	44,625	98,245	
Cost	Production cost	Feed	8,195	6,200
		Mineral and salt	0	0
		Cost for Animal health	50	2,010
		Other	6,500	0
		Depreciation, building	375	375
		Depreciation, machine and vehicle	250	250
		Depreciation, livestock	27,500	34,000
	Sales cost	Net decrease of inventories	-48,000	-112,000
Total cost		-5,131	-69,165	
Net income (Total revenue-Total cost)		49,756	167,410	
Family labor		46,720	50,458	
Net profit (Net income- Family labor)		3,036	116,952	
Total milk produced (Kg)		1,785	2,120	
Average selling price of milk (Rs. per Kg)		25.0	41.2	
Cost of feed per Kg production of milk		4.6	2.9	

Factor analysis is a method of analysis where the income factor (which is the result of farm management) is divided into various factors so that the major elements that contribute to the level or change in income can be explored. Figure VII-1 shows the factor analysis tree for the case of the farm of Mr. Chattan. The number in the upper part represents the indicator in 2011 and the low part represents that of 2012. As one can see, the factor analysis tree is structured in a way that the indicators in the lower ladder explain the indicator in the above. If one looks at the difference

between 2011 and 2012 in each indicator, he can find that average price of milk had increased dramatically from 2011 to 2012. Also, the production of milk per cow had increased significantly, though lesser degree. Thus, the increase of the selling price of milk and the productivity growth per cow are found to be major drivers for the increase in income.

The productivity increase is thought to be brought about by the provision of new feed (cotton seed cake) which was given by the project. As the feed was given to Mr. Chattan for free, the costs of the new feed was not reflected in the P/L.

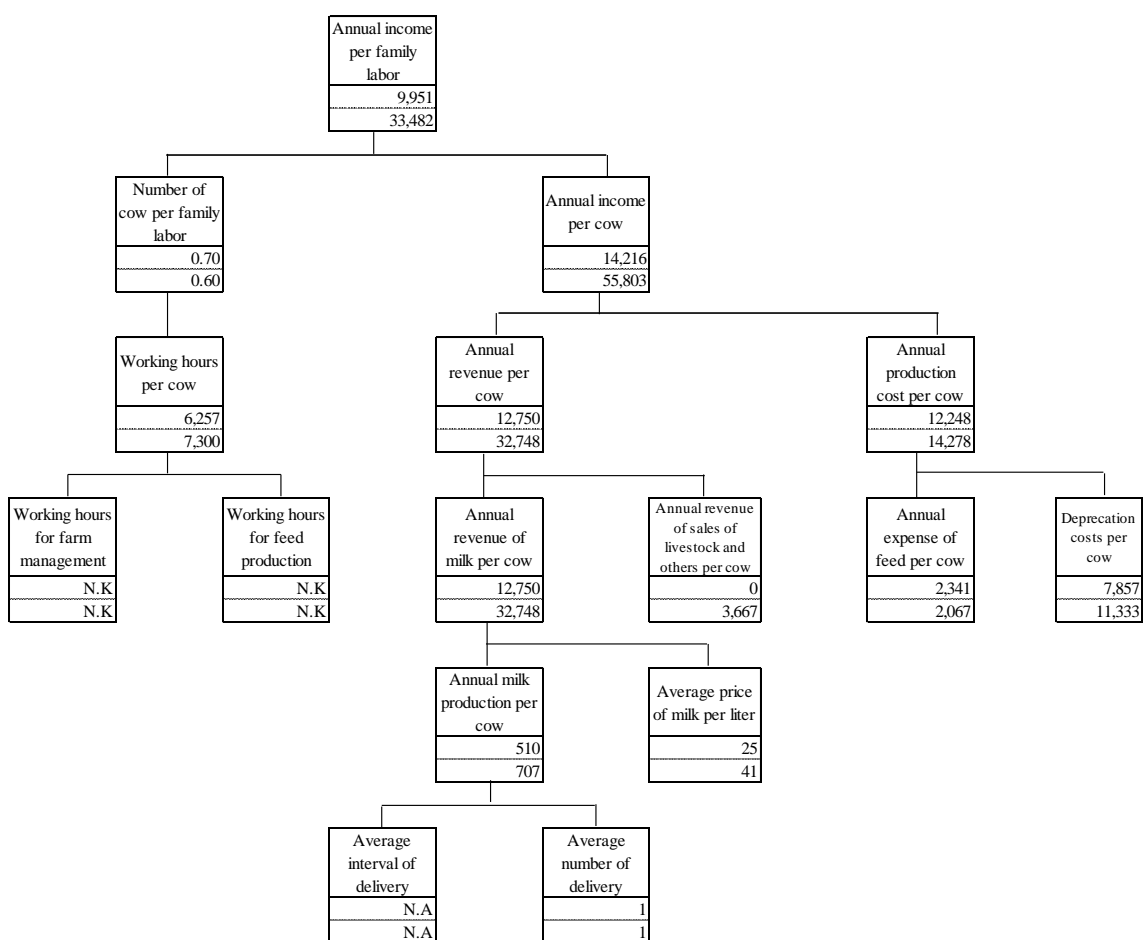


Figure VII-1: Factor analysis tree for the case of the farm of Mr. Chattan (2011 and 2012)

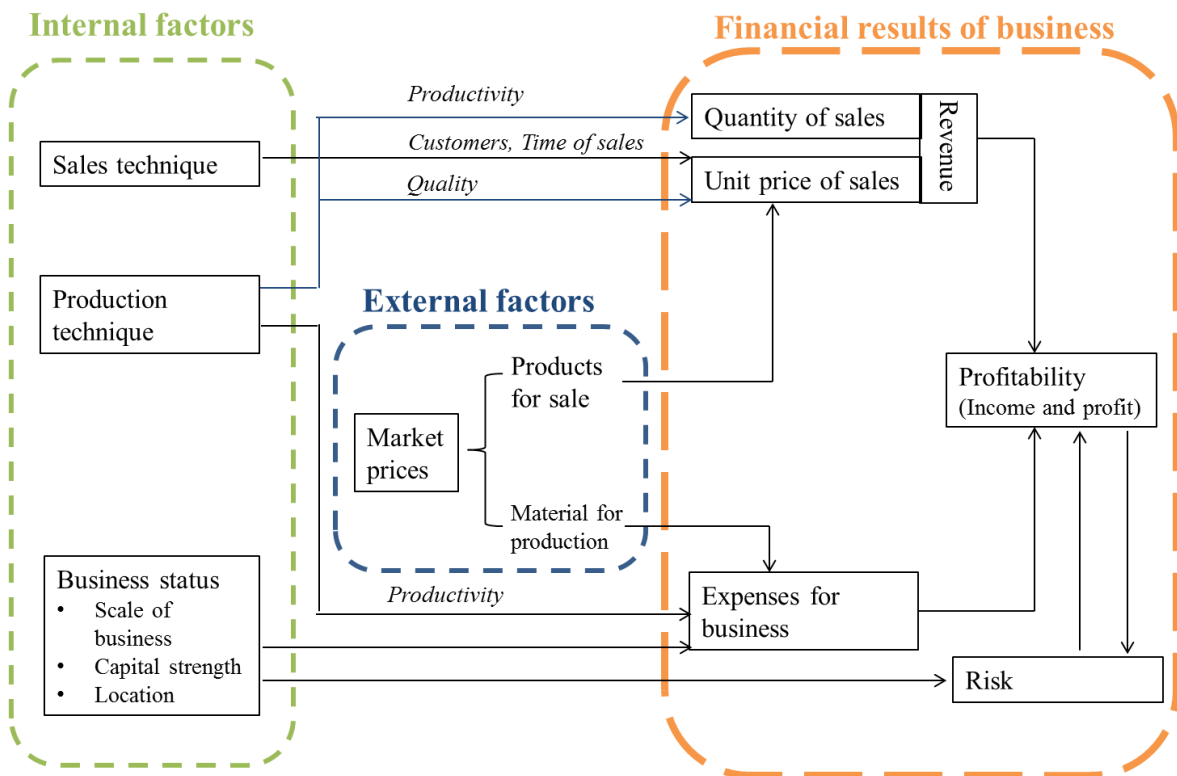
3. From financial analysis toward technical analysis

The financial results of farm business are affected by the production and sales technique of the farm. Thus, it is desirable to conduct the financial analysis combined with technical analysis.

The important financial indicators such as net income and profit are determined by the differences between revenue and expense. It is thus important to understand how skill level of the farm affects the revenue and expense. It is also important to understand that the skill level of the farm is associated with the skills and efforts of the family members and thus it is considered as “internal factor”. Yet there are some factors that affect the business but the family members cannot control. These include the market prices of the products or materials, and these factors are considered to be external factors.

Figure VII-2 below shows the major internal and external factors which affects the financial results and how they are related. For example, the quantities of sales are mostly determined by the scale of farm and the productivity which are affected by the skills of workers. Thus, it is mostly determined by internal factors. On the other hand, the sales prices of the products are not only determined by the quality of the product but also the market situation; thus it is affected by both internal and external factors.

Figure VII-2: Financial results and factors that affect them





**The Project on Sustainable Livestock Development
for Rural Sindh “PSLD”
(JICA Technical Cooperation)**

Textbook for Livestock Marketing



January 2019

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This textbook has been developed for the use of livestock professionals. The Livestock and Fisheries Department, Government of Sindh welcomes your comments and suggestion to improve this material.

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Preface

Livestock is the largest sub-sector in agriculture of Pakistan, contributing 11.4 percent to overall GDP of the country. Livestock plays vital role in rural economy and livelihood of rural poor, so as in rural Sindh. It is a source of cash income, nutrition and sometimes only asset for the rural and marginalized people.

The Project on Sustainable Livestock Development for Rural Sindh (The Project) is the 5 years technical cooperation project implemented in collaboration with the Livestock and Fisheries Department, Government of Sindh and Japan International Cooperation Agency (JICA), Government of Japan, aiming for creating foundations of sustainable livestock sector development in Sindh province, which benefit small scale dairy farmers who comprises more than 80 percent of the sector. The Project was initiated in February 2014 and implemented in 5 pilot districts, namely Matiari, Hyderabad, Tando Muhammad Khan, Tando Allahyar and Badin. The Project focused on development of appropriate technologies for dairy farming. Throughout five years of implementation, appropriate technologies were developed, piloted and verified for the use of small scale formers in Sindh province. Along with the appropriate technologies, useful basic technologies for livestock professional technicians were developed. The technologies range over 7 areas, namely, farm management, marketing, feeding management, fodder, animal health, animal reproduction and genetic improvement. The Project worked on effective utilization of livestock resources, i.e. calves and dry buffaloes in the commercial cattle colony as well. Method for salvation of calves and dry buffaloes were verified.

Technologies developed by the Project are compiled as textbooks, guidelines and booklets for wider application and dissemination to professional technicians, and ultimately to farmers. The Livestock and Fishery Department hope that these series of publications will widely be used by livestock professional technicians both public and private and dairy farmers in Sindh province for uplifting their livelihood.

Director General / Project Coordinator
The Livestock and Fisheries Department
Government of Sindh

Foreword

The Project on Sustainable Livestock Development for Rural Sindh (hereinafter called the Project) is implemented in Southern parts of Sindh Province, Pakistan in collaboration with Livestock and Fisheries Department, Government of Sindh (hereinafter called the Department) and Japan International Cooperation Agency (hereinafter called JICA). The Project was supported by the team of Japanese experts led by Mr. Hiroshi Okabe.

The Textbook for Livestock Marketing is developed as a supplemental textbook of “the Textbook for Appropriate Technology of Dairy Farming for Livestock Technician” for livestock technician in the field of livestock marketing, as aiming that livestock farmers increase incomes and assets, which is a project purpose of the Project, by improving their marketing channels and applying hygienic milk production techniques.

In general, in order to improve marketing channel for farmers, establishment of transparent price determination system is essential to ease information asymmetry. For this purpose, it is required to introduce scientific milk quality check system, which is not yet applied in Sindh Province except milk procurement channel of dairy companies such as Engro Foods and so on. However, because of limited project period and current mandatory of the Department, the Project focused more on farmer’s awareness activities to improve their marketing channel and to provide technical guidance for hygienic quality milk production.

The Project set up a principle for marketing activities as “Produce to Sell but not Produce and Sell” for farmers to focus more on marketing. Based on this principle, the Project collected and analyzed market information as summarized in this textbook, designed and has been conducting marketing workshop, identified and has been sharing marketing success stories to farmers through extension activities or directly from project counterparts along with technical guidance for hygienic milk production.

At last but not least, we would like to appreciate all supports provided by the Department, farmers, dairy processing companies, project counterparts, other Japanese experts and any other stakeholders who supported these marketing activities. We hope that this textbook will be utilized and hopefully will be continuously revised as reflecting market environment change for the betterment of livestock farmers in Sindh Provinces.

January 2019,

Dr. Iqtidar Ali Memon, Project Counterparts in charge of Marketing
Dr. Ghullam Muhammad Jiskani, Project Counterparts in charge of Farm Management, and
Ms. Fumiko Ikegaya, Japanese Expert in charge of Marketing

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Abbreviation List

Abbreviation	
BCS	Body Condition Score
C/P	Counterpart
GIS	Geographic Information System
JICA	Japan International Development Agency
LDDDB	Livestock Dairy Development Board
LR	lactometer Reading
M/T	Master Trainer
MCCI	Milk Collection Center In charge
PDDC	Pakistan Dairy Deployment Company
PF	Pilot Farmer
SEC	Socio Economic Class
SNF	Solid Non Fat
TMK	Tando Muhammad Khan
TS	Total Solid



Chapter 1 Basics of Marketing and Livestock Marketing

This chapter summarizes basic idea and information on marketing and livestock marketing in general and particularly in Sindh Province, Pakistan where the Project on Sustainable Livestock Development for Rural Sindh (hereinafter called “ the Project”) conducted in collaboration with the Livestock Department of the Sindh Province (hereinafter called “the Department”) and the Japan International Development Agency (hereinafter called “JICA”) has been conducted since February 2014 until 2019.

1.1 Definition

1.1.1 What is “Market”?

According to “Livestock Economics and Marketing” published by the Sindh Agriculture University, Tando Jam in 2009, “Market” is defined as follows;

- Particular place or locality where goods are bought and sold.
- Any areas which buyers and sellers come in close contact with each other, either directly or indirectly

1.1.2 What is “Marketing”?

According to “Livestock Economics and Marketing” published by the Sindh Agriculture University, Tando Jam in 2009, “Marketing” is defined as follows;

- Marketing is a process of executing various activities that are involved in selling goods, services, ideas and what lead to an exchange between sellers or buyers.

According to the American Marketing Association¹, “Marketing” is defined as follows;

- Marketing is a process of executing various activities that are involved in selling goods, services, ideas and what lead to an exchange between sellers or buyers.

1.1.2 What is “Livestock Marketing”?

According to “Livestock Economics and Marketing” published by the Sindh Agriculture University, Tando Jam in 2009, “Marketing” is defined as follows;

- Livestock marketing comprises all activities and operations including the movement of livestock and livestock products (including by-products) from farms to final consumers.
- Sale and purchase of livestock and livestock products (including by-products) are known as livestock marketing.

¹ The American Marketing Association (web) <https://www.ama.org/AboutAMA/Pages/Definition-of-Marketing.aspx> retrieved on December 24, 2019



1.2 Principle and Importance of Marketing

1.2.1 Principle of Marketing for the Project

In order to achieve “the foundation for increasing income and assets of livestock farmers is built up in the pilot districts” which is the project purpose of the Project, the Project set up the following principle for marketing.

- Marketing principle for the project is “Produce (Grow) to Sell” but not “Produce (Grow) and Sell”

Based on the above principle, the Project intends to raise farmers’ awareness on marketing by providing market information and implementing marketing workshop which is introduced in Chapter 2 along with technical assistant to improve floor and roof producing hygienic milk which is introduced in the “Textbook for Appropriate Technology of Dairy Farming for Livestock Technician”.

1.2.2 Why “Marketing” is Important?

The reasons why “marketing” is important are summarized as following:

- It provides the mechanism whereby producers exchange their products (e.g. livestock and livestock products) and services for cash.
- The cash is used for acquiring goods and services which they do not produce by themselves in order to satisfy a variety of needs ranging from food items, clothing, medication and schooling to the purchase of necessary inputs and supplies.
- Prices of both input and output fluctuate over time.

1.3 Current Situation of Livestock Sector

1.3.1 Dairy

(1) Statistic Information

1) Milk Production in Pakistan

According to the Pakistan Economic Survey 2017-18, the milk production in Pakistan is 57.89 million tons in 2017-18 and the milk consumption in Pakistan is 46.62 million ton.

Table 1-1 Estimated milk production (thousand tons)

Species	2015-16	2016-17	2017-18
Milk (gross production)			
Cow	19,412	20,143	20,903
Buffalo	33,137	34,122	35,136
Sheep	39	39	40
Goat	867	891	915
Camel	873	885	896
Total	54,328	56,080	57,890
Milk (human consumption)			
Cow	15,529	16,115	16,722
Buffalo	26,510	27,298	28,109
Sheep	39	39	40
Goat			
Camel			
Total	43,818	45,227	46,682

Source: The Government of Pakistan (2018) The Pakistan Economic Survey 2017-18



2) Per Capita Monthly Consumption of Milk

According to the Government of Pakistan, per capita monthly consumption of milk (both milk (fresh and boiled) and milk packed)) in 2015-16 was 6.67 liters and one in 2013-14 was 6.92 liters as summarized in below table.

Table 1-2 Per capita monthly consumption of milk

	2013-14			2015-16		
	Urban	Rural	Total	Urban	Rural	Total
Milk (fresh and boiled)	6.24	6.88	6.66	6.09	6.56	6.40
Milk (packed)	0.46	0.16	0.26	0.44	0.17	0.27
Total	6.70	7.04	6.92	6.53	6.73	6.67

Source: The Government of Pakistan (2016) Household Integrated Economic Survey 2015-16

3) Processed Milk and Loose Milk

According to the Pakistan Dairy Development Company, PDDC, around 97% of milk is distributed as fresh milk from producer to consumer while only 3% of milk is processed in Pakistan (Source: PDDC (2006) *The White Revolution "Dhoodh Darya" white paper on Pakistan 's dairy sector*).

(2) Distribution Channel

According to the final report of the Project for the Master Plan Study on Livestock, Meat and Dairy Development which was implemented by the Department and JICA until 2011, the outline of the milk distributing channel in Sindh Province was summarized as follows:

1) Karachi

In urban cities such as Karachi, Hyderabad and Sukkur, cattle colonies were established and provide large amount of milk to urban areas. Table 1-3 depicts the number of lactating animals and the size of production at those colonies.

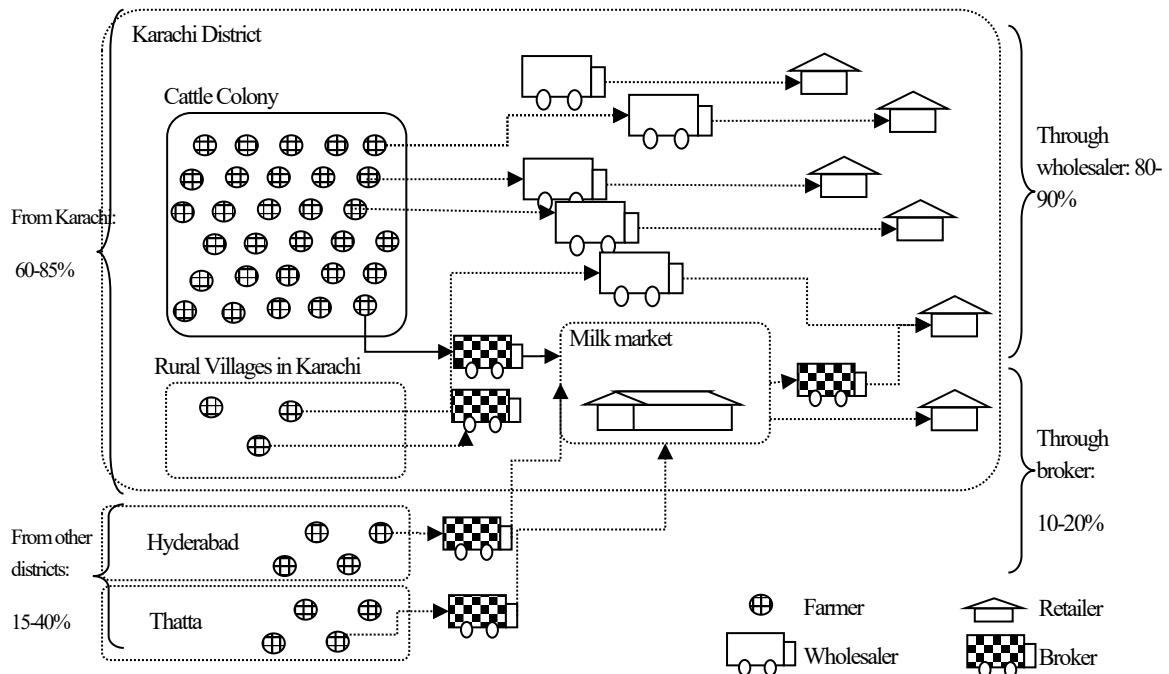
Table 1-3 Lactating animals and milk production at colonies in Karachi and Hyderabad

	Name of Cattle Colonies	Animal Population (head)	Milk Production per day (liter)
Karachi			
1	Landhi Cattle Colonies and surrounding	345,416	2,763,328
2	Nagori Dairy Farming Society and Surrounding	171,873	1,374,984
3	Al-Madina Stat 11 and surrounding	75,130	601,040
4	Qurashi Colony and surrounding	142,144	1,137,152
5	Surjani Dairy Colony and surrounding	91,362	730,896
6	Baldia (Mawach Goth) Orangi Town and surrounding	200,849	1,606,792
7	Billal Cattle Colony and surrounding	122,364	978,912
8	ShairPaoGidder Colony and surrounding	105,274	842,192
	Total in Karachi	1,254,412	10,035,296
Hyderabad			
1	New Cattle Colony	6,049	n.a.
2	Old Cattle Colony	13,947	n.a.
	Total in Hyderabad	19,996	
Sukkur			
1	Cattle Colony	1,351	13,386

Source: JICA (2011) *The final report of the Project for the Master Plan Study and Livestock, Meat and Dairy Development*

According to the Dairy Farmers Association Karachi, about 30 to 40 % of milk consumed in Karachi in summer is supplied from the surrounding areas. The majority of milk in Karachi is distributed by the “wholesalers” who handle milk

between farmers and retailers at the price fixed by their annual contracts. According to the Dairy Farmers Association Karachi, the Milk Wholesaler Association and the All Karachi Milk Retailers Welfare Association, approximately 80 to 90% of milk sold in Karachi are distributed by the wholesalers, while the rest are dealt by the brokers. Figure 1-1 summarizes these transactions.



Source: JICA (2011) The final report of the Project for Master Plan Study on Livestock, Meat and Dairy Development

Figure 1-1 Milk Distribution Channel in Karachi

2) Others

Farmers sell their milk to middleman, retailers, restaurants, consumers, etc. depending on the availability of transportation, sales amount, and so on. While milk is partly delivered through the wholesale market at the market price, it is also delivered from producers to middleman, retailers, restaurants, or consumers directly. Distribution of milk from producers or middleman to restaurants or consumers, but not through retailers, has been getting popular because restaurants and consumers can pay by credit for a month and receive milk at their restaurants or houses.

(3) Price Determination Mechanism

1) The Official Retail Price and Wholesale Price in Hyderabad and Karachi

According to an interview with the Livestock Development Officer on 28th October 2015, the way to determine the milk price in Hyderabad can be summarized as follows;

In case of Hyderabad

- The official milk price in Hyderabad is fixed under the Deputy Commissioner Hyderabad. When the prices of inputs such as green fodder and concentrate for milk production increase, the commercial dairy farmers at cattle colonies request the Deputy Commissioner Hyderabad to revise the wholesale price of milk.



- The Deputy Commissioner Hyderabad as a Chairman of the Market Committee calls a meeting to discuss the issue with concerned stakeholders like members of the dairy farmers association, members of the Agriculture Board, an Assistant Commissioner and the Director Animal Husbandry Sindh.
- The Deputy Commissioner assigns the Director Animal Husbandry to survey the cost of milk production.
- The Director Animal Husbandry formulates a survey team to confirm the market prices of inputs required for milk production and calculate the cost of milk production per liter. The survey team consists of a Livestock Development Officer (LOD), a veterinary officer Hyderabad and a veterinary officer of the Directorate of Animal Husbandry. The wholesale price is calculated based on the production cost plus 10% profit for dairy farmer. The report is submitted to the Director Animal Husbandry. The Director Animal Husbandry forwards it to the Deputy Commissioner Hyderabad.
- The Deputy Commissioner Hyderabad authorizes and applies the milk wholesale price in the region through the Market Committee.

In case of Karachi

- In Karachi, the Commissioner Karachi does the same procedure as the Commissioner Hyderabad does for the fixation of milk wholesale price.

Note

- The Market Committee: it is the government organization authorized to control the prices of all commodities in the market and monitor on daily basis.
- The following documents are attached as attachments for reference.
 - Attachment 1-1: Cost of milk production of buffalo milk in Karachi (as of June 2013)
 - Attachment 1-2: Cost of milk production of buffalo milk in Hyderabad (as of April 2014)
 - Attachment 1-3: Cost of milk production of buffalo milk in Hyderabad (as of 2017)
 - Attachment 1-4: Cost of milk production of buffalo milk in Hyderabad (as of 2018)

3) The Milk Wholesale Market

a) Market Mechanism

In the milk wholesale markets of Hyderabad and Karachi, the price is determined by auction. The person in charge of the milk wholesale market calls all buyers in the market and does the auction. The price of milk in the wholesale market varies from season to season based on the demand and supply as well as quality checked unscientifically. The price is determined by checking the quality of milk; the buyers put their hand in the milk can and /or tasting milk to check the consistency of milk. Seasonal changes in demand and supply also affect the market price.



b) Trend of Milk Price at the Wholesale Milk Market

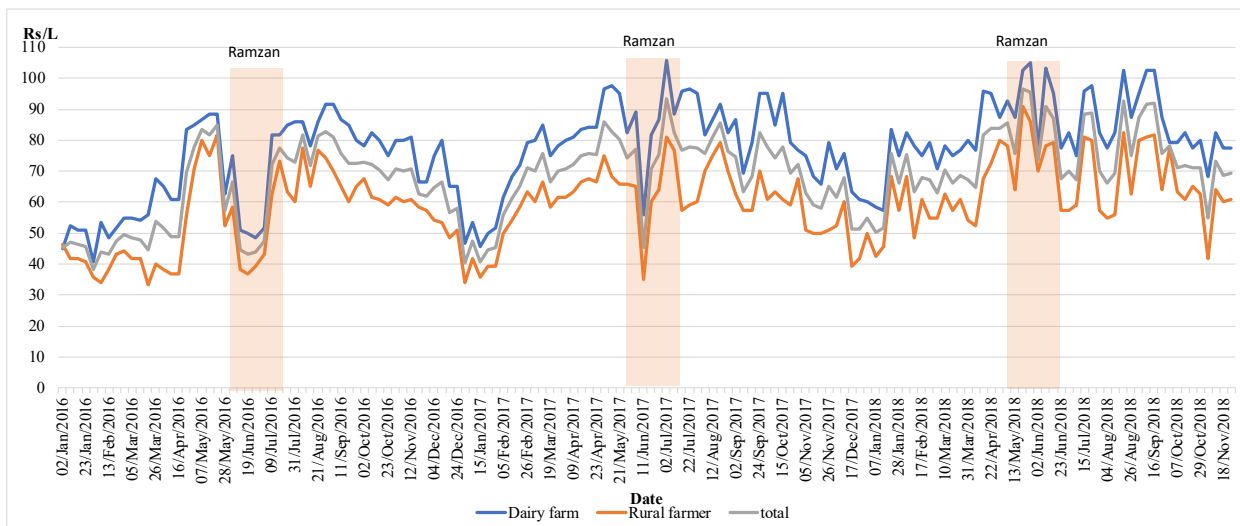
The Project has monitored the milk wholesale price at the milk wholesale market in Hyderabad for three years from the beginning of 2016 to the end of 2018. The below table summarized the average milk prices of i) commercial farmers, ii) rural farmers, and iii) all in 2016, 2017, and 2018 as well as average of these 3 years. The prices of milk from commercial farmers have been higher than ones from rural farmers, and the price of milk from both commercial farmers and rural farmers have been increasing since 2016. Within three years, the average milk wholesale price has been increased by Rs.12/L, from 62.2/L in 2016 to Rs.74.6L/L in 2018.

Table 1-4 Average milk price of commercial farmers and rural farmers in 2016, 2017, and 2018

	2016	2017	2018	Average for 3 Years	Difference between 2016 and 2018
Commercial Farmers	Rs.2787/40L (Rs.69.7/L)	Rs.3131/40L (Rs.78.3/L)	Rs.3354/40L (Rs.83.8/L)	Rs. 3,078 (Rs.76.9/L)	Rs.567/40L (Rs.14.2/L)
Rural Farmers	Rs.2182/40L (Rs.54.5/L)	2355/40L (Rs.58.9/L)	Rs.2610/40L (Rs.65.2/L)	Rs.2,356 (Rs.58.9/L)	Rs.429/40L (Rs.10.7/L)
All	Rs.2486/40L (Rs.62.2/L)	2743/40L (Rs.68.6/L)	Rs.2,982/40L (Rs.74.6/L)	Rs. 2,724 (Rs.68.1/L)	Rs.496/40L (Rs.12.4/L)

Source: The JICA project team

The below figure depicts average milk prices of i) commercial farmers, ii) rural farmers, and iii) all. The average milk prices of commercial farmers have been always higher than one of rural farmers. Milk prices dropped dramatically in winter and Ramadan month.

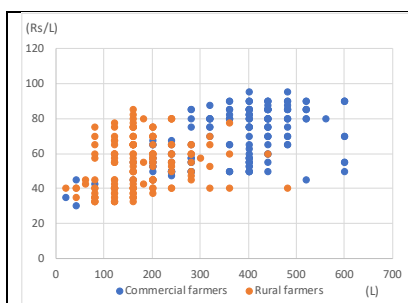


Source: The JICA Project Team

Figure 1-2 Average milk price at the wholesale market in Hyderabad

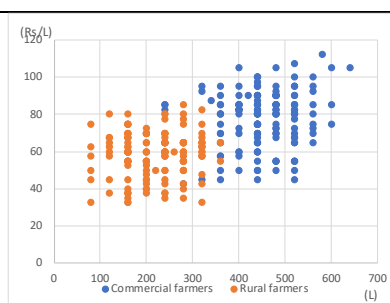
c) Relation between Price and Sales Volume at the Wholesale Milk Market

The below figures depict relation between price and sales volume for both commercial farmers (blue dots) and rural farmers (orange dots) in 2016, 2017, and 2018. The figures indicate the volume of milk from commercial farmers brought to the wholesale market is relatively larger comparing with the volume of milk from rural farmers, and prices of milk from commercial farmers are relatively higher than ones from rural farmers. As same as Table 1-4 indicates, the figures also indicated milk price have been increased year by year.



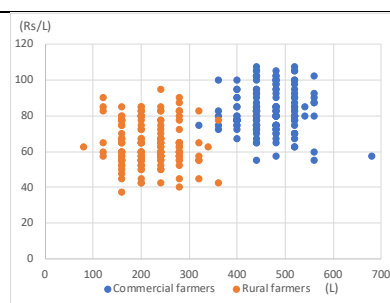
Source: The JICA project team

Figure 1-3 Relation between price and sales volume in 2016



Source: The JICA project team

Figure 1-4 Relation between price and sales volume in 2017



Source: The JICA project team

Figure 1-5 Relation between price and sales volume in 2018

d) Relation between Fat Percentage and Price at the Wholesale Milk Market

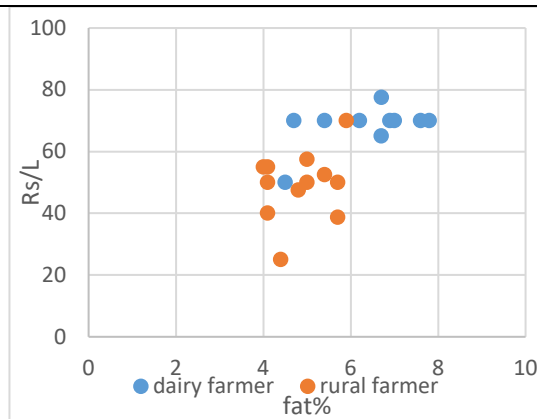
The Project conducted milk survey in January 2017 to confirm the relation between fat percentage and price at the wholesale milk market Hyderabad. The twelve sample from commercial farmers and ten samples from middleman who purchase milk form rural farmers were collected. The result is summarized in the below table and figure.



Table 1-5 The result of milk survey at the wholesale milk market in Hyderabad

	Sample	Average price (Rs/L)	Average fat %	Alcohol test (positive)	Alcohol test (positive %)
Dairy farmer	10	68.3	6.35	2	20%
Rural farmer	12	49.3	4.85	6	60%
Total	22	57.9	5.53	8	36%

Source: The JICA project team



Source: The JICA project team

Figure 1-6 The result of the milk survey conducted by the project team in January 2017

The average milk price per liter was Rs.57.9/L of all 22 samples, Rs.68.3/L of 10 commercial farmers, and Rs. 49.3/L of 12 rural farmers, so that there was Rs.19.0/L difference between the commercial farmers and the rural farmers. The average fat percentage was 6.35% of 10 commercial farmers while 4.85% of 12 rural farmers. It is in line with what people said that the price of milk from commercial farmers is high because fat percentage is high.

The positive result of the alcohol test implies large number of bacteria in the milk so that the alcohol test is used as one of methods to confirm milk quality. The milk samples from rural farmers show higher percentage of positive in alcohol test: 20% of samples from commercial farmers became positive while 60% of samples from rural farmers became positive. The result indicates that the quality of milk from commercial farmers is better than milk from rural farmers.

3) The Purchasing Price of Private Dairy Company

The Project keeps exchanging information with private dairy company namely Engro Foods which has milk collection points in the southern Sindh for possible collaboration for rural farmers. According to the interview in 2015, their way to determine the purchasing price can be summarized as follows:

- Engro Foods has a dairy factory in Sukkar and set up milk collection centers in Sindh Province to collect milk. The location of the milk collection centers is located in the southern part of Sindh such as District Badin and Tharparkar etc.
- The Engro Foods determines the price of milk by checking the quality of milk. Milk collection center in charge (MCCI) checks the temperature of milk by thermometer, gravity by lactometer, and fat percentage by Gerber method to calculate percentage of total solid (TS). The procedure is as follows:
 - Step 1: MCCI checks smell, taste, temperature, and lactometer reading (LR) of milk. The measured LR is adjusted by milk temperature based on the adjustment table.
 - Step 2: MCCI takes certain amount of sulfuric acid and puts into the glass container.
 - Step 3: MCCI takes 10ml of milk after mixing milk sample and puts into the glass container.
 - Step 4: MCCI takes certain amount of alcohol and puts into the glass container.
 - Step 5: MCCI caps the glass container with rubber cap and mixes it well.
 - Step 6: MCCI puts it into centrifugal separator and separate fat from milk.

Step 7: MCCI measures the amount of fat after a few minutes of separation



- Solid non fat (SNF) and total solid (TS) are calculated by the following formulas.

$$\text{SNF \%} = (\text{fat \%} * 0.22) + (\text{LR} * 0.25) + 0.72$$

$$\text{TS \%} = \text{SNF \%} + \text{fat \%}$$

- Their minimum TS % is 13%. The price of milk with 13% of TS is called as a “basic price!”. As of April 2015, the basic price (price of milk with 13% of TS) was Rs.42/L. If TS % is higher than 13%, the price of milk will be increased accordingly.
- Seven samples were collected from some pilot farmers and middlemen. The milk price of Engro Foods are summarized in the below table.

Table 1-6 Milk price of pilot farmers and others analyzed in 2015

	Farmer Name	Milk Type	Fat (%)	LR	SNF	Adjusted Vol: 13%ts	Basic Rate (Rs./L)	Price (Rs./L)
1	Mr.Zaheer Ali (middleman of Mr. Haji Ali Akbar) in Badin	Cow	3.7	27.5	8.41	0.93	42	39.12
2	Mr. Haji Ali Akbar Jamali (PF) in Badin	Cow	8	21.5	7.86	1.22	42	51.22
3	Mr. Qazi Suleman (PF) in Badin	Buff	5.7	27.5	8.85	1.12	42	47.00
4	Mr. Saleh (middleman of Mr. Qazi Suleman) in Badin	Buff	6	25.5	8.42	1.11	42	46.62
5	Mr. Ghullam Hayder (PF) in Matiar	Buff	4.6	24.5	7.86	0.96	42	40.25
6	Mr. Ghullam Qadir (middleman of Mr. Ghulam Hayder)	Buff	3.8	27.5	8.43	0.94	42	39.52
7	Mr. Jeo (middleman)	Buff	6.7	-	8.94	1.2	42	50.40

Source: The JICA project team

4) Annual Agreement Between Farmers and Retailers/Wholesalers

Some dairy farmers make the annual agreement with the milk retailers and wholesalers on the following terms and conditions.

- The dairy farmers is bound to supply agreed quality and quantity of milk at fixed price, time and place throughout year from January 1 to December 31.



- The buyer is responsible for purchasing the agreed quantity of milk at fixed rate throughout year, and he has to deposit Rs.100,000 per 40 liters of milk in advance to dairy farmer or so as per the agreement. Some agreements are verbal and some are on the official paper depends upon the trust/relations between dairy farmer and retailer/wholesaler.

According to the Dairy Farmers Association Karachi, the Milk Wholesale Association and the All Karachi Milk Retailers Welfare Association, approximately 80 to 90% of milk sold in Karachi are distributed by wholesalers under annual agreement.

5) Traditional Way

Some buyers like milk shops, tea shops, mava makers check the quality of milk by using a lactometer, by putting hand in the milk can to check the consistency of milk, by tasting the milk, smelling the milk and by making mava (e.g. amount of mava produced from 1 kg of milk) then fix the price of milk.

(4) Consumer Preference

The summary of the Consumer Preference Survey implemented in 2013 under “Project for Master Plan Study on Livestock Meat and Dairy Development in Sindh Province” implemented by the Livestock Department Sindh and JICA are following:

- While 96% of the respondents consume milk every day, the others do the same more than one or two times per week.
- People use milk for tea (98%), drinking (85%), desert (56%), lassi (25%), and yogurt (17%).
- Among fresh milk, packed milk, and powder milk, fresh milk is preferred the most (88% of respondents consume fresh milk). 56% of the respondents consume only fresh milk while 19% consume both fresh and packed milk and 6% consume all types of milk.
- In the last three years, the number of respondents who have increased consuming fresh milk is more than that of respondents who have decreased, especially in the urban area.
- 55% of respondents in rural area and 10% of respondents in total obtain milk from own livestock while the others buy it.
- When respondents buy milk, 80% of them pay attention to freshness, and 73% of them pay attention to pureness from adulteration.
- The majority of respondents prefer milk with high fat %.

1.3.2 Meat

(1) Statistic Information

1) Meat Production in Pakistan

According to the Pakistan Economic Survey 2017-18, the meat production in Pakistan is 4.3 million tons in 2017-18 as summarized in below table.

Table 1-7 Estimated meat production (thousand tons)

Species	2015-16	2016-17	2017-18
Beef	2,017	2,085	2,155
Mutton	686	701	717
Poultry	1,1170	1,276	1,391
Total	3,873	4,061	4,262

Source: The Government of Pakistan (2018) The Pakistan Economic Survey 2017-18



2) Per Capita Monthly Consumption of Meat

According to the Government of Pakistan, per capita monthly consumption of meat (mutton, beef, and chicken) in 2015-16 was 0.63kg and one in 2013-14 was 0.62kg (*Source: Household Integrated Economic Survey 2015-16 published by the Pakistan Bureau of Statistics, the Government of Pakistan*) as summarized in the below table.

Table 1-8 per capita monthly consumption of meat (kg)

	2013-14			2015-16		
	Urban	Rural	Total	Urban	Rural	Total
Mutton	0.07	0.07	0.07	0.09	0.04	0.06
Beef	0.23	0.22	0.23	0.25	0.18	0.20
Chicken	0.42	0.26	0.32	0.46	0.33	0.37
Total	0.62	0.55	0.62	0.80	0.55	0.63

Source: The Government of Pakistan (2016) Household Integrated Economic Survey 2015-16

(2) Consumer Preference

The summary of the Consumer Preference Survey implemented in 2013 under “Project for Master Plan Study on Livestock, Meat and Dairy Development in Sindh Province” implemented by the Livestock Department and JICA are following.

- 85% of the respondents consume meat once or twice per week. The respondents in urban area as well as the respondents who belong to high socio-economic class (SEC) tend to consume meat more frequently than those who in rural area and who belong to low SEC.
- 74% of the respondents consume chicken most frequently among beef, chicken, mutton, and fish. 20% of the respondents consume beef most frequently, and only 3% of them consume mutton most frequently.
- 99% of the respondents buy meat at nearby shops. However, if there is no shop nearby area, then respondents buy meat at shop in city.
- Regarding preference of color and parts of meat,
 - The majority of the respondents prefer pink color of meat rather than red or dark red.
 - The most preferred part of beef is leg. The most preferred part of chicken is chest followed by legs. The other respondents do not care the parts.

(3) Price Determination

- The official price of beef and mutton are fixed at district level. However, the official prices are not timely revised.
- The price of chicken is determined based on the market demand and supply. The price of poultry s announced on the newspaper daily.

(4) Others

- Cold chain for meat is not well-established in Pakistan. Only a few mat shops such as Al Shaheer have cold chain for meat.
- There are two meatless days in a week because of shortage of meat production.

1.3.3 Livestock

(1) Statistic Information



There are more than 100 livestock markets in Sindh. The location map of livestock markets as well as flow of animal head through livestock were developed under “Project for Master Plan Study on Livestock, meat and Dairy Development in Sindh Province” implemented by the Livestock Department and JICA as Geographic Information System (GIS) maps. See the following attachments for the references.

- Attachment 1-5: GIS map - Location of Livestock Market in Sindh
- Attachment 1-6: GIS map - Total number and distribution of livestock sold at livestock market per week at talka level
- Attachment 1-7: GIS map – Flow of Animal Had through Livestock Market

(2) Price Determination

There is no scientific price determination mechanism for sale and purchase of live animal in Sindh. However, the Project identified some trend on price of milking buffalo based on the data collection conducted at Talhar livestock market, District Badin from February 13 to December 31, 2016. Totally 470 milking buffalo price information for 47 weeks had been collected. The data show clear trends as summarized below box.

- Positive relation between price and body condition score (BCS)
- Negative relation between price and parturition number
- Seasonal trend on milking buffalo price (The price is high in summer)

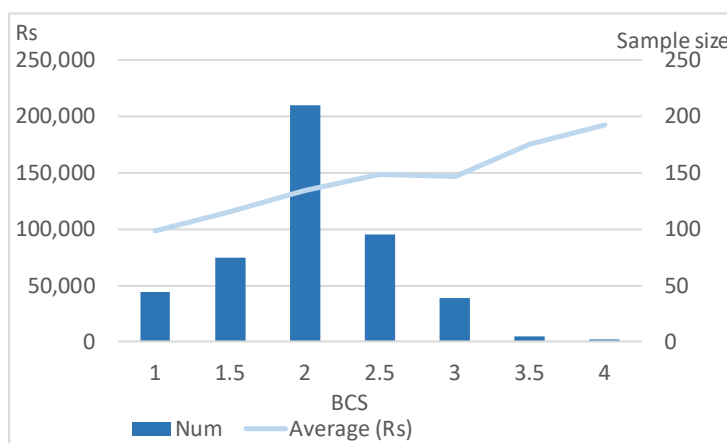
1) Positive Relation between Price and BCS

The below table and figure show that there is weak negative relation between the parturition number and the price of milking buffalo; The price of milking buffalo is higher with lower parturition number.

Table1-9 BCS, sample number and average prices

BCS	Sample number	Average (Rs)
1	44	98,432
1.5	75	115,733
2	210	134,136
2.5	95	148,421
3	39	146,231
3.5	5	175,600
4	2	192,500

Source: The JICA project team



Source: The JICA project team

Figure1-7 BCS and average prices

2) Negative Relation between Price and Parturition Number

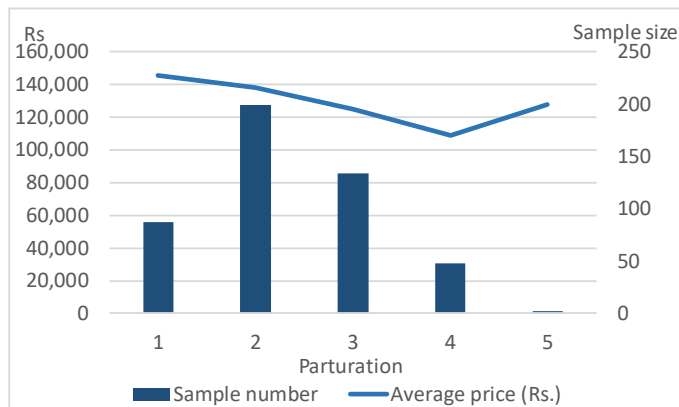
The below table and figure show the parturition number and the average price of milking buffalo. The number of milking buffalos with two parturition number is highest, 199 samples followed by three parturition number with 134 samples and one parturition number with 87 samples.



Table1-10 Parturition number, sample number and average prices

Parturition number	Sample number	Average price (Rs)
1	87	145,218
2	199	137,905
3	134	124,586
4	48	108,729
5	2	127,500
Total	470	132,437

Source: The JICA project team

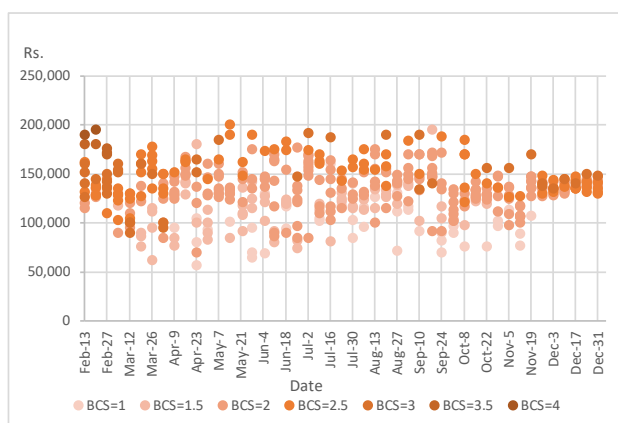


Source: The JICA project team

Figure1-8 Parturition number, sample number and average prices

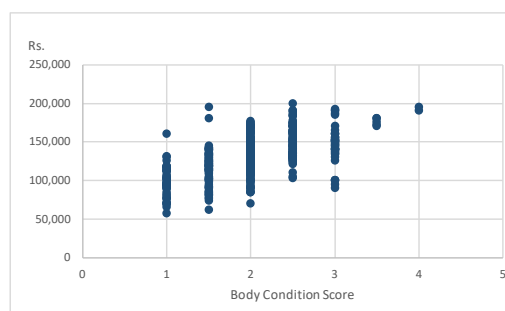
3) Seasonal Trend on milking Buffalo Price (The price is high in summer)

The below figures depict date, price, and BCS of milking buffaloes. The seasonal change is not clearly seen on the graph. From the middle of November to the end of December, the price range became narrower. It might be because of biased sampling. The relation between price and BCS score show clear positive relation on the below graph.



Source: The JICA project team

Figure1-9 Date, price and BCS of milking buffalo



Source: The JICA project team

Figure1-10 Relation between price and BCS of milking buffalo

**Attachment****Attachment 1-1 Cost of milk production of buffalo milk in Karachi as of June 2013**

COST OF MILK PRODUCTION FOR THE MONTH OF JUNE 2013
Calculated on 100 Buffaloes farm basis.

01- DEPRECIATION

Cost of Fresh Buffalo		125000-00
Resale after 270 days (one lactation)		70000-00
Depreciation		55000-00
Daily Depreciation Cost		203-70

02- MANAGEMENTAL EXPENSES / DAY / BUFFALOE.

Labor Charges + Manager		30.85
Medicines + Vaccination	RS.18000 / Month	6.00
Herbal Medicines	Rs. 5000 / Month	1.67
Farm Rent	RS. 35000/Month	11.67
Electric Water + Gas	18500 / Month	6.16
Repair of Utensils & Equipments.	5000 / Month	1.67
Miscellaneous	200 / Lactation	1.67
		2.00
		61.69

03- FEEDING CHARGES

Concentrates	Rs. 23 / Kg Daily need 8 kgs	184-00
Green Fodder	Daily 4 kgs Rs. 180 / 36kgs	20.00
Wheat Straw	330 / 40kgs need 7 Kg	57.75
		261.75

Depreciation = 203-70
 Management Cost = 061.69
 Feeding Cost = 261.75
 Grand Total of Daily Expenses. = 527.14
 Average Daily Milk Production = 8 Litres
 Cost of 1 liter fresh milk at farm $RS. 527.14 \div 8 L = 65.89$



Attachment 1-2 Cost of milk production of buffalo milk in Hyderabad (as of April 2014)

COST OF PRODUCTION PER LITTER OF BUFFALO MILK IN HYDERABAD.

Milk production per Buffalo 8 Litters / Day

*1400
Meeting fixed on
6/5/14 at 3 PM
post price
up to
7/5/14
at 3 PM*

Capital Investment

- Average Cost of Fresh Milking Buffalo RS: 125,000-00
 - (-) Resale Value RS: 75000-00
 Difference: RS: 50000-00
 - **Net Investment per Buffalo** RS: **50000-00**
 Lactation period 270 days

A. Cost of Production per litter

• Per Day Capital Investment RS: 185.19
 • Mortality RS: 7.41
Total RS: 192.59

B. Management

• Labor Pay RS: 27-00
 • Vaccine / Medicine RS: 10-00
 • Country Medicine, Molasses & oil etc RS: 05-00
 • Electricity Equipment (Hardware, Purchase / repair) RS: 05-00
 • Electric Charges / Gas & Phone Bills RS: 07-00
 • Farm rent / repair RS: 07-00
 • Miscellaneous RS: 03-00
Total RS: 64-00

C. Feeding Charges

• Green Fodder 20 Kg at RS: 4.5 per Kg RS: 90-00
 • Wheat straw 6 Kg per day at RS: 8 per Kg RS: 48-00
 • Cotton Seed cake 2Kg per day at RS: 28per Kg RS: 56-00
 • Wheat Bran 2kg per day at RS: 20 per Kg RS: 40-00
 • Grain 1 Kg per day at RS: 54 per Kg RS: 54-00
Total RS: 288-00

Grand Total A+B+C= RS: 544.59
 Suggested profit RS: 10-00

Cost of production per 8 litters of Milk RS: 544.59
Cost of production per litter of Milk RS: 68.00
Per litter Milk prices RS: 69-00

[Signature]
 Director Animal Husbandry
 Sindh, Hyderabad



Attachment 1-3 Cost of milk production of buffalo milk in Hyderabad (as of 2017)

OFFICE OF THE EXECUTIVE DIRECTOR ANIMAL HUSBANDRY SINDH

Ground Floor, Block-A Shahbaz Building Hyderabad-71000, Tel, 022-9200966, Fax: 022-9200669, Hyderabad.

NO: DAH/LSF/2017/

Hyderabad dated:

**Cost on per litter production of Milk Year 2017
(For Interior Sindh)**

Sr.#	Particulars	Value
Cost of production per liter of buffalo Milk		
1	Average Milk production per Buffalo	08 litter / day
2	Capital investment	
	a. Average cost of Fresh milking buffalo	RS: 140000-00
	b. Average Resale value of dry buffalo	RS: 80000-00
	c. Average difference per Buffalo	RS: 60000-00
	Average Lactation Period	270 Days
3	Average production cost per litter of Milk	
A.	Cost production of per day of Milk (8 litters)	RS: 588.00
	Per day capital investment (as above)	RS: 222.22-00
	Mortality	RS: 04.44
	Total	RS: 226.66
B.	Management	
	Labour Pay	RS: 27-00
	Vaccine / Medicine	RS: 10-00
	Country Medicine, Molasses & Oil etc	RS: 05-00
	Electricity Equipment (hardware, purchase / repair)	RS: 05-00
	Electric Charges / Gas & Phone Bills	RS: 07-00
	Farm rent / Repair	RS: 07-00
	Total	RS: 61-00
C.	Feeding Charges per Buffalo per day	
	Green Fodder 20 KG at RS: 4.5 / KG	RS: 90-00
	Wheat Straw 6 KG as RS: 7.5 /KG	RS: 45-00
	Cotton seed Cake 2 KG RS: 32 / KG	RS: 64-00
	Wheat Bran 2 KG at RS: 26	RS: 52-00
	Grain 1 KG at RS: 36 / KG	RS: 36-00
	Total	RS: 287-00
D.	Grand Total of all (A+B+C=D) *	RS: 574.66
4	Suggested profit	RS: 13.34
5	Cost of Production per 8 litter of Milk / day	RS: 588.00
6	Cost of Production per liter of milk	RS: 73.50

Note: Young Calf is Additional Bonus income for farmer.

(DR ABDUL QADIR JUNEJO)
EXECUTIVE DIRECTOR



Attachment 1-4 Cost of milk production of buffalo milk in Hyderabad (as of 2018)

**OFFICE OF THE
EXECUTIVE DIRECTOR ANIMAL HUSBANDRY SINDH**

Block – A, Shahbaz Building, Thandi Sarak Hyderabad - 71000




No: EDAH/LSF/2018/

Hyderabad, dated:- 2018

**Cost on per litter production of Milk Year 2018
(For Sindh)**

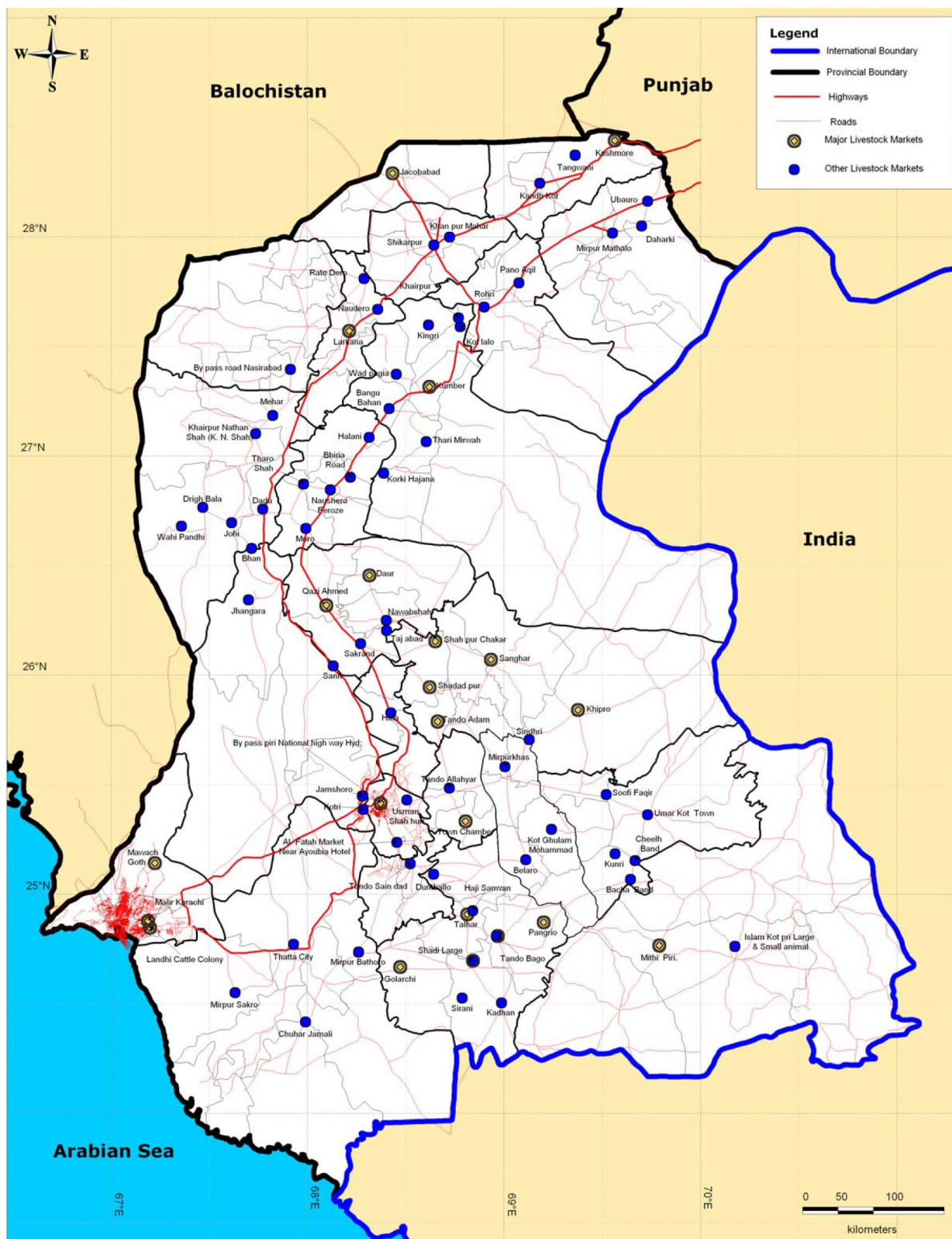
Sr.#	Particulars	Value
Cost of production per liter of buffalo Milk		
1	Average Milk production per Buffalo	08 litter / day
2	Capital investment	
	a. Average cost of Fresh milking buffalo	RS: 140000-00
	b. Average Resale value of dry buffalo	RS: 80000-00
	c. Average difference per Buffalo	RS: 60000-00
	Average Lactation Period	270 Days
3	Average production cost per liter of Milk	
	A. Cost production of per day of Milk (8 litters)	RS: 601.66
	Per day capital investment (as above)	RS: 222.22-00
	Mortality	RS: 04.44
	Total	RS: 226.66
	B. Management	
	Labor Pay	RS: 40-00
	Vaccine / Medicine	RS: 10-00
	Country Medicine, Molasses & Oil etc	RS: 08-00
	Electricity Equipment (hardware, purchase / repair)	RS: 08-00
	Electric Charges / Gas & Phone Bills	RS: 08-00
	Farm rent / Repair	RS: 12-00
	Total	RS: 86-00
	C. Feeding Charges per Buffalo per day	
	Green Fodder 20 KG at RS: 4.5 / KG	RS: 90-00
	Wheat Straw 6 KG as RS: 8 /KG	RS: 48-00
	Cotton seed Cake 2 KG RS: 32 / KG	RS: 64-00
	Wheat Bran 2 KG at RS: 26	RS: 52-00
	Grain 1 KG at RS: 36 / KG	RS: 36-00
	Total	RS: 290-00
	D. Grand Total of all (A+B+C=D)	RS: 601.66
4	Suggested profit	RS: 15.00
5	Cost of Production per 8 litter of Milk / day	RS: 601.66
6	Cost of Production per liter of milk	RS: 75.20
7	Suggested Milk Prize	Rs.90.20

Note: Young Calf is Additional Bonus income for farmer.


 Live Stock Development
 Officer Sindh



Attachment 1-5 GIS map – Location of livestock market in Sindh



JICA Project Team:
Kaihatsu Management Consulting, Inc.
C.D.C. International Corporation

Prepared By:
Exponent Engineers (Pvt.) Ltd

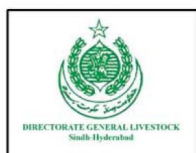
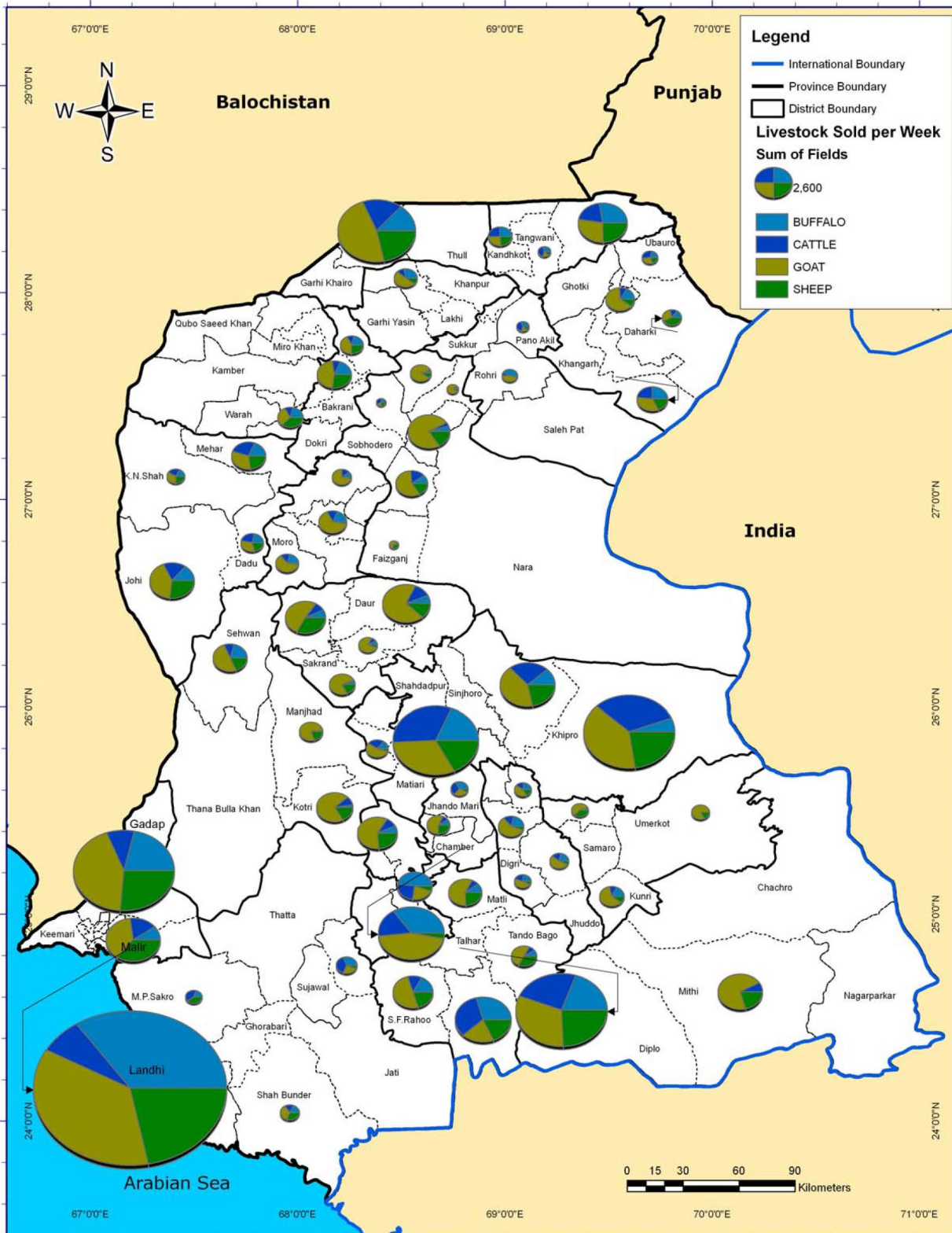
The Project for the Master Plan Study on Livestock, Meat and Dairy Development in Sindh Province

Location of Livestock Market in Sindh





Attachment 1-6 GIS map – Total number and distribution of livestock sold at livestock market per week at taluka



JICA Project Team:
 Kaihatsu Management Consulting, Inc.
 C.D.C. International Corporation

Prepared By:
 Exponent Engineers (Pvt.) Ltd

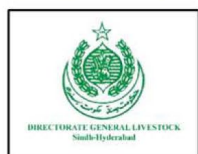
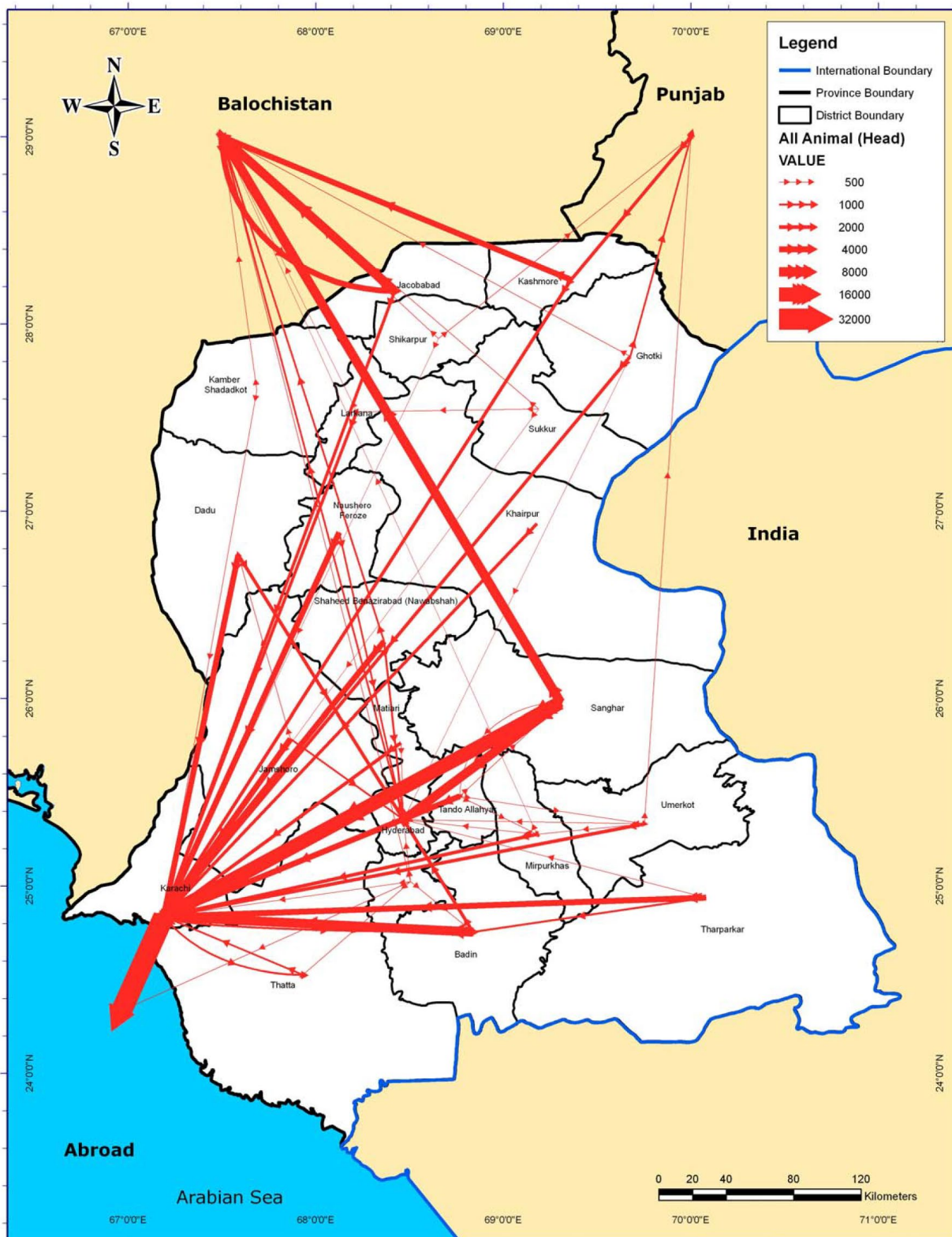
The Project for the Master Plan Study on Livestock, Meat and Dairy Development in Sindh Province

Total number and Distribution of livestock sold at Livestock Markets per Week at Taluka Level





Attachment 1-7 GIS map – Flow of animal head through livestock market



JICA Project Team:
 Kaihatsu Management Consulting, Inc.
 C.D.C. International Corporation
Prepared By:
 Exponent Engineers (Pvt.) Ltd

The Project for the Master Plan Study on Livestock, Meat and Dairy Development in Sindh Province
Flow of Animal Head through Livestock Market





Chapter 2 Farmers' Awareness Raising Activity

As mentioned in Chapter 1, the Project set up the following principle for marketing.

- Marketing principle for the Project is **“Produce (Grow) to Sell”** but not “Produce (Grow) and Sell”

Based on the above principle, the Project intends to raise farmers' awareness on marketing by providing market information and implementing marketing workshop. In this chapter, how to conduct workshop (as Section 2.1), marketing model and case study which can be introduced to farmers (Section 2.2) are introduced.

2.1 How to Conduct Workshop

2.1.1 Objective of Workshop

Objective of workshop for marketing as follows:

- To understand the current situation of participants (farmers) regarding milk marketing such as (milk production volume,) milk sales volume, milk sales price, and milk sales channel before providing advices on milk marketing
- To let farmers recognize their marketing potentials by knowing current situation of milk marketing in the community as well as success story in other areas
- To find additional success stories of milk marketing

2.1.2 Procedure of the Workshop

(1) Preparation

- Before implementing the workshop, milk market information such as milk purchasing/selling price/volume at milk shop, milk purchasing price/volume at tea shop, those shops' willingness to buy milk from rural farmers in the area including nearby city should be confirmed.
- Before implementing the workshop, tentatively identify suitable marketing success models to share with participants.
- Prepare necessary materials for the workshop such as large paper, pens, and so on.

(2) Workshop for marketing

1) Introduction

- Share the purpose of the marketing workshop with participants.
- Share the importance of marketing.

2) Network diagram development (for milk, butter, and ghee)

< milk >

- Identify persons who sell milk among participants, then start drawing the network diagram.
- If the number of the persons who sell milk was a few, please identify persons who produce milk, then start drawing the network diagram.
- Ask persons who said selling (or producing) milk about following items and draw the networking diagram.
 - Name
 - Their milk production volume and milk selling volume
 - Their milk selling price
 - Their milk selling outlet (middleman, shops in the village, individual household in the village, etc)



- Their milking animals (buffalo or cow)
- Their baradari if they are mix
- Please refer Figure 2-1 which indicates how to draw the network diagram.

<butter/ghee>

- Please confirm if anyone sell butter and ghee. If someone sells butter or ghee, please draw another network diagram.

3) Confirmation of the result

- Once the network diagram of milk is developed, share the best practices and bad practices of milk marketing
- Please note if you find interesting/good practices of milk marketing and report it.
- If farmers sell milk at low rate, ask farmers the reason and how they can improve it.
- Share existing success stories which can be applied in the area.
- Let farmers think and let them talk how they can improve their milk sales channel.
- Suggest farmers to visit nearby market. If farmers agree, help them to visit and discuss with potential buyers.
- Confirm their conclusion, next step. Please summarize their next step and report it.

(3) Follow-up

- If farmers agree to visit nearby market, help them to visit and discuss with potential buyers.
- Share the result and findings of marketing workshops, their next step, and success story (if any) with M/T and C/P in charge of marketing.
- Monitor their progress a few weeks or month later and report it to M/T and C/P in charge of marketing.

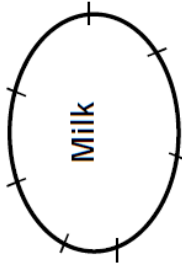
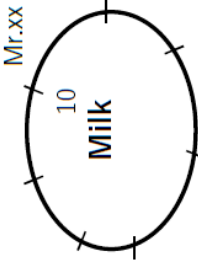
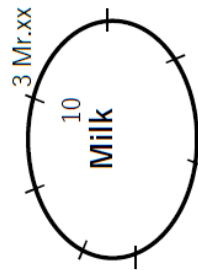
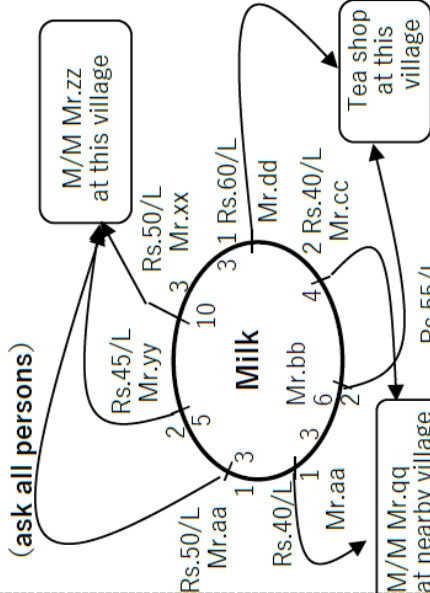
<p>① “How many persons sell milk?” e.g. 7 persons Please draw 7 points on the diagram.</p>  <p>* If the number of persons who sell milk is small, please ask persons who produce milk then start drawing the diagram.</p>	<p>② Please share your marketing channel with other villagers. “Can I have your name?” “How may milk do you produce?” Please write production volume in the circle.</p> 	<p>③ “How many milk do you sell?”</p> 
<p>④ “To whom do you sell your milk?” “And how much?”</p>  <p>(ask all persons)</p>	<p>* Please identify biradari if participants' biradari are mixed. * Please confirm milking animals are buffalo (or cow).</p>	

Figure 2-1 Example of network diagram for milk marketing



2.2 Case Study and Potential Marketing Model

Through various field activities with P/F, the Project found remarkable success stories for dairy marketing and could identify potential marketing models which can be applied to other farmers. In this paper, brief of cases for dairy marketing, potential marketing models and the detail of each success case are summarized.

2.2.1 Brief of marketing model and cases

(1) Example of good practices

Six successful stories for dairy marketing were identified. While the detail of each case are summarized later, outline of the stories are summarized below.

Marketing model 1: Direct sales to neighboring households in the village – Case of Ms. Saleha in District TA

Ms. Saleha, one of the pilot farmers of the Project, can get higher price of milk by selling buffalo pure milk to neighboring households at Rs.80/kg when the retail price in the village is Rs.70/kg. (As of January 2018) (The model was developed by herself)

Marketing model 2: Becoming a middleman – Case of Mr. Pahlaj in District Hyderabad

Mr. Pahlaj, one of the pilot farmers of the Project, can get better price by becoming a middleman after he increased milk production by applying formula feed. He used to sell his milk to a middleman at Rs.40/kg in winter and Rs.45/kg in summer. In February 2015, he started selling his milk and other farmers milk to shops in Hyderabad city at Rs.65/L to Rs.70/L. In December 2015, he decreased his milk price to Rs.50/L. However, he again increased milk price at Rs.60/L in April 2016 and Rs.65/L in July 2017. Since then he has been selling milk at Rs.65/L (As of January 2018).

Marketing model 3: Linkage to Engro chiller – Case of Mr. Haji Ali Akbar in District Badin

Mr. Haji Ali Akbar, one of the pilot farmers of the Project who lives in Badin, sold his cow milk to his son who works as a middleman. His son sold milk to nearby mava maker at Rs.30/kg. After his son took some commission, his son can pay Mr. Haji Ali Akbar only Rs.28/kg. In addition to low price, delay of payment from the mava maker was another issue.

The Project implemented a joint workshop with Engro in the village. The son of the pilot farmer is interested in and decided to sell his milk to Engro. Now he can sell his milk at about Rs.37/kg throughout a year without any delay of payment. He stopped selling milk to Engro chiller in April 2016 because his milk production volume became small. He said that once his milk production volume increases, he will start selling milk to Engro chiller. (As of January 2018)

Marketing model 4: Negotiation with an existing middleman as a group – Case of Mr. Naiz Ali in District TMK

Mr. Naiz Ali, one of the pilot farmers of the Project, lives at Village Adam Punhawar, District Tando Mohammad Khan used to sell his buffalo milk to a middleman at Rs.40/L in the beginning of April 2015 although the village is located relatively close to Hyderabad city where milk retail price is Rs.70/L to Rs.80/L.

A marketing workshop was conducted in the village by the Project in the middle of April 2015 as encouraging villagers to improve their milk sales channel. After the workshop, he and the village chief discussed internally and negotiated with the middleman. The middleman has good marketing channel for pure buffalo milk in Hyderabad and



agreed to have an annual agreement which ensured the middleman pays Rs.60/L for pure buffalo milk. The middleman reduced milk purchasing price of almost all farmers to Rs.50/L or Rs.55/L. However, since Mr. Naiz Ali has been selling pure milk, his milk selling price has been the same, at Rs.60/L in January 2018. This case can be a success case of marketing model 6 “Sales of good quality milk at better price”.

Marketing model 5: Selling milk to individual households an town through relatives at town– Case of Mr. Abdul Qadir (non-PF) in District Badin

Mr. Abdul Qadir who lives in the same village with Mr. Haji Ali Akbar, our PF, sells his milk at Rs.80/L through his brother who lives in Talhar city in November 2015. As of January 2018, he has been selling his milk at Rs.80/L

Marketing model 6: Sales of good quality milk at better price - Case of Mr. Niaz Ali (P/F) in District Tando Muhammad Khan and case of Dhanar Dairy Farm in Chattan Arisar Village, District Tando Allahyar

As mentioned above, Mr. Niaz Ali, P/F in District Tando Muhammad Khan, can be a success story of this marketing model.

In addition, Dhanar Dairy Farm was established in June 2016. Since the farm produces good quality and quantity of milk, 120 L/day of pure milk, the farm can sell their milk at relatively higher price (Rs.70/L to tea shops and Rs.75/L to individual households nearby the farm in October 2016) and individual households and some tea shop owners come to the farm to buy milk.

Marketing model 7: By-products sales – Case of Abdul Karim at a pilot village named Haji Hussain Dal and Mr. Faqero at Haji Ghulam Nabi Shah in District Tando Muhammad Khan

Two success stories of by-products sales have been identified during the fourth project year in District Tando Muhammad Khan.

2) Example of bad practices

Case A: Lost trust of buyers – Case of Mr. Ghulam Hyder in District Matiari

Mr. Ghulam Hyder who used to work as a middleman lost trust from the dairy shop which pays Rs.70/kg in Saeedabad since he adulterated milk with water. As a result, Mr. Ghulam Hyder sells his milk at Rs.50/kg these days.

The shop owner is willing to buy pure milk. Therefore, in near future the Project can try to develop linkage with the dairy shop if surrounding farmers commit procure pure milk to the dairy shop.

2.2.2 Potential marketing model

Based on the above mentioned good practice, the potential marketing models can be summarized as shown in the below table.

Table 2-1: Potential marketing models based on good practices

#	Model	Case	Good practice
1	Direct sales to neighboring households in the same village	Case of Ms. Saleha in TA	<ul style="list-style-type: none"> • Selling hygienic and pure milk • Direct sales to neighboring households
2	Becoming a middleman	Case of Mr. Pehlaj in Hyderabad	<ul style="list-style-type: none"> • Becoming a middleman • Direct sales to dairy shops at nearby city
3	Linkage to Engro chiller	Case of Mr. Haji Ali Akbar	<ul style="list-style-type: none"> • Linkage between milk processors and



			farmers
4	Negotiation with existing middleman as a group	Case of Mr. Niaz Ali	<ul style="list-style-type: none"> • Selling hygienic and pure milk • Negotiation with existing middlemen after recognizing market
5	Selling milk and by-products to individual households at town through relatives at town*	Case of Mr. Abudl Qadir (non-PF) in Badin and case of Mr. Faqero in TMK	<ul style="list-style-type: none"> • Direct sales to individual household at town through relatives at town
6	Sales of good quality milk at better price	Case of Mr. Niaz Ali in TMK, Mr. Sultan in TA, and Dhanar dairy farm	<ul style="list-style-type: none"> • Selling pure milk at higher price
7	By-products sales	Case of Mr. Abdul Karim (a villager at a pilot village named Haji Hussain Dal, TMK, and case of Mr. Faqero in TMK	<ul style="list-style-type: none"> • Producing and selling by-products (ghee)

Note *: The name of marketing model 5 “Selling milk and by-products to individual households at town through relatives at town” was changed from “Selling milk to individual households at town through relatives at town” because new success story of Mr. Faqero, P/F in TMK, who started selling ghee through his cousin in Hyderabad, was confirmed in 2017.

2.2.3 How to find applicable good practices?

As introduced above, there are several good practices identified by the Project. However, some practices can't be applied for all farmers because of the marketing environment. Applicable marketing environments and suitable location for each case are summarized in the below table.

Table:2-2 Applicable condition of each case

#	Marketing model	Applicable condition	Suitable location
1	Direct sales to neighboring households in the same village	<ul style="list-style-type: none"> • High demand of milk in the village 	Nearby Hyderabad city, Tando Allahyar town, and Matiari town
2	Becoming a middleman	<ul style="list-style-type: none"> • The village is located near city 	Nearby Hyderabad city, Tando Allahyar town and Matiari town
3	Linkage to Engro chiller	<ul style="list-style-type: none"> • Location where there is proper marketing channel (such as city) • Applicable to especially cow milk producers 	Rural area in Badin and TMK
4	Negotiating with existing middleman as a group	<ul style="list-style-type: none"> • The village is located near city 	Nearby Hyderabad city, Tando Allahyar town and Matiari town
5	Selling milk to individual households at town through relatives at town	<ul style="list-style-type: none"> • Farmers or any supporters has good relation with retail shops or individual households at nearby town • The village is located nearby town 	Villages nearby town in any pilot district
6	Sales of good quality milk at better price		Everywhere
7	By-products sales	<ul style="list-style-type: none"> • Quality ghee can be produced and linkage to market can be confirmed 	Everywhere



In order to find applicable practice, the blow flowchart can be used.

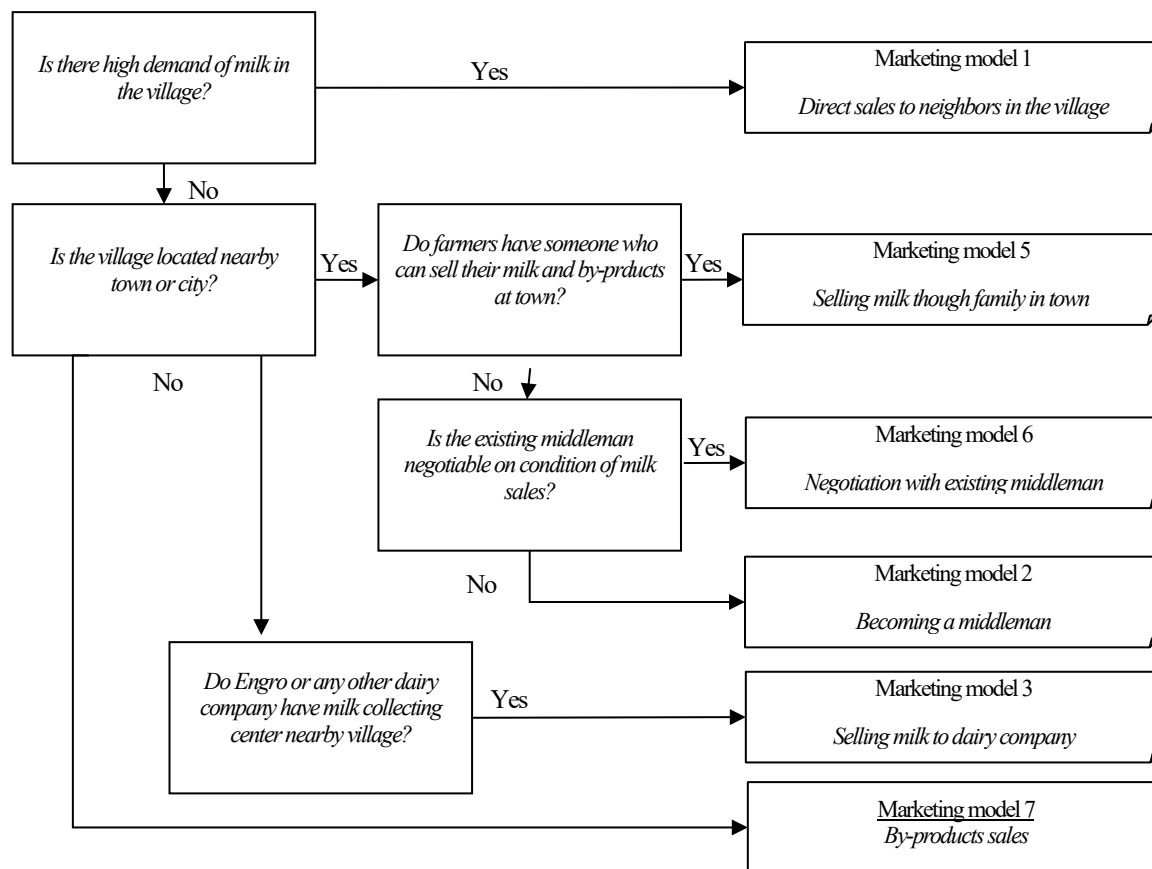


Figure:2-2 Flowchart to identify applicable cases

2.2.4 Other potential models

Based on the discussions and observation with farmers and other stakeholders such as dairy shops and middlemen, following marketing model are identified as additional potential marketing models. In the third project year, the following marketing model will be examined and applied if the model is recognized as good practices.

(1) Long distance distribution

- The Project analyzed the cost and profit of long distance distribution, e.g. from villages in District Badin to Hyderabad open market by collecting milk wholesale price at milk wholesale market in Hyderabad. The result from January to November 2016 is summarized. If farmers are interested in applying this model, the Project will support the farmers to do it.



2.2.5 The detail of the each case

Case 1: Direct sales to neighboring households in the village – Case of Ms. Saleha in District TA

Background of Ms. Saleha

Ms. Saleha Daudani is one of the pilot farmers under the Project on Sustainable Livestock Development for rural Sindh funded by JICA and Government of Sindh. She lives at village Haji Bahadur Daudani, union council Bagan Jarwar, Taluka Chamber, District Tando Allahyar. She is a small scale livestock farmer. Her major income source is livestock, having 8 Kundhi buffaloes (6 own animals and 2 calves shared with the JICA Project).



The pilot village is located about 52 km away from the project office in Hyderabad and 12 km from Tando Allahyar city. The village size is 12 acres. Four biradarries, namely Daudani, Majidano, Chandia and Kolhi, lives in the village, consisting of 6 para with 126 households.

Before the independence of Bangladesh, she had originally lived in East Pakistan which is current Bangladesh and migrated to Karachi in 1970. After her marriage in 1971, she settled in village Haji Bahadur Daudani, District Tando Allahyar.

Although she came from outside, she has developed good social relations with all biradarries of the village. With high motivation for rearing livestock, she has been leading all females and supporting them in case of any livestock issues by calling local veterinarians for treatment.

She is a decision maker of her household regarding livestock. She is rearing high potential mix Kundhi buffaloes in appropriate manner. She always follows the vaccination and deworming schedule as well as early treatment of sick animals.

Her milk production and sales

As of April 2015, she has 3 milking mix Kundhi buffaloes and the milk production is 16 liters per day. She keeps 10 liters for self-consumption and sells 6 liters per day at Rs.80/L which is higher than the retail price in Tando Allahyar city, Rs.70-75/liter.

One of reasons why she can sell her milk at higher price is because of high demand of milk in her village. In this pilot village, the human population is about 900 while population of cattle and buffaloes are about 100 and the milking cattle and buffaloes are about 25. Therefore, the demand of milk is higher because of less production of milk. Two milk retail shops in the village purchase milk from nearby villages and sell it at Rs.65-70/L.



Another reason why she can sell her milk at higher price is that she sells hygienic and pure milk without adulteration. The villagers want to purchase milk from PF Ms. Saleha because villagers are afraid that the milk available at milk shops in the village is adulterated with water.

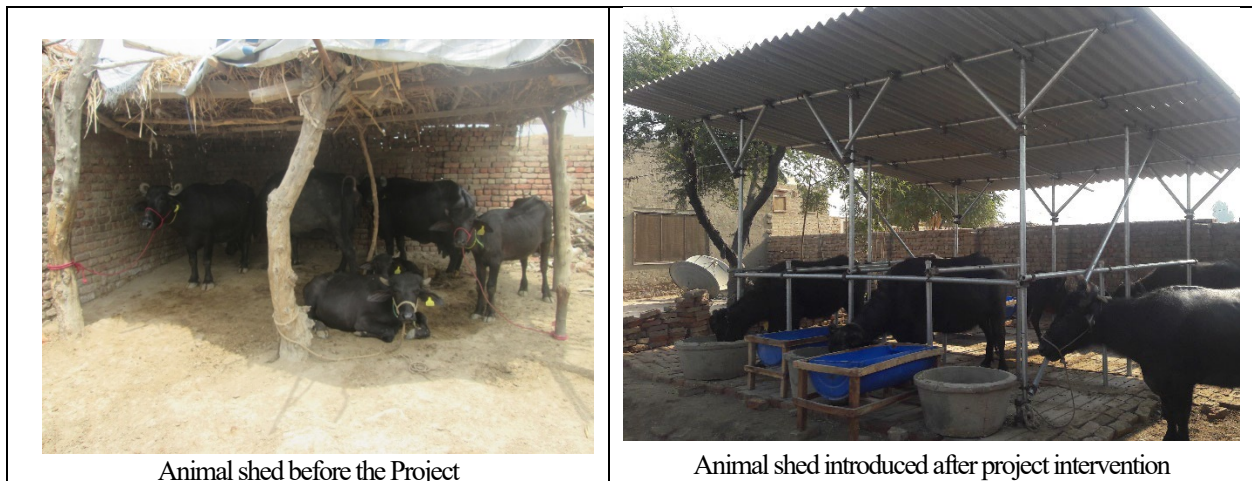
She is also making milk by-products such as butter and Ghee. She sells butter at 800/kg and Ghee at Rs.1,000/kg which is another good income source for her.

Good practices

- If farmers sell pure and hygienic milk, they can get better price like P/F Ms. Saleha.
- Farmers can get better price by direct sales to households in the same village

Monitoring

- 1) As of December 2016, she sells her milk at Rs.80/L to her neighboring households.
- 2) As of January 2018, she continues selling her milk at Rs.80/L to her neighboring households.
- 3) As of January 2019, PF has one milking head, and total milk production is 4 liters per day. PF keeps 2 liters of milk for self-consumption and sells 2 liters of milk per day at Rs. 80 per liter to individual households in the village.



(As of November 2015)

(Updated in December 2016)

(Updated in January 2018)

(Updated in January 2019)

(end)



Case 2: Becoming a middleman – Case of Mr. Pelaji in District Hyderabad

Background of Mr. Pehlaj

Mr. Pehlaj Kolhi lives at village Saleh dal, union council Masu Bhurgri, Taluka Hyderabad in District Hyderabad, having 8 family members. He is a tenant agriculture farmer and his major income sources are agriculture and livestock. He rears 14 animals in total, 13 kundhi buffalos and one Thari cattle. He practices sharing of 4 Kundi buffalos and 1 Thari cattle while he owns 8 Kundhi buffalos. He is one of the pilot farmers under the project on sustainable livestock development for rural Sindh, hereinafter called “the Project”, funded by JICA, the Japan International Cooperation Agency, and the Government of Sindh. The village where he lives is 15 km from Hyderabad city.



His milk production and sales

All livestock farmers in the village sold their milk to a middle man who comes outside of the village at Rs. 40/L in winter and Rs.45/L in summer in 2014. He has 2 milking mix Kundhi buffaloes, and the milk production was 5.5L/day (once a day). He kept 2 liters for self-consumption and sold 3.5 liters to the middle man at Rs.40/L.

The Project introduced 2kg of formula feed twice a day to his 2 milking animals and provided suggestions on marketing of milk to develop a linkage to milk market at Hyderabad city.

The milk production is increased up to 13.5L/day. He keeps 4L/day for self-consumption, and he sells 9.5L/day to a tea shop and a sweet shop in Hyderabad city in morning at Rs.65/L. In addition, he started collecting milk from 5 livestock farmers in the same village. He can collect 25L in the morning and 10L in the evening, 35 liters in day. He pays Rs.50/L to the livestock farmers in the same village.

Good practices

- Farmers can sell his milk at higher prices by working as a middleman who sells milk directly to dairy shops and individual households.

Monitoring

- 1) In December 2015, he decreased his milk price from Rs.60-70/L to Rs.50/L. However, in April 2016, he again increased his milk price at Rs.60/L. Since then, he has been selling milk at Rs.60/L.
- 2) As of December 2017, he has 2 milking buffaloes which produces 15L of milk. He consumes 7 L at home and sells 8 L per day at Rs.65/L to a sweets shop in Hyderabad city. He also purchases 9 L of milk at Rs.50/L from 2 farmers in the same village and sell 4 L of milk to individual households at nearby village and 5L of milk to tea shop at nearby village at Rs. 65/L. He said that he used to purchase milk at Rs.50/L from other villagers before this winter and sold it at the milk wholesale market in Hyderabad. However, since the milk price at the milk wholesale market in Hyderabad



decreased to less than s.50/L, he stopped purchasing milk from those farmers. He said that he will start purchasing milk from those farmers once the milk price at the milk wholesale market in Hyderabad increases.

- 3) As of January 2019, PF has two milking animals. Milk production is 10 liters per day. They keep 3 liter per day for self-consumption and sell 7 liters per day directly to tea shops in Hyderabad at Rs.80 per liter. He found this marketing channel through his relative in Hyderabad in April 2018. The PF was happy to sell his milk at Rs.80 per liter throughout year. Beside, the PF also work as a middleman and purchase 30 liters of milk per day from surrounding farmers in the same village at Rs.60 per liter and sell them at Rs.80 per liter with his milk.

(As of November 2015)

(Updated in December 2016)

(Updated in January 2018)

(Updated in January 2019)

(end)

Case 3: Linkage to Engro chiller – Case of Mr. Haji Ali Akbar in District Badin**Background of Mr. Haji Ali Akbar**

Mr. Haji Ali Akbar lives at Village Ghulam Hussain Jamali, District Badin. He has 14 acres of own land and rears both buffalos and cattle, 9 buffalos and 8 cattle. In the end of March 2015, he produced 6L/day of buffalo milk and 3L/day of cattle milk. Mr. Haji Ali Akbar consumed buffalo milk and sold only cattle milk. His son, Mr. Siraj, has been working as a middleman. Mr. Siraj collected milk from his house, his family's house, and others and sold milk to nearby mava maker at Rs.30/kg. After Mr. Siraj takes small commission, he paid Mr. Haji Ali Akbar only Rs.28/kg. In addition to the low price, the delay of payment from the mava maker was another issue.



The Project tried to find better marketing channel for the pilot farmers. However, purchasing price of cattle milk is relatively low at shops in nearby town. In winter, some shops don't accept cattle milk because of high supply and low demand of milk in the season.

Workshop by Engro

The Project discussed with a dairy company, named Engro Foods limited (Engro), who installed milk collecting center in Sindh Province. In District Badin, Engro installed milk collecting centers at Badin town, Tando Bago, Golarchi, and so on, and was willing to buy more milk. The Project implemented a joint workshop with Engro in the village. Engro explained their purchasing price and tried to convince farmers to sell their milk to Engro chiller. Engro established milk collecting system in which all milk brought by farmers or middleman are checked and its price is determined based on the ratio of total solid in milk. For example, if the milk contains 13% of total solid, Engro pays Rs.42/L or so.

**His milk production and sales**

The Project brought milk of Mr. Haji Ali Akbar and confirmed that the purchasing price of the milk was about Rs.37/L. Mr. Siraj preferred selling milk to Engro instead of the mava maker because of higher purchasing price, transparent payment, unlimited purchasing volume, and timely (weekly) payment. Mr. Siraj can get Rs.5/L of commission as a middleman and Mr. Haji Ali Akbar can get about Rs.32/L constantly.



Good practices

- Farmers who rear cow in District Badin where milk marketing channel is limited may get better price by linking with milk processors.

Monitoring

1) From July 2015 to December 2016

Mr. Siraj Uddin, a son of Mr. Haji Ali Akbar who lives at Ghullam Jamali Village, Badin District started selling milk to Engro chiller after the joint workshop held by JICA team and Engro Foods in May 2015. The milk supply and payment had gone smoothly. However, in July 2015, the second week of Ramadan, there was an issue of the payment.

Mr. Siraj Uddin claimed that i) The payment was Rs.4,500 less than his expected amount, ii) The amount of the previous payments were also Rs.250 or Rs.400 less than his expected amount, iii) Mr. Siraj Uddin supplied 490L of milk (adjusted volume). But the payment was only 419L (adjusted volume). In the end of the discussion among Mr. Siraj Uddin, Engro, and the Project team, the confusions was made by Mr. Siraji Uddin's misunderstanding. The detail explanations on each issue were summarized as follows;

i) The payment was Rs.4,500 less than his expected amount

- ⇒ The weekly payments of the week was divided into two times, the first payment was Rs.4,210 on 10 July and the second payment was Rs.13,411 on 15 July. The total amount was one which he expected. However when he asked received money at the bank, the bank told only the amount of the second payment. Therefore Mr. Siraj though he received only Rs.13,411 instead of Rs.17,621.
- ⇒ The Project team recommended him to check his bank note carefully. And Engro checked his registration and found that the registered phone number was one of his father. Engro will change the registered phone number of Mr. Siraj in order that Mr. Siraj can receive remittance information directly from Engro through his mobile phone (Engro sends SMS to suppliers' mobile phone in each remittance).

ii) The amount of the previous payments were also Rs.250 or Rs.400 less than his expected amount

- ⇒ Mr. Siraj saw the notification of (adjusted) milk price was Rs.42.5/L at Milk Collecting Center. However, the price was for direct farmer which is different category (he belongs to Village Milk Collector). His actual (adjusted price) price was Rs.42.0/L.

iii) Mr. Siraj supplied 490L of milk (adjusted volume). But the payment was only for 419L

- ⇒ Mr. Siraj supplied 490L of milk in the previous week while he supplied 419L of milk in the week instead. Mr. Siraj receives slip every time. However, because of the thermal paper, the printed information will disappear within several days. Therefore Mr. Siraj can't remember which week how much he supplied milk exactly. The Project team recommended him to take copy of the slip and keep them for a while to avoid this confusion. Mr. Siraj agreed on it.

Mr. Siraj understood the situation and explanation. He started selling his milk to Engro by the end of November 2015. Since September 2016, Mr. Haji Ali Akbar has not had enough milk production for sale. But he said that once he gets enough quantity of milk, he will start selling milk to Engro.

2) From December 2016 to January 2018



In October 2017, Mr. Haji Ali Akbar had 17 buffaloes and cow including 2 calves provided by the Project for sharing. However, he decided to sell his animals to buy some land nearby his house. He sold 9 animals from October to December 2017. As a result, he has only 3 adult female buffalos and 5 calves including 2 calves provided by the Project for sharing. He has 2 milking buffalos which produce 12 L/day, but he consumes all milk at home and doesn't sell milk. However, once he get harvest in next agriculture season at his land, he has a plan to increase the number of animals. He said that once he increases milk production, he would like to sell his milk to the same Engro chiller.

3) As of January 2019

The PF has three milking buffaloes producing 20 liters per day. He keeps 10 liter per day for self-consumption and sells 10 liters per day at Rs.60 per liter to a milk shop in nearby town, Talhar.

(As of November 2015)

(Updated in December 2016)

(Updated in January 2018)

(Updated in January 2019)

(end)



Case 4: Negotiation with an existing middleman as a group – Case of Mr. Naiz Ali in District TMK

Background of Mr. Naiz Ali

Mr. Naiz Ali, one of the pilot farmers of the Project, lives at Village Adam Punhawar, Taluka Tando Muhammad which is close to Hyderabad city.

Workshop by the Project

A marketing workshop was implemented in the village by the Project in the middle of April. The Project encouraged villagers to consider how they could improve their milk sales after sharing the market price of milk is high, about Rs.70/L to Rs.80/L.



His milk production and sales

He sold his buffalo milk to a middleman at Rs.40/L in the beginning of April 2015.

After the workshop, he and the village chief discussed internally and negotiated with the middleman. The middleman has good marketing channel for pure buffalo milk in Hyderabad and agreed to have an annual agreement which ensured the middleman pays Rs.60/L for pure buffalo milk.



Good practices

- Farmers can get better price by selling hygienic and pure milk
- Farmers may get better price by negotiation with existing middlemen

Monitoring

1) As of December 2016

The middleman reduced milk purchasing price to almost all farmers at Rs.50/L or Rs.55/L because those farmers adulterate milk with water. However, since Mr. Niaz Ali has been selling pure milk, his milk selling price has been keeping at the same, Rs.60/L in December 2016.

2) As of January 2018

He continues selling milk to the same middleman at higher price, Rs.60/L.

3) As of January 2019

He continues selling milk to the same middleman at Rs.60/L.

(As of November 2015)

(Updated in December 2016)



The Project on Sustainable Livestock Development for Rural Sindh



(Updated in January 2018)

(Updated in January 2019)

(end)



Case 5: Selling milk to individual households in town – Case of Mr. Abdull Qazi (non-PF) in District Badin

Background of Mr. Abdul Qadir

Mr. Abdul Qadir Jamali resident of pilot village Ghullam Hussain Jamali District Badin working as primary school teacher in same village having three mix Kundhi buffaloes, two are milking and one is dry total milk production is 10 liters per day he sales 5 liters of milk per day and keeps 5 liters of milk for self-consumption per day.

Previously he sold milk at Rs.50 per liter to the middle man in the village.



Mr. Abdul QadirJamali

One of his younger brother is shifted with family in nearby town Talhar and opened a grocery shop, and kept one milking buffalo for self-consumption, one day he was milking buffalo one person from nearby household came and request him that kindly give 2 liters of milk I will pay you, he said that I will sell milk at Rs.80/= per liter than the customer said ok I will pay you Rs.80/= per liter. In this way he found few customers in the neighbor. He doesn't have enough quantity of milk to fulfill the demand of all customers, and he contacted with his brother Mr. Abdul Qadir that you are selling milk to middleman at Rs.50/L please supply to me I have few customers in Talhar I can sell your milk are Rs.80/L. In this way Mr. Abdul Qadir Jamali improved the marketing of milk and at present he sells his milk at Rs.80/L and he happy now.

Good practices

- Farmers can get better price by direct sales to individual households at town through relatives at town

Monitoring

- 1) As of December 2016, he has been selling his milk through the same marketing channel and at the same price, R.80/L.
- 2) As of January 2018, he continues selling his milk through his relative at Tando Muhammad Khan city.
- 3) As of January 2019, he has five buffaloes; one is dry pregnant, and four are milking producing 23 liters per day. He keeps six liter per day for self-consumption and sells 17 liters per day at Rs.80 per liter to same marketing channel.

(As of November 2015)

(Updated in December 2016)

(Updated in January 2018)

(Updated in January 2019)

(end)

Case 6: Producing good quality and quantity of milk- Case of Dhanar Dairy Farm in Chattan Arisar Village, Tando Allahyar District

Background of Dhanar Dairy Farm

This farm was established in June 2016. As of October 2016, the total number of animals is 63, out of which 16 are milking. All animals are tagged. The farm also rears calves.

The original plan of the farm was to purchase dry buffaloes for recycling to earn income. But after purchasing a few animals, some animals aborted and they thought that dry buffalo recycling business was not profitable. On the same time, they thought that there was demand of pure and good quality of milk in the area. The plan was changed to purchase milking animals and sell milk.



(Photo of Dhanar Dairy Farm)

Their milk production and sales

Total milk production volume is 120 liters per day (L/day). Self-consumption volume is 10 L/day, and sales volume is 110 L/day. Sales price is Rs.70/L to tea shops and Rs.75/L to individual households near the farm.

At present, they supply morning milk to tea shops at nearby stop. In evening tea shop owners come to the farm to buy milk. The individual households also come and purchase milk directly from the farm. They said that they can sell 40 liters of milk per day in addition to their current sales volume, 110L/day.

They are keeping the farm management record of both hard and soft copies. They record sale and purchase of animals, daily milk production, self-consumption, sales volume and price of milk, expenditure for purchase of concentrate, green fodder, and dry fodder, health record and labor cost.

Good practices

- The dairy farm can sell milk at higher price than surrounding rural farmers. Even the buyers such as the shop owners and individual households come to the farm to buy milk. It is a good example which shows farmers can sell their milk at higher price if farmers can produce quality milk with sizable volume, and even buyers come to farmers to buy milk.

Monitoring

1) As of January 28, 2018

They increased the number of animals. At present they have 70 milking buffaloes, 10 milking cows, 40 calves, 1 buffalo bull and 1 cow bull so that total number of animal is 122. They produce 400L of buffalo milk and 120L of cow milk per day and they keep 10L/day for self-consumption. They sell 140L of milk at Rs. 83/L to tea shop in Tando Allahyar on annual agreement bases. For sustainable milk marketing they opened their own milk outlet in Tando Allahyar and sell 370L/day at Rs.78/L. At present they don't have any issue to sell the milk. Their shop, Dhanar dairy milk, sells fresh raw milk, yoghurt at Rs.95/kg, desi ghee at Rs. 1000/ kg and flavored milk with pistachio at Rs. 55 per bottle of 250ml.



This farm has 100 acres of own agriculture land and cultivates green fodder at 8 acres of land. They store 6,000 to 10,000 mounds (40kg) of wheat straw and use concentrate as per body requirement and milk production

They keep the manual as well as computerized record in all respect for example purchasing date and price of animal, health record, milk record, reproduction record, selling date and price of all animals.

Recently they imported two pregnant heifers (Holstein Frisian) from Australia at Rs. 520,000. If they will not have no health issues and can produce good amount of milk, they and will import more heifers.

(As of October 2016)

(Updated in January 2018)

(end)



Case 7: By-products sales – Case of Mr. Abdul Karim at a pilot village named Haji Hussain Dal, District Tando Mohamad Khan

Background of Mr. Abdul Karim Dal (Farmer in pilot village)

Mr. Abdul Karim Dal is a resident at pilot village named Haji Hussain Dal District Tando Muhammad Khan working at the Livestock Department as a laboratory technician in Tando Muhammad Khan city as well as he is a village chief of the pilot village having. As of July 2017, he has 6 Kundhi buffaloes, of which 2 buffaloes are milking and 4 buffaloes are dry. The total milk production is 15 liters per day. He sales 10 liters of milk per day and keeps 5 liters of milk per day for self-consumption.



During the marketing training conducted in July 2017, he shared that in summer season the selling price of milk is Rs. 50 to 60/L and in winter the selling price of milk is Rs. 35 to 40/L. He shared that the selling price of milk in summer is fine for him but he is not happy with the selling price of milk in winter.

Therefore Mr. Abdul Karim decided to make butter and desi ghee in winter season instead of selling milk at low price. He knew that the price of desi ghee is Rs.800/kg in the nearby town, Tando Muhammad Khan city. In last winter season, Mr. Abdul Karim stopped selling milk and he started to make butter and desi ghee at home with the help of his family. During the four months of last winter season, he made 38 kg of desi ghee and he sold it at Rs. 800/kg to the individual household in the village and surrounding villages.

Furthermore, he shared that 1kg of desi ghee can be made from 1.4 kg of butter and 1.4 kg of butter can be made from 12kg of milk.

Calculation according to his statement

- If the price of milk in the winter season is Rs.40/l, the price of 12 L of milk is Rs.480.
- On the other hand, the selling price of desi ghee is Rs.800/kg
- It means he earns Rs.320 more with 12L of milk.
- If he earns Rs.800 from 12 L of milk, the selling price of milk per liter is Rs.66.66 which is about Rs.27/kg higher than selling milk.

** The project team also measured actual amount of milk required for 1kg of desi ghee. 0.11466kg of ghee can made from 1.5L of milk at his home. It indicates that about 13L ($1.5L / 0.11466kg = 13.0821 L$) of milk is required to produce 1kg of desi ghee.*

Mr. Abdul Karim also shared that the demand of desi ghee is high in winter as compared to summer. He has the view that the selling of milk in summer and selling of desi ghee in winter are reasonable respectively.

He was happy with this practice and earned more as compared to selling milk in winter season. He said that every year he will make desi ghee in winter. During the marketing training he also advise other farmers at the pilot village to make desi ghee in winter season instead of selling milk at low price.



Monitoring

1) As of January 2018

Mr. Abdul Karim has 4 milking buffalo which produce 24L/day of milk. He sales 14L of milk to a milk shop in Tando Muhammad Khan city at Rs.65/L while he keeps 10L of milk per day for self-consumption and ghee making. He started making ghee from December 2017 and he produced 5 kg of desi ghee so far. He has already sold 2kg of ghee at Rs.900/kg in December 2017 and keeps 3kg of stock now. He said that there is no issue for selling ghee since people in the village and surrounding village know him making ghee and buy ghee from him.

2) As of January 2019

He has one dry pregnant buffalo and five milking buffaloes producing 32 liters per day. He keeps seven liters per day for self-consumption and sells 15 liters per day in morning at Rs.60 per liter to a milk shop at nearby town, Tando Muhammad Khan. The tea shop has no capacity to purchase more milk because of winter. With the remining 10 liters of milk produced in evening, his family produces desi ghee especially in winter. From November to up to the middle of January, his family produced 40 kg of desi ghee and sold 24 kg at Rs.1,000 per kg. According to him, he will produce desi ghee by first week of March when the price and demand of milk increase.

(As of July 2017)

(Updated in January 2018)

(Updated in January 2019)

(end)



Case 8: By-products sales – Case of Mr. Faqero in District Tando Mohamad Khan

Background of Mr. Faqero

Mr. Faqero Kolhi is one of pilot farmers (P/F) under the Project on Sustainable Livestock Development for rural Sindh funded by the Government of Sindh and JICA. He is a small scale tenant farmer who lives at village Haji Ghullam Nabi Shah, union council Lakhat, Taluka Tando Muhammad Khan, District Tando Muhammad Khan as having 8 family members. Major source of income is agriculture and livestock. He has 6 mix Kundhi buffalo, (4 own animals and 2 PSLD calves on sharing).



The pilot village is located about 50 km away from the project office in Hyderabad and 15 km from Thando Muhammad Kham city. The village size is about 12 acers. There are two biradaries in the village such as Kolhi (non-Muslim) and Zoaur (Muslim), consisting of 3 para with 63 households.

Marketing training by the Project

The marketing training was conducted in the village Ghullam Nabi Shah, District Tando Muhammad Khan on 6 December 2016. Participants shared in the training that a middleman stopped coming or pay low price because of winter when there is no demand of milk in the town and city. The P/F and surroundings farmers decided that they would not sell their milk in winter but make the bi-product (ghee) and sell it in the market.

Development of selling channel of ghee

The P/F visited Tando Muhammad Khan city to find selling channel for ghee. The P/F found some shops but their purchasing price is Rs. 600 per kg. The farmers in the village were not satisfied by the price. The P/F, Mr. Faqero, shared the situation with his cousin residing in Hyderabad. His cousin has good circle of friends and his friends are demanding desi gee. He shared with the P/F that he needs desi ghee. The P/F replied that “we are making desi ghee and can sell. But the price should be Rs. 800 per kg”. His cousin agreed.

The P/F has no issue to make and sell ghee nowadays. As the P/F has enough quantity of ghee, he informs his cousin so that his cousin visits the village and purchases ghee at Rs.800 per kg.

The P/F also helps surrounding female farmers who make ghee and have no good selling channel of ghee. In addition, the P/F’s elder sister and wife are also guiding the females for making good quality ghee.

The P/F belongs to Hindu community. This community has two religious celebrations in a year, one in May and another in August. So on these occasions there is good demand of ghee. In addition to these occasions, now the farmers have additional channels of ghee in Hyderabad. From November to February there is enough demand of ghee, so that the farmers make and sell ghee easily. Since in these months, because of winter, there is no demand of milk, the farmers are happy to make ghee and sell at good price.



Monitoring

- 1) As of January 2018, Mr. Faqero has 1 milking pregnant buffalo and 1 dry pregnant buffalo which produce 2L/day of milk in total. Since his milk production volume is small, he sells neither milk nor ghee. But he is supporting to sell ghee produced by two females living at the same village with Mr. Faqero through friends living in Hyderabad. During this winter season, he supported selling 2kg of ghee produced by the females at Rs.850/kg.
- 2) As of January 2019, he has one milking animal producing three liter per day. He keeps three liter per day for self-consumption and doesn't sell his milk at all. His family sometimes makes and sells desi ghee at Rs. 1,000 per kg.

(As of February 2017)

(Updated in January 2018)

(Updated in January 2019)

(end)



Case 9: Improving sales channel by himself – Case of Mr. Naiz Hussain Behrani in Tando Allahyar

Background of Mr. Naiz Hussain Behrani

Mr. Naiz Hussain Behrani, one of PF is 25 years old resident of village Haji Gul Muhammad Behrani, Deh: Gujo, U/C: Shah Inayat Rizvi, Taluka and District Tando Allahyar, He is a landless dairy farmer who occasionally works as agriculture labor having total 12 animals (10 own Kundhi buffaloes two PSLD calves on sharing). His village is located about 30 kms away from the project office and 15 kms from Tando Allahyar city, and his village size is 8 acres and major caste is Baharani. PF has 3 milking buffaloes producing 28 liters per day of milk. He sells 23 liters per day and keeps 5 liters for self-consumption per day.



Previously he was selling milk at Rs.50/L to the middle man in the village. After the project intervention and marketing training, he was motivated to increase milk price. He visited nearby market such as milk and tea shops by himself, but he could not find the better channel.

He discussed with his cousin residing in nearby village about the improvement of milk selling price and finding the better milk selling channel. His cousin was already selling milk at Rs.80/L to a tea shop in nearby village.

His cousin promised with him that his cousin will help to find the better milk selling channel, His Cousin discussed with the owner of one tea shop in nearby village, Dhingano Bozdar. The tea shop owner agreed to purchase the milk at Rs. 70/L if the milk quality is good. His cousin shared this with him and on the next day he gave one liter of milk at the tea shop as a sample for quality check. After the tea shop owner was satisfied by the milk quality, the shop owner offered Rs.70/L. However, he didn't agree on the offered price, then after discussion between him and the tea shop owner, finally the price of milk was fixed at Rs.80/L.

Now he, Mr. Naiz Hussain Behrani is happy to sell milk at Rs. 80/L to the tea shop in nearby village and he is earning additional Rs.690/day and Rs. 20,700/month. Initially the mode of payment was on weekly basis but from December 1st, 2018 the mode of payment became on daily basis.

(As of January 2019)

(end)



Case 10: Group selling of milk and group purchasing of formula feed - Case of Mr. Sultan Lashari in Tando Allahyar

Background of Mr. Sultan Lashari

During the weekly project meeting held on October 27, 2017, the extension team shared that Mr. Sultan who is one of P/Fs living in Village Ghazi Khan Lashari, District Tando Allahyar had started group selling of milk and group purchasing of formula feed since last month. The project coordinator and the project manager recommended C/P in charge of marketing to visit the P/F and confirm the actual situation. Then C/P in charge of marketing accompanied by C/P in charge of farm management visited Mr. Sultan on November 6, 2017.

Group selling of milk

Mr. Sultan shared that C/Ps and the extension team of the Project gave technical guidance many times for the hygienic milk production, no adulteration, group selling of milk and market survey to identify better milk selling channel by themselves. One day, C/P shared that there is milk chiller installed by Livestock Dairy Development Board (LDDDB) in nearby town and nowadays it is run by community. The head is master Mehmood and he is paying good price throughout the year. C/P recommended Mr. Sultan to visit the chiller and discuss about the milk purchasing price when Mr. Sultan visits the nearby town.

On September 30, 2017, Mr. Sultan visited the chiller nearby town named Dhingano Bozdar and met the head of the community with the reference of C/P. The head agreed to purchase milk at Rs.60/L in winter (with limited volume of 20 L/day) and Rs.65/L in summer (with limited volume of 40L/day).

On October 1, 2017, Mr. Sultan started selling milk to the chiller. Few days later, Mr. Sultan shared with his cousins that Mr. Sultan was selling milk to the chiller in nearby village at Rs. 60/L and his cousins agreed to sell milk to same channel. Then Mr. Sultan and two farmers (his cousins) started selling milk as a group to the chiller and getting paid on daily basis so that they were satisfied with this channel.

Group purchasing of formula feed

Mr. Sultan also said that C/P in charge of fodder development shared the contact information of formula feed distributor in Tando Allahyar after the project stopped supplying the formula feed to P/Fs free of charge on September 30, 2017. Mr. Sultan decided to visit Tando Allahyar and purchased formula feed for milking animals. After couple of days, Mr. Sultan shared to his cousins that Mr. Sultan purchased the formula feed which quality is good for milking animals. His cousins decided to purchase formula feed for their animals and asked Mr. Sultan to purchase feed and they would pay for the expenses.

Monitoring

1) As of January 2018

Mr. Sultan has one milking buffalo producing 9L/day of milk and one milking cow producing 4L/day of milk. He gets 13L/day and keeps 3 L/day for self-consumption and sells 10L/day at Rs.60/L to the chiller in nearby town. Only two



farmers are selling milk as a group because the chiller limits milk to buy in winter. Mr. Sultan expects that more farmers will sell milk as a group after March 2018. This collaboration (Group Selling of milk) is made within his family (brothers, father and cousins who belong to same biradri) residing in the same fence.

Three farmers in a group started to purchase formula feed from master feed distributor Tando Allahyar and purchase 20-25 bags (40 kg/bag) in a month. But Mr. Sultan shared that at present he has some issues in purchase of formula feed from Tando Allahyar because he has to pay Rs. 50/bag extra for transportation charges due to the distance from Tando Allahyar to his village. Therefore Mr. Sultan requested to make formula feed available in nearby town Dhingano Bozdar to save the transport charges as well as time. Mr. Sultan's request was shared to C/P in charge of fodder development during the weekly meeting held on November 10, 2017. The C/P in charge of fodder development discussed with the feed company and enabled the formula feed nearby town Dhingano Bozdar. As a result, not only Mr. Sultan but also farmers living nearby area can purchase the feed.

2) As of January 2019

The PF has 5 milking heads and his total milk production is 26 L/day. He keeps 13L/day for self-consumption and sells 13 L/day at Rs: 60/L to the same chiller in nearby town Dhingano Bozdar. The PF is also making and selling desi ghee at Rs. 1,000/kg to individual household at nearby villages.



Chapter 3 Data Collection Methods

In this chapter, the methods of data collection which made by the Project are summarized for future data collection activity of the Department.

3.1 Monthly Data Collection of P/F

- The Marketing C/P visits P/Fs for monthly data collection once a month and collects data such as i) number of milking heads, ii) total milk production volume, iii) self-consumption volume, iv) sales volume, v) sales price and vi) sales channel. The Marketing C/P inputs data on the developed proforma and analyzes in the end of year.
- As the number of P/Fs is 25 so it is difficult to visit all the farms once in a month. From the remaining P/Fs, the C/P collects the price information by telephone.

3.2 Monthly Data Collection of Milk Shop and Tea Shop

- A project staff visits the milk wholesale market in Hyderabad once a week and records of information of 6 deals, 3 deals on milk from commercial farmers and 3 data on milk from rural farmers (sold by middlemen).
- Collected information are i) date and time of the deal, ii) price of milk (rupees per 40L), iii) quality of milk sold, iv) origin of milk (district), and v) producers (commercial dairy farmers or rural farmers).

3.3 Weekly Data Collection of the Milk Wholesale Market in Hyderabad

- The Marketing C/P visits the milk shops and tea shops for monthly data collection once a month, and collects the following data and inputs on the developed proforma,
 - Milk shops: milk purchasing volume and price, milk sales volume and retail price, yogurt sales volume and retail price, Lassi sales volume and retail price, Mava sales volume and retail price, Ghee sales volume and retail price.
 - Tea shop: milk purchasing volume and price, tea sales volume and price.
- As the number of milk shops and tea shops covered by the data collection during the Project is 46 so it is to visit all shops once in a month. Therefore, the Marketing C/P collects the price information sometimes by telephone.
- The data collection was started in the beginning of January 2016 and ended by the end of 2018.

3.4 Weekly Data Collection of the Milking Buffalo at Talhar Livestock Market, District Badin

- A project staff visits the livestock market in Talhar, District Badin once a week and records prices of 10 milking buffaloes.
- Collected information are i) date and time, ii) body condition score (BCS), iii) price of livestock, iv) commission fee, v) market charge, and vi) with/without of calf.
- The data collection was started on February 13, 2016 and ended in the end of December 2016.



Chapter 4 Analysis Methods

4.1 Gerber Methods (Milk Fat Content)

4.1.1 Equipment and Reagents

(1) Reagents

1) Chemical grade 90 to 91 % sulfuric acid of specific gravity 1.820 to 1.825 at 20 degree C.



2) Amyl alcohol of highest purity, specific gravity 0.81, and boiling point 128 to 132 degree C.





(2) Equipment

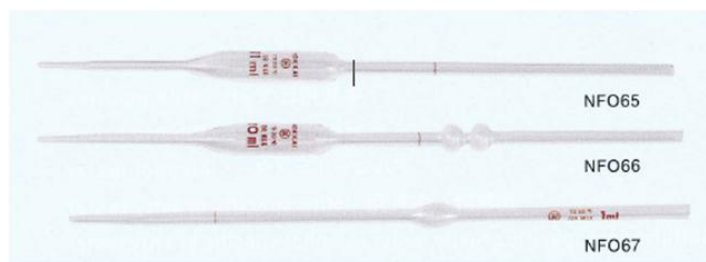
1) Gerber milk tester



2) Elastic rubber stoppers of amber color. Stoppers supplied with butyrometers may be used.

Application type	Original type
	

3) 10-ml pipets for sulfuric acid, 11-ml pipets for milk, and 1-ml pipets for amyl alcohol. Pipets for milk should have a short discharging part. Pipets for sulfuric acid and amyl alcohol should be equipped with a safety bulb. An autoburette may be used.



4) A water bath with enough depth to immerse the lipid phase in the rubber-stopped butyrometer completely. It is used at 60 to 65 degree C.



5) An electric Gerber centrifuge equipped with a revolution counter.

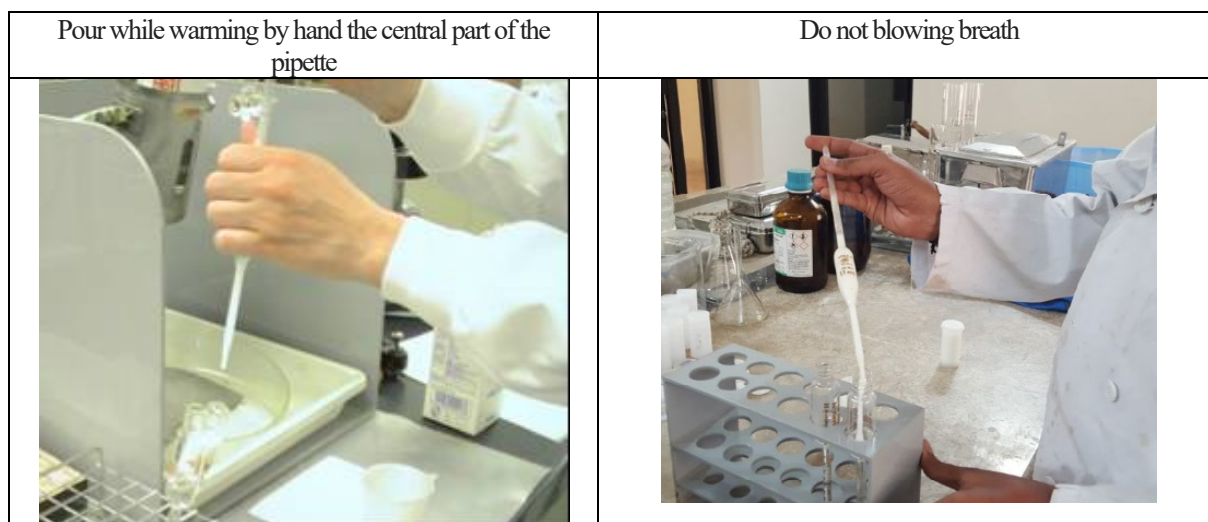
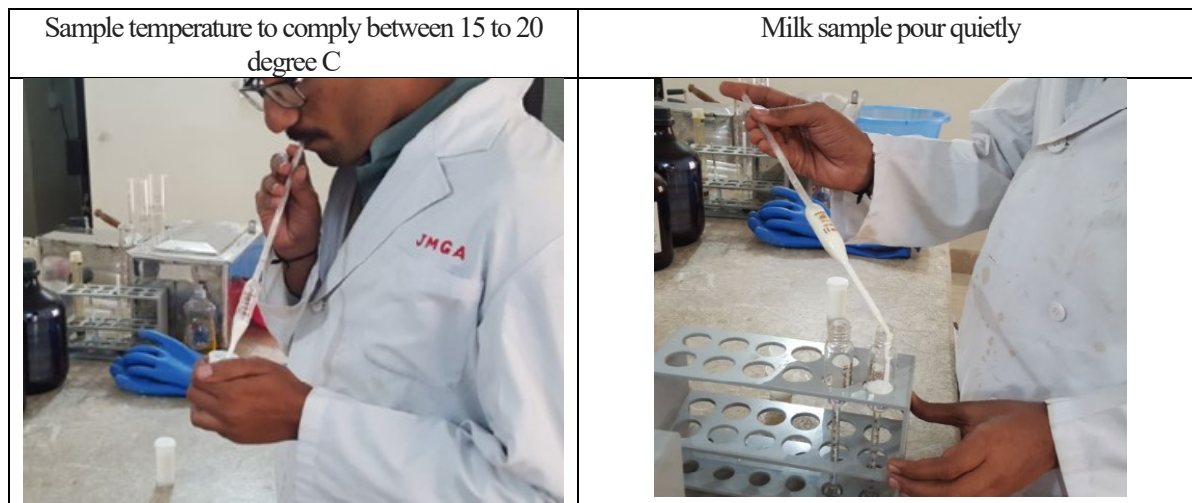


4.1.2 Measurement

(1) Add 10 ml sulfuric acid using a pipette for sulfuric acid to a butyrometer



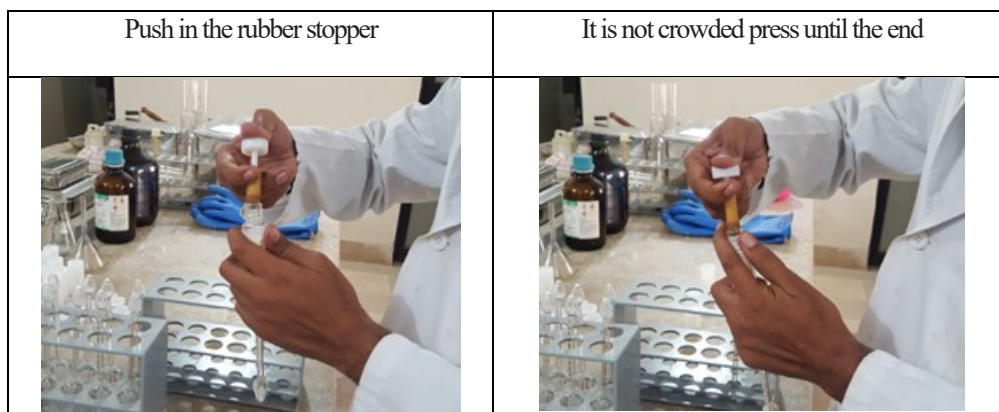
(2) Add 11 ml milk sample along the wall of the butyrometer so that it forms layer over the sulfuric acid.



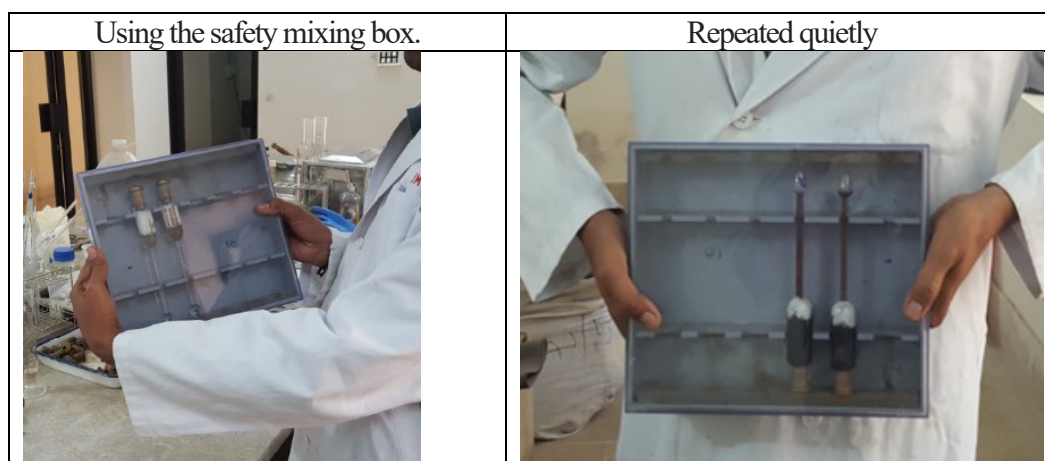
(3) Then add 1 ml amy alcohol



(4) Cap the butyrometer with a rubber stopper



(5) Invert the butyrometer several times until the curds are completely dissolved. Wrap the butyrometer with cloth or other appropriate material for safety in case of a vigorous exothermic reaction with sulfuric acid.



(6) After warming the butyrometer in a hot water bath at 60 to 65 degree C for 15 minutes



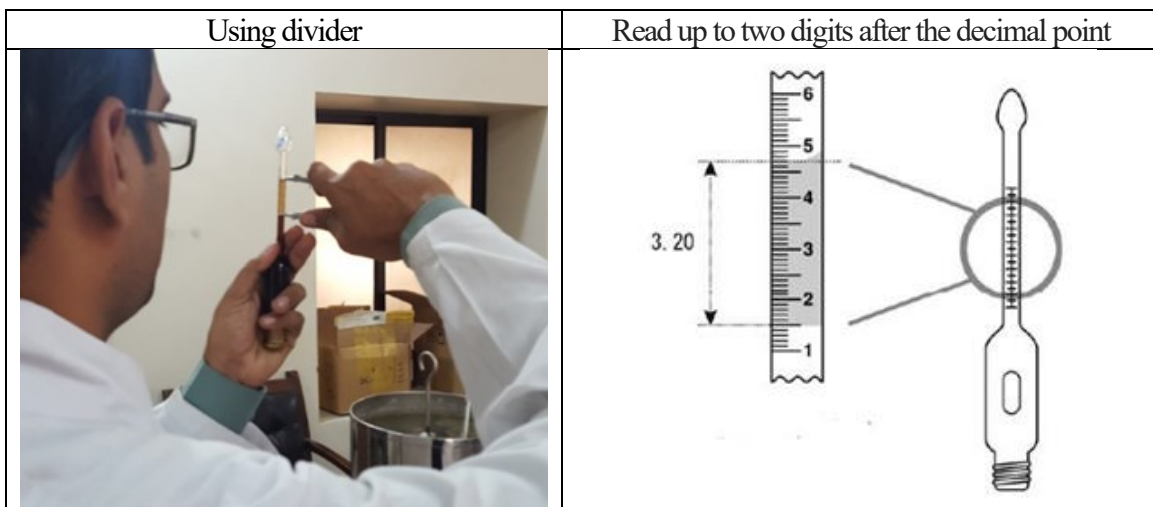
(7) Centrifuge it at 900 rpm for 5 minutes to separate the lipid phase.



(8) Replace the butyrometer in the water bath to completely immerse the lipid phase, keeping it at 60 to 65 degree C for 5 minutes.



(9) As shown in Figure as fallow, read the lower level of the top and bottom meniscuse.





4.1.3 Notes

- (1) Both sulfuric acid and milk should be used at 15-20°C. A higher temperature of milk will result in foaming when mixing with sulfuric acid. The room of laboratory be in cooler in advance.
- (2) The mouth of the butyrometer should be wiped with filter paper after adding amyl alcohol. The rubber stopper should be wiped as well. A stopper may slip out of a wet mouth, which may lead to an unexpected accident.
- (3) Reading the column of lipid phase should be done quickly.
- (4) Once the measurement is complete, empty the butyrometer and treat the waste sample as waste water.
- (5) After washing with warm water, boil the butyrometer in weak alkaline or other appropriate detergent for 20 to 30 minutes, rinse and dry.

4.1.4 Record Format

Example of the data entry format of milk fat analysis is shown below.

Table 4-1 Example of the data entry format of milk fat analysis

Record of The Milk Fat Content by Gerber Method				
		Date:		
	Centrifuge:	rpm,	Time:	minutes
Sample Number	Temperature , Hot water bath	Fat % (a)	Fat % (b)	Average Fat %
		Name of Inspector:		



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**The Project on Sustainable Livestock Development
for Rural SINDH “PSLD”
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**Textbook for Feeding Management & Fodder
for Livestock Technician**



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This textbook has been developed for the use of livestock professionals. The Livestock and Fisheries Department, Government of Sindh welcomes your comments and suggestion to improve this material.

Developed by The Project on Sustainable Livestock Development for Rural Sindh

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Preface

Livestock is the largest sub-sector in agriculture of Pakistan, contributing 11.4 percent to overall GDP of the country. Livestock plays vital role in rural economy and livelihood of rural poor, so as in rural Sindh. It is a source of cash income, nutrition and sometimes only asset for the rural and marginalized people.

The Project on Sustainable Livestock Development for Rural Sindh (The Project) is the 5 year technical cooperation project implemented in collaboration with the Livestock and Fisheries Department, Government of Sindh and Japan International Cooperation Agency (JICA), Government of Japan, aiming for creating foundations of sustainable livestock sector development in Sindh province, which benefit small scale dairy farmers who comprises more than 80 percent of the sector. The Project was initiated in February 2014 and implemented in 5 pilot districts, namely Matiari, Hyderabad, Tando Muhammad Khan, Tando Allahyar and Badin. The Project focused on development of appropriate technologies for dairy farming. Throughout five years of implementation, appropriate technologies were developed, piloted and verified for the use of small scale formers in Sindh province. Along with the appropriate technologies, useful basic technologies for livestock professional technicians were developed. The technologies range over 8 areas, namely, farm management, marketing, feeding management, fodder, animal health, animal reproduction and genetic improvement, Livestock assets. The Project worked on effective utilization of livestock resources, i.e. calves and dry buffaloes in the commercial cattle colony as well. Method for salvation of calves and dry buffaloes were verified.

Technologies developed by the Project are compiled as textbooks, guidelines and booklets for wider application and dissemination to professional technicians, and ultimately to farmers. The Livestock and Fishery Department hope that these series of publications will widely be used by livestock professional technicians both public and private and dairy farmers in Sindh province for uplifting their livelihood.

Director General / Project Coordinator
The Livestock and Fisheries Department
Government of Sindh

Foreword

The Project on Sustainable Livestock Development for Rural Sindh has been implemented in Southern parts of Sindh Province, Pakistan in collaboration with Livestock and Fisheries Department, Government of Sindh and Japan International Cooperation Agency (JICA). The Project was supported by the team of Japanese experts headed by Mr. Hiroshi Okabe.

The long-term objectives of the Project are improvement of productivity of milk and increase of income of small scale dairy farmers. The number of cattle/buffalo reared by one small scale dairy farm is small, generally within 5 heads, which includes both adult cattle/buffalo, heifers and calves. Most of small scale dairy farmers do not possess their own land. Under such conditions it is difficult to run sound dairy farming.

The Project is confirmed the importance of improvement of feed provision for stable increase of milk production even for cattle/ buffalo reared under such a severe environment.

This text book is compiled mainly by Dr. Teruo Sugiwaka, expert on feeding management. We appreciate the support of the project counterpart Dr. Safdar Ali Fazlani and Dr. Arif Khan and contribution of Dr. Syed Muhammad Zeeshan and Dr. Imran Ali Qaim Khani of Poultry Research Institute.

We hope this text book will be of use of technicians who will extend support to dairy farmers in Sindh Province.

Editor in Charge Dr. Hideo Tominaga

Along with Support of
the Technical Counterparts of Sindh Livestock and Fisheries Department
and the Japanese Expert team

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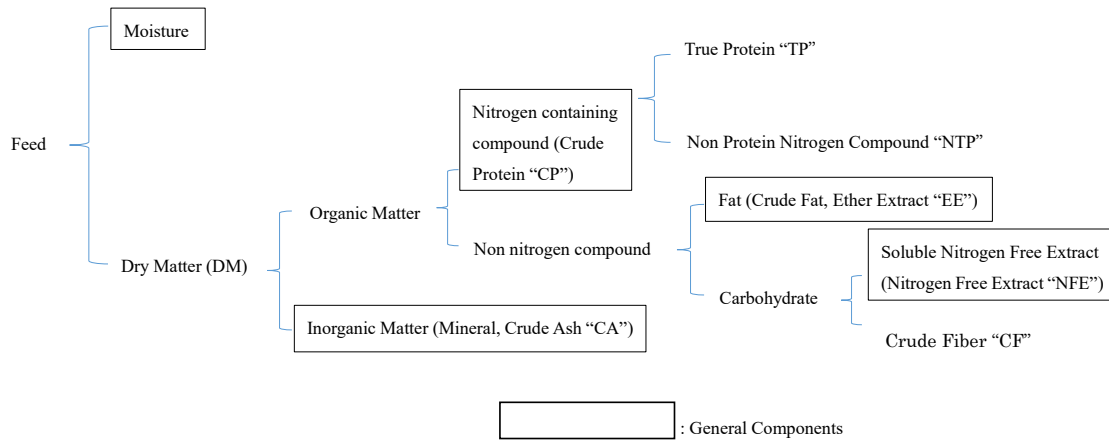
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Chapter 1 Essential basic knowledge of animal feeding

1.1 Feed composition



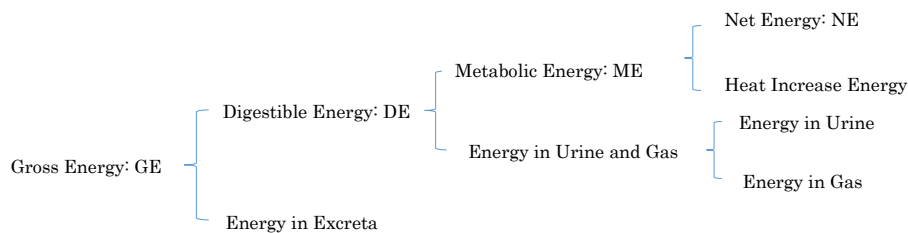
- 1) Feed which works as energy: Protein, Fat, Carbohydrate
- 2) Feed which builds a body: Protein, Crude ash (Mineral)
- 3) Feed which adjusts the various function of a body: Mineral, Vitamins

1.2 Energy contained in feed

- 1) How to calculate Total Digestible Nutrients (TDN)

$TDN = CP \times \text{Digestibility (\%)} + \text{Ether Extract (EE)} \times \text{Digestibility (\%)} \times 2.25 + \text{Nitrogen Free Extract (NFE)} \times \text{Digestibility (\%)} + \text{Crude Fiber (CF)} \times \text{Digestibility (\%)}$

2) What is Net Energy (NE) quoted in the standard feed? Net energy is the difference of gross energy of feed and metabolic energy and calculated by deducting metabolic energy from gross energy of feed. Net energy is turned to be dairy products such as milk and meats.



1.3 Classification of feed

- 1) Roughage

Roughage contains lots of crude fiber but little digestible nutrients. Volume of roughage is large. It gives the feeling of fullness and supports digestive function of animals. Roughage is mainly fed to maintain body weight of animals. Roughage is classified in to 1) Straw and hay which contains much fiber but less moisture and 2) Green forage (pasture grass and wild grass), green cut feed (maize, sorgo and millet) and silage, which contain much moisture.

- 2) Concentrate

Concentrate volume is small and contains less crude fiber but much digestible nutrients. Concentrates are mainly fed to animals to produce dairy products such as milk and meats. Concentrates includes grains as well as oilcakes and sugars which are byproducts of oils and sugars.



3) Special feed

Special feeds include feed additives such as minerals and vitamins. Special feeds also include artificial milk.

1.4 Feed standard

Feed standard indicates standard amount of nutrients required for rearing livestock animals. Required amount of nutrients is calculated based on the results of detailed feeding tests. Exemplary standards available in the world are 1) Morrison (U.S.A.), 2) ARC (British), 3) NRC (U.S.A.), 4) Japanese Feeding Standards, 5) Feed Pedia (Italia) etc.. Most common standard widely used in the world at present is NRC. The project applies NRC standard. Feed standards are designed each for milking cows, beef cattle and sheep, respectively. However, the project cannot find feed standard exclusively developed for buffalo up till now. The project, therefore, will use feed standard for milking cows for the time being.

1) Technical terms used in the NRC feed standard (Nutrient Regulation of Dairy Cattle)

- ① DM: Dry Matter
- ② CP: Crude Protein
- ③ ADP: Apparent Digestive Protein
- ④ RDP: Rumen Degradable Protein (Protein which is dissolved by microbe in the rumen)
- ⑤ RUP: Rumen Undegradable Protein (Protein which cannot be dissolved by microbe in the rumen) and Rumen Bypass Protein
- ⑥ TDN: Total Digestible Nutrients
- ⑦ NE: Net Energy
- ⑧ DE: Digestive Energy
- ⑨ ME: Metabolic Energy
- ⑩ Mineral Requirements: Ca, P
- ⑪ Vitamin Requirements: Vitamin A etc.

2) Nutrients required for each following category of cow are indicated in the NRC feed standard for milking cow as follows.

- ① Nutrients required for young female calves: Nutrients required for calves to grow and gain weight normally.
- ② Nutrients required for adult cow to maintain her body: Nutrients required for adult cow to survive while keeping current body weight.
- ③ Nutrients required for production of milk: Nutrients required for milking cow to produce milk, which is calculated from fat percentage and quantity of milk production.
- ④ Nutrients added at a last stage of pregnancy: Nutrients required for fetus to gain weight at a last stage of pregnancy.

3) The project's plan for calculation of feed (temporary measures)

The standard feed composition table which indicates the nutrients value of each feed used in the feed standard is available. Nutrients value of each feed, especially of roughage varies in cultivation methods and soils. The nutrients value of the feed of each region, therefore, should be unique and the feed composition table of each region should be developed. By the time the project obtains the nutrients value of the feed applicable to the feed in Sindh, the project temporarily applies the nutrients value of the feed composition table appeared in the 'Handbook of Dairy Nutrition Pakistan' for the time being.

Any nutrients value of feed not listed in the above feed composition table, the project applies the nutritious value mentioned in the NRC or Japanese standard table of feed composition.



Chapter 2 Diagnosis of feeding

It is necessary to grasp the current situation of feeding at farms prior to giving technical guidance to them. Survey forms such as 'Questionnaire on feeding animals at farms' developed by the project will be used for recording the data of each farm.

2.1 Points to be taken care when inquiring current situation of feeding animals at farms

- ① As for body weight, milk production quantity, feed quantity given to animals, measured figure by measurement scale will be recorded in principal. Estimated figures will be used only when measurement by scale is not possible. Those estimated figures should be remarked as an estimated figure on the questionnaire form.
- ② As for feed which contains much moisture, sample (approximately 300g) should be collected to measure moisture content for DM% compensation.
- ③ Condition of animals and actual feeding situation at farms will change day by day. Date of survey should, therefore, be noted down in the questionnaire form.

2.2 Feeding diagnosis tool

The project developed the "Pakistan Project Feeding Program" in Excel format. In this program, feeds frequently used at farms in project sites are registered so that the diagnosis can be performed easily.

2.3 Points to be taken care at the time of diagnosis

Result of diagnosis is regarded as a reference or guideline. The actual results have an error range of 10%. The technical advice should be given with consideration of this error and body condition of animals.



Chapter 3 Points to be taken care when designing feeding plan

3.1 Designing feeding plan

Feeding can be easily designed using the principle that roughage is to maintain body and concentrates are to produce milk.

Feeding will be designed and diagnosed according to the feed standard. Sufficiency ratio and proper range of each nutrients value can be regarded as follows;

- 1) DM: DM quantity prescribed in the NRC standard is regarded as quantity which animal can eat up. However, in practical, there always have leftover of DM.
- 2) CP: Protein is basic nutrients for animals to build body. CP provision should be always kept more than 100% of quantity prescribed in NRC but not exceed 150% of quantity. When CP is obtained from feed which contains much RDP such as pasture green, CP can exceed 150% of quantity.
- 3) TDN: TDN should be in the range of 100 to 110%. Excess energy will be accumulated as fat which result in obesity. The maximum TDN, therefore, should be within 110%.
- 4) CF: CF is essential for maintaining function of rumen. Minimum 16 to 17% of total feed should be supplied with CF. NDF and ADF are used as CF recently.
 - ① NDF: Neutral Detergent Fiber. Main composite of NDF are hemicellulose, cellulose and lignin.
 - ② ADF: Acid Detergent Fiber. Main composite of ADF are cellulose and lignin. When hemicellulose is added to ADF, it's composite becomes similar to those of NDF.NDF and ADF have been started used as CF because it is necessary to grasp the accurate digestibility of fiber to design feeding plan for high capacity milking cow. It was difficult to estimate nutrient value of roughage by conventional methods. It is not necessarily needed such accuracy for less capacity milking cow and can be managed with conventional methods. Nevertheless, it is useful for effective utilization of roughage if nutrient value of roughage can be grasped with high accuracy.

3.2 Role of Roughage and Concentrates

- 1) Roughage: Roughage contains much fiber and less nutrients. Roughage mainly works for maintaining the good physical balance of rumen and providing energy to maintain body. When digestive and good quality roughage is fed in a good quantity, animal can even use energy from those roughages to produce milk to some extent. Roughage should be cut into 5cm long pieces. When it is cut into shorter than 2cm, the function of rumen becomes a bad physical condition. Roughage in the dry matter form should be fed more than 30% of total feed even during peak lactation period. In case roughage in the dry matter form exceeds 70% of total feed, milk production cannot be high.
- 2) Concentrates: Feed contains much nutrients, whose TDN is around 60% is called concentrates. Concentrates contains less fiber and low physical condition for rumen. It is used for milk production purpose. Some of byproducts of grain, oil and sugar contains much crude fiber but length is short so that it does not stimulate the function of rumen.

3.3 Role of Mineral

Minerals can be categorized into Macrominerals (Ca, P, Na, Cl, K, Mg, S) and microminerals (Co, Au, I, Fe, Se, etc). Here, the role of some of important macrominerals is highlighted.

- 1) Ca: It plays important role for bone formation, innervation, muscular contraction stimulation, blood coagulation and being component of milk. For absorbing Ca, ratio between Ca and P is important. Ca:P ratio should be kept between 7:1 to 1:1 ranges. Ca deficiency can cause developmental disorder for the case of young animals and astasia for the case of milking animals. Ca:P ratio is better be designed as 2:1 to 1:1.
- 2) P: Together with Ca, P is composing bone. As ATP, P is composing energy metabolism and cell.

3.4 Role of Vitamin

Vitamins are categorized into liposoluble vitamin (A, D, E) and water soluble vitamin (B group,



C, K). Vitamin plays a role as if lubricant oil for machine. It does not require much quantity, but various disorders will be caused if vitamin is deficient.

- 1) Liposoluble vitamin: Liposoluble vitamin cannot be produced in the animal body. It is, therefore, necessary to obtain from feed.

Vitamin A: It is essential for growth of body and eye-sight. It will maintain normal function of mucosal epithelial tissue so that sound immune system is functional.

Vitamin D: Vitamin D can facilitate absorption of Ca from small intestine and adjust the density of Ca in blood serum.

Vitamin E: Vitamin E works as antioxidants for whole body.

- 2) Water soluble Vitamin: Vitamin B group is fed from microbe in the rumen of ruminants. The vitamin B group, therefore, do not need to be obtained from feed.



Chapter 4 Feeding according rearing/milking stage

4.1 Feeding before and after parturition

- 1) Dry period before delivery: Dry period before delivery is very important period for animals to regain physical strength, rest and recover mammary tissue and supply required nutrients for fetus. Generally 60 days before the delivery should be regarded as dry period.
- 2) 3 weeks before delivery: A farm will increase concentrates fed to animals from 1 up to 3 kg gradually since 3 weeks before delivery so that animals' rumen can get used to concentrates to be continuously fed after the delivery. Maximum provision is 3kg. It should not exceed 3kg even the delivery date is delayed.

4.2 Feeding during lactation period

- 3) Early lactation period: 1 to 3 months after the delivery (for 3 months)
Peak lactation period is between 1 and 3 months after the delivery whereas peak dry matter (DM) intake of animal is 2 months after the delivery. Animals tend to be deficient in nutrients during early lactation period. A farm, therefore, is better to feed high palatability and nutritious feed.
- 4) Middle lactation period: 4 to 6 months after the delivery (for 3 months)
At this period, milk production decreases whereas intake of dry matter (DM) improves. When required nutrients are supplied enough, a farm do not need to give special attention on the quality of feed.
- 5) Post lactation period: More than 7 months after the delivery
Post lactation period is to regain physical strength deteriorated during milking period and to accumulate nutrients for the next delivery. For animals emaciated during milking period, additional nutrients will be given to improve physical strength.

4.3 Feeding during dry period

- 6) Dry period: Only roughage can be fed during dry period to keep normal body weight up to late dry period and not to become obesity.



Chapter 5 How to change feed

It is important for buffalo digestive physiology to keep normal function of rumen. To keep normal function of rumen, microbe of rumen should be active. For that, it is essential to keep temperature, PH and moisture inside rumen stable.

Types and composition of microbes in the rumen will be changed according to the feed fed to animals.

Sudden change of main feed may cause disturbance of digestive function and digestive disorder on animals since microbe in rumen cannot adjust itself with sudden change of feed.

When a farm wants to change main feed item, the new feed should be replaced gradually in 2 to 3 weeks so that enough time will be given for new microbe suitable for new feed to grow in rumen.



Chapter 6 Feeding method to improve intake and utilization of feed

- 1) It is better to cut feed into 5cm pieces than feed in lengthy shape.
- 2) Intake of feed is higher in case of feed containing middle ratio of moisture (50 – 70%) than those with low or high moisture.
- 3) Intake of low palatability feed can be increased by mixing with high palatability feed.
- 4) Granular feed such as pellet and rolling type feed has less residue than mashed type feed.
- 5) Intake of feed which is fed with more frequency is higher. Palatability will be decrease when residue of previous feed is mixed with fresh feed. The residue should be always removed from feed trough when fresh feed is fed.
- 6) Feed trough is better to be placed 10 to 15cm higher from the ground so that animal can easily eat feed.

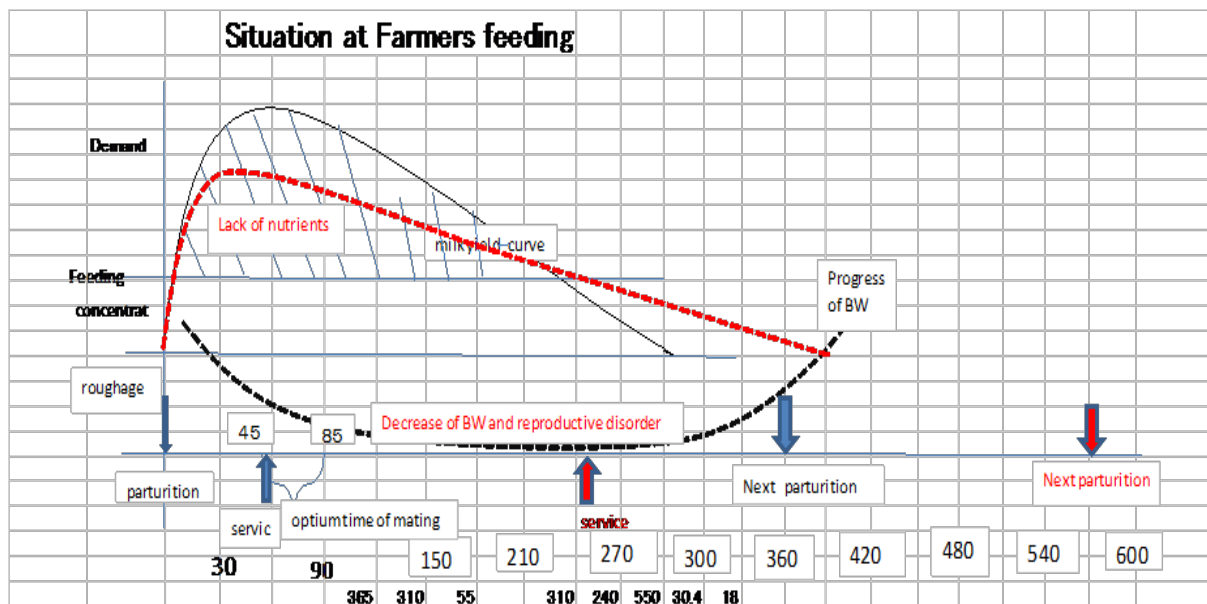
Good example: Wheat straw and rice straw cut into pieces are often mixed with small cut pieces of high moisture wild grass to feed animals in Sindh. This is very reasonable feeding which applying 1), 2) and 3) points explained above.



Chapter 7 Information about current situation of feeding management by farmers in the pilot villages

Farmers are recognized the necessity of shade for animals, however, they do not aware the importance of free access to drinking water to animals. (Farmers tie their animals in the shade but no water trough is placed near animals.)

- 1) As for roughage, only one type of green fodder available at those time is fed to animals at farms. Besides, wheat straw available at farms all around year is fed to animals as a roughage. Farmers does not have knowledge that sudden changes of feed affects functions of rumen.
- 2) As for concentrates, farmers often feed wheat bran and cotton seed case at the ratio of 1:1 or 2:1.
- 3) Farmers feed same amount of concentrates all around year regardless of milk production quantity and quantity of provision of roughage.
- 4) The drawing below shows the consequences of above feed provision appeared to animals.



Nutrients required for milking buffalo are comprised of 1) nutrients required for maintaining body and 2) nutrients required for producing milk. Suppose roughage fulfills nutrients requirement for maintain body and concentrate is fed for milk production nutrient requirements. Nutrients fed will be feeding line level if fixed quantity of concentrates are fed.

There are following issues with above feeding pattern.

1) Nutrients deficiencies are compensated with the accumulated nutrients such as fat and muscles. The body weight of animals, therefore, will be reduced, which might cause malfunction of reproductive function of animals. To keep reproductive interval once in a year, animals have to conceive 45 to 85 days after a delivery. Nutrients become highly deficit during these period. If the above feeding pattern is practiced during this period, animals are difficult to come into heat. Once the milk production is decreased and nutrients fed become sufficient to fill nutrients requirement, reproductive function of animals will be recovered. Animals become able to come in heat and conceive. The above feeding pattern, therefore, prolong reproductive interval of animals to 1 and half year to 2 years.

2) When nutrient requirement for milk production is compensated with accumulate nutrients, the milk production efficiency will be decreased. The animals, therefore, cannot give full milk production ability. The quantity of milk production, therefore, might not be up to the mark.



**The Project on Sustainable Livestock Development
for Rural SINDH “PSLD”
(JICA Technical Cooperation)**

**Textbook for Nutritional Evaluation
of Feed Stuffs for
Poultry and Ruminant**

Enlarged and revised edition



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August 2018

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ANNEX1

Format for collecting sample

ANNEX 2

Concept of “Dry matter” and “As Fed” conversions

ANNEX 3

Practical use of various chemical composition tables of feedstuff

INTRODUCTION

Nutritional value evaluation of feed is indispensable for improvement of livestock productivity. Productivity here refers to growth and conception rate, morbidity rate, milk production as well as being free from lack of nutritional intake, hunger and thirst as welfare of livestock. Many problems in livestock production can be improved by taking necessary amount of nutrients when livestock is needed. For that, it is necessary to evaluate the nutritional value of each feed.

The analysis items taken up in this text for nutritional evaluation of feed are basic nutrient value obtained through proximate analysis (moisture, crude protein, crude fat, crude ash) and detergent fiber analysis (acid detergent fiber (ADF), neutral detergent fiber (NDF)). Physical examinations such as feed uniformity and insect damage status are analysis items indispensable for evaluating feed nutritional value. These analysis items covered in this text, were selected in consideration of the PRI equipment situation. Regarding the crude fat analysis, the drying & extraction operation was devised so as to obtain a more accurate analysis result. The calculation formula for finding each component value in the feed from the titration value or the weight measurement value was devised so that the relationship with the analysis operation procedure and formula is clear.

The data obtained by the analysis can be used for designing livestock feed in a rational way. The fiber content of the feed obtained by detergent fiber analysis is known to be effective for evaluating feed intake and digestibility of ruminant livestock. Moreover, by combining data actually obtained by analysis and ingredient values (such as energy and mineral content) of feed in the feed composition table such as of Feedipedia (see ANNEX 3) published in the Website, it is possible to design more precise livestock feed according to the nutrient requirement level of livestock. The data of cereals and byproducts obtained by proximate analysis can also be used as basic data for designing feed to poultry.

SAMPLE COLLECTION and pre-drying

The amount of sample used in the analysis of feed is between 1 to 15 g for each constituent. Since the analytical values obtained from the sample are representative of the nutrients contained in the feed or fodder, the sampling process is an important step.

A. Register

At the time of collecting feed, the characteristics of feed samples should be registered in the “Recording form”(ANNEX 1). This register is very important for the evaluation of nutritive level of feed sample.

B. Green fodder, natural grass, residues after harvesting, etc.

Collection sample in field

1. Since factors such as irregular growth and composition of the grass species can affect the chemical composition, perform sample collection from pastures or fields with care.
2. For grazing grasses, at least select three sites exhibiting average growth and cut 1 m² quadrates marked out. Cut all the grass in the quadrates, chop into 5~10 cm lengths, mix and take some of them out as an analytical sample.
3. For corn and sorghum, cut about 5 plants exhibiting average growth, chop into 5~10 cm lengths, mix and take some of them out as an analytical sample.
4. Mark identification on a sample bag, i.e. Name, Address, Sample number and Date.



Pre-drying

1. Weigh a forage sample cut in the field for analysis immediately after cutting.
2. Cut the collected forage in 5~10 cm.

3. Spread fresh forage (green fodder), silage or moist hay on a tray and dry at 60°C for 18 hours using a forced-air drier.
4. Allow the dried material leave indoors and air-dry for 24 hours and weigh it.
5. Grind all the sample for analysis including the leaves which fall of from the stems.

Moisture (%) of Pre-drying weight = $\frac{\text{Sample weight(g) after drying at } 60^{\circ}\text{C}}{\text{Sample weight(g) before drying}} \times 100$

C. Grain, by-products, straw, hay, etc.

1. Collect samples from different portions (top, middle, base) into a clean and dry plastic or paper bag. Then mix collected samples thoroughly.
2. Sample quantity should be 500 g.
3. Tie a mouth of a bag with thread or rubber band.
4. Keep a sample in cool and dry place.
5. Mark identification on a sample bag, i.e. Name, Address, Sample number and Date.
6. Mention name of the test required on a bag.



(Sampling of rice straw)

03

PHYSICAL ANALYSIS

The physical procedure is carried out by visual inspection of checking the following items*;

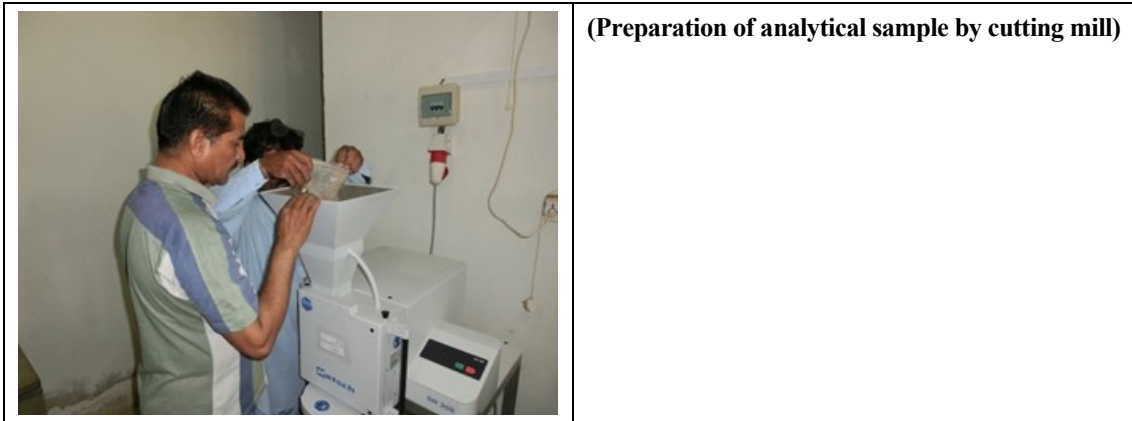
1. Uniformity in texture
2. Properly grinded or not
3. Color
4. Wet spot
5. Dirt/sand
6. Metal, wood, plastic objects
7. Thread, cloth pieces
8. Proper mixing or not
9. Bones, feather/skins
10. Insect
11. Mould /fungus
12. Odor
13. Rancid

*For this check, the use of “Loupe” is effective.

04

PREPARATION OF SAMPLE FOR ANALYSIS

1. Use 1 mm sieve for grinding.
2. Take approximately 200~300 g of sample to be grinded
3. Time required for grinding is 3 mins
4. Keep the grinded sample in prescribed plastic bottle marked with identified/allowed laboratory number.
5. Clean the grinder (Cutting mill) with a plastic brush and get ready for the next sample preparation.



05

BALANCE

1. Accurate balance reading of sample is very important to get good results*.
2. Use of Digital/electronic balance.
3. It gives 3 digits after decimal.
4. Requirement of sample depends upon the test.
 - 1) Protein 1.0 grams
 - 2) Ash 2.0 grams
 - 3) Fiber 1.0 grams
 - 4) Fat 2.0 grams
 - 5) Moisture 10 grams
 - 6) Aflatoxin 50 grams

*Before weighing the sample, wait for 5~10 minutes after switching on the balance to stabilize it.



(Waiting for stabilizing the function electrical balance)

PROXIMATE ANALYSIS

-Determination of Moisture*

Procedure

1. Weigh accurately approximate 10 g of sample (pre-drying or air-drying) on Petri dish.
2. Dry in an air-oven at 105°C for overnight to make the sample moisture-free.
3. After allowing to cool in a desiccator for 30 minutes, weigh the weighing dish.
4. Use this dried sample for “the determination of crude fat”.

$$\text{Moisture (\%)} = 100 - (W1 - W0) / S \times 100$$

$$\text{Laboratory dry matter (\%)} = 100 - \text{Moisture (\%)}$$

W0; Constant weight of Petri dish(g)

W1; Weight of dried sample + Petri dish

S; Sample weight(g)

*Calculation of amount of moisture in green fresh forage

Dry matter % in green fresh forage (DM base) = Dry matter (%) of pre-drying x laboratory dry matter (%) / 100



-Determination of crude ash

PRINCIPLE; The sample is ignited at 600°C to burn off all organic matters. The inorganic carbon free substance which remains at that temperature is called ash.

PROCEDURE

1. Weigh the clean empty crucible.
2. Put approximate 2 g of sample in crucible then take accurate weight.
3. Put the crucible with sample in muffle furnace.
4. Raise temperature of muffle furnace step by step, and keep the sample in muffle furnace at 600°C for at least 4 hours.
5. Switch off the muffle furnace.
6. Transfer the sample from furnace to desiccator.
7. Keep the sample in the desiccator till the sample cool down to room temperature, it takes about 1 hour.
8. The sample is now called crude ash.
9. Weigh the crucible with ash.

CALCULATION;

- 1) $(\text{Weight of crucible} + \text{ash}) - \text{Weight of crucible} = \text{Weight of ash (g)}$
- 2) $\text{Ash (\%)} \text{ on the base of DM} = \frac{\text{Weight of ash(g)}}{\text{Weight of sample(g)}} \times 100$
 $\times 100 / (100 - \text{moisture (\%)})$



(Muffle furnace)

-Determination of crude protein

The crude protein content is determined by the Kjeldahl method.

Concentrated sulfuric acid is added to the sample and digested by heat. The protein is dissolved into ammonia and reacts with the sulfuric acid to produce ammonium sulfate. The solution is subjected to steam distillation under alkaline conditions and the distilled ammonium is absorbed with a known amount of sulfuric acid. The total nitrogen is determined by titration. The determined nitrogen by this decomposition method includes non-protein nitrogen compounds such as amino acids, amides, and ammonia, however it excludes nitrate nitrogen and nitrite nitrogen. The determined nitrogen value is multiplied by a constant of 6.25 (assuming the nitrogen content in protein is 16 %) to give

the crude protein content.

1. Reagents

- Sodium carbonate (this reagent is dried in 105°C for 2 hours)
- Sulfuric acid
- Sodium hydroxide
- Methyl red
- Methyl orange
- Methyl blue
- Potassium sulfate
- Copper sulfate

2. Standardization of 0.25 N H₂SO₄ and 0.1 N NaOH standard solution

1) Standardization of sulfuric acid solution with sodium carbonate

- Place 0.250 g of sodium carbonate in an Erlenmeyer flask.
- Add 50 mL of distilled water into the Erlenmeyer flask. Then add 2 to 3 drops of indicator (Methyl orange solution).
- Titrate the solution with 0.25 N H₂SO₄ solution*.
- Obtain the factor of the 0.25 N H₂SO₄ titration solution from the titer.

*Approximate 14 mL is added to 200 mL distilled water. After cooling the solution, it is diluted up to 2 L.

Calculation formula to find the normal value of 0.25 H₂SO₄ standard solution

Chemical equivalent; The weight in grams of a substance that combines with or displaces one gram of hydrogen. Chemical equivalents usually are found by dividing the molecular weight by its valence.

In case of Na₂CO₃, ne molecular (105.999)/2=52.999= one chemical equivalent

(a) Chemical equivalent of Na₂CO₃(0.250 g) used to titration

$0.250/105.999 \rightarrow 0.002359$ mole $\rightarrow 0.004718 \times 2 = 0.004718$ chemical equivalent

(b) Chemical equivalent of 0.25 H₂SO₄ solution used for titration (In case of titration of 18.5 mL)

As one normality(molarity/2) of H₂SO₄ solution is correspond to one chemical equivalent in 1000 mL of the solution, the chemical equivalent of 0.25 N H₂SO₄ in 18.5 mL titration is

obtained as follows;

Chemical equivalent of H_2SO_4 in 18.5 mL of 0.25 N H_2SO_4 solution used to titration = 18.5 ml
x **normality of 0.25 N H_2SO_4 solution**/1000 ml

(c) Normality of 0.25 N H_2SO_4 solution

Chemical equivalent of Na_2CO_3 which is used for titration has to be equal to chemical equivalent of H_2SO_4 in 18.5 mL of normality of 0.25 N H_2SO_4 solution which is used for titration.

Therefore, $0.250/52.999 = 18.5/1000 \times \text{normality of } 0.25 \text{ N } \text{H}_2\text{SO}_4 \text{ solution} \rightarrow$

Normality of 0.25 N H_2SO_4 solution = $0.250 \times 1000/52.999 / 18.5 = 0.2550 \text{ N } \text{H}_2\text{SO}_4$

2) Standardization 0.1 N NaOH titration solution

- (a) Add approximately 8 g NaOH to 200mL distilled water under stirring.
- (b) Dilute the solution up to 2 L solution.
- (c) Place 10 mL of 0.25 N H_2SO_4 in an Erlenmeyer flask and add 2 to 3 drops of indicator (Methyl red and methyl blue in the ratio of 3:1
- (d) Titrate the solution with 0.1 N NaOH solution.
- (e) Obtain the factor of the 0.1 N NaOH titrated solution from the titer (Blank value in sample titration).

Calculation formula for finding the normality of 0.1 N NaOH standard solution

Titration value of 0.1 N NaOH solution x normality of 0.1 N NaOH solution =

10 mL of titration of 0.25 N H_2SO_4 solution x Normality of H_2SO_4 solution

So, Normality of 0.1 N NaOH solution = 10 mL of 0.25 N H_2SO_4 solution x Normality of H_2SO_4 solution/
Titer* of 0.1 N NaOH solution.

*This titer is about 25ml. This titer corresponds to 3) the blank value of determination of nitrogen content by titration. It is desirable to determine the normality of 0.1N NaOH standard solution every time even when the same standard solution is used.

3. Procedure

1) Digestion

- (a) Weigh accurately approximate 1.0 g of sample with using a sheet of medicine paper then put it in 200mL of Kjeldahl flask.
- (b) Add approximately 3 g of digestion accelerator (Catalyzer)*.
- (c) Introduce 10 ml of concentrated H_2SO_4 gently.
- (d) Attach Kjeldahl flask to the digestion apparatus.
- (e) Heat gently the mixture until foaming stops and white fumes begin to be given off (Set a dial for the heating of the digestion apparatus to "Low" position, heat Kjeldahl flask for about 90

minutes).

(f) Then, set a dial for the heating of the digestion apparatus to "Medium" position, heat Kjeldahl flask for about 90 minutes.

(g) After (f), set a dial for the heating of the digestion apparatus to "High" position, heat it for about 30-60 minutes.

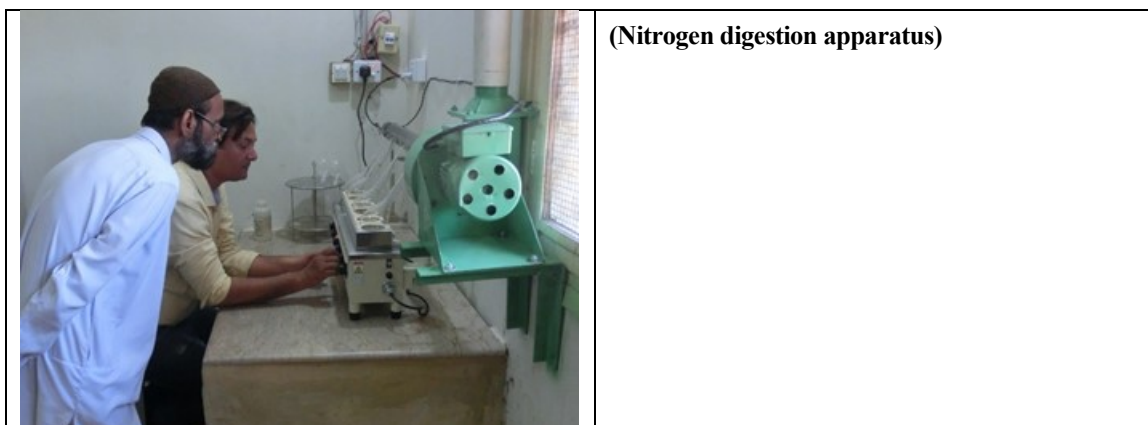
(h) After the solution turning transparent green, heat the solution for additional 1 hour 60 or longer until the digestion is completed (About 60 min. in "High" position)

(i) Transfer the solution to 100mL measuring flask and cool it down.

(j) Add the distilled water up to the marked line and mix well.

*Catalyzer:

Mix Potassium sulfate (K_2SO_4) and copper sulfate ($CuSO_4$) in the ratio of 9 :1.



2) Distillation

(a) Take 10 mL of 0.25 N sulfuric acid solution in a conical flask and add three drops of indicator (the indicator is a mixture of methyl red and methyl blue in ratio of 3:2)

(b) Take 20 mL of the digested solution sample which is diluted to 100 mL then put in 200 mL Kjeldahl flask.

(c) Add 100mL distilled water in the same flask and mix well.

(d) Add 8 mL of 40% Sodium hydroxide solution* to the sample.

(e) Pour the sodium hydroxide which is attached to the edge of the flask into the flask with a little amount of distilled water.

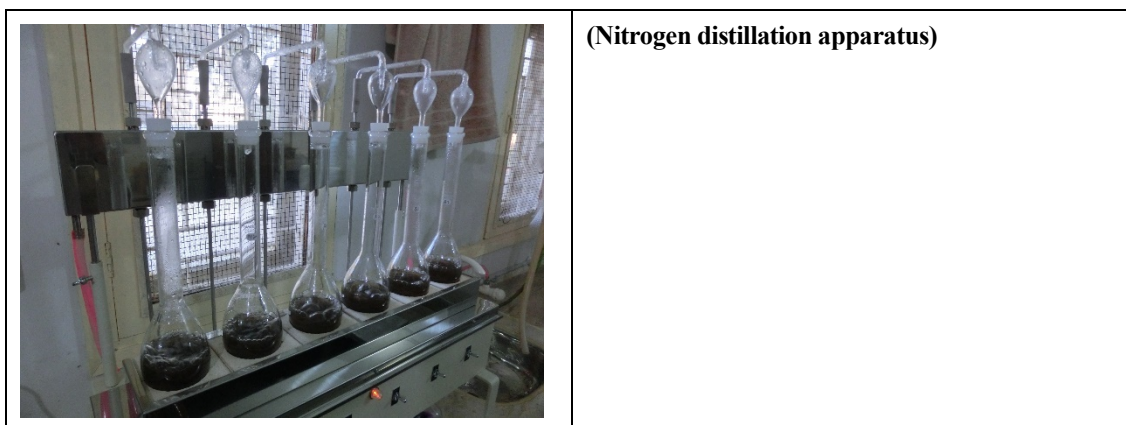
(f) Set the Kjeldahl flask and conical flask to the distillation equipment

(g) Distill for about 20 minutes after boiling started.

(h) Determine the nitrogen content absorbed in 0.25 N H_2SO_4 solution by titration.

*40 (w/v) % Sodium hydroxide solution;

Dissolve 400 g of sodium hydroxide (NaOH) in distilled water and made up into 1000 mL.

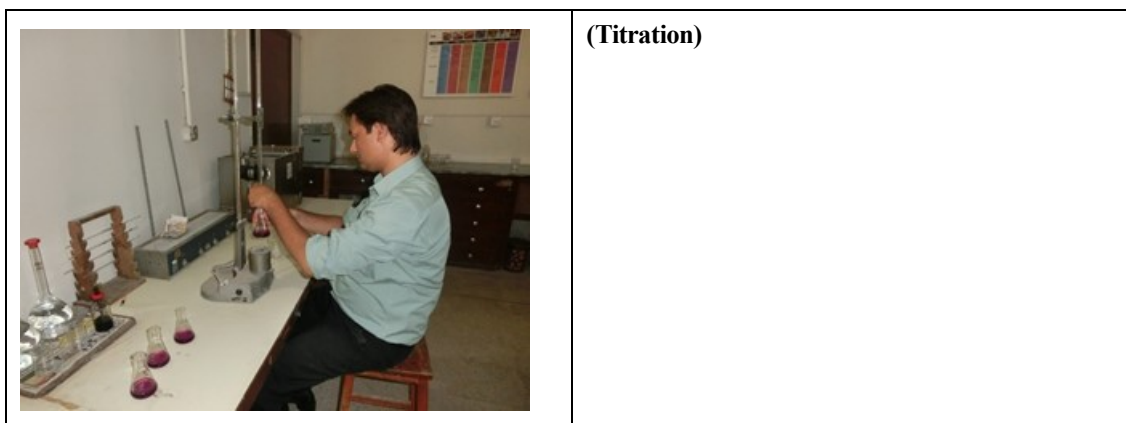


3) Determination of nitrogen content by titration

- (a) Fill the 25 ml burette with 0.1 N NaOH solution.
- (b) Titrate the distilled solution of conical flask immediately with 0.1 N NaOH solution (Back titration*).
- (c) Determine the end point of the titration when the deep purple colour of conical flask solution changes into green.

*Back titration

In back titration, the amount of NH_3 can be calculated indirectly by titrating sulfuric acid standard solution which is not reacted with NH_3 , using 0.1 N NaOH standard solution.



4) Nitrogen-to- protein conversion factor

There are slight differences in the amount of nitrogen in the proteins. It depends on the type of the proteins however the average is 16%. Therefore, to calculate the amount of the protein from the amount of nitrogen, it is needed to multiplied by 6.25 as its reciprocal number. The numerical value 6.25, is called nitrogen coefficient. How to calculate 6.25 is shown as below.

Amount of nitrogen in the sample/amount of protein in the sample $\times 100 = 16$ (%)

Amount of nitrogen in the sample $\times 100 = 16 \times$ amount of protein in the sample

Amount of nitrogen in the sample $\times 100/16 =$ the amount of protein in the sample

Amount of nitrogen in the sample $\times 6.25 =$ amount of protein in the sample

5) Calculation of crude protein content in feed

$$1) \text{ Crude protein (\%)} \text{ on the base of DM} = (T_b - T_s) \times N \times 14 \times 5 \times \frac{6.25}{S} \times 100 \times 100 / (100 - \text{moisture (\%)})$$

$$2) \text{ Crude protein (\%)} \text{ on the base of As Fed (Air dry sample)} = (T_b - T_s) \times N \times 14 \times 5 \times \frac{6.25}{S} \times 100$$

$$3) \text{ Crude protein (\%)} \text{ on the base of As Fed (Green fodder)} = \text{Crude protein (\%)} \text{ on the base of DM} \times (100 - \text{moisture (\%)}) / 100$$

T_b ; Titer (mL) of blank* by 0.1 N NaOH standard solution

T_s ; Titer (mL) of sample

N ; Normality of 0.1 N NaOH solution

Nitrogen amount (g) in $(T_b - T_s)$; $(T_b - T_s)$ mL $\times N \times 14$ g / 1000 mL

S ; 100 mL / 20 mL (Digested sample)

14; Molecule weight of nitrogen (g)

6.25; Nitrogen-to- protein conversion factor

S ; Sample weight (g)—As Received basis

100; For indication by the percentage (%)

*Titer of blank is about 25 ml

-Determination of crude fat

1. Take a six inch square piece of filter paper.
- A. Take accurately approximate 3 g from the moisture free sample (See "06 PROXIMATE ANALYSIS-Determination of Moisture") on the filter paper and thoroughly mix it.
2. Fold the filter paper closed tightly in a specified manner and mark identified number.
3. Dry the filter paper containing sample in the oven at 105°C for two hours—
4. Remove the sample from the oven and put it in desiccator for 30 minutes*.
5. Weigh the sample(W_1)** in desiccator.

6. Set the sample in Soxhlet. Connect the condenser on top of Soxhlet with cooler and connect cooler with tap water.
7. Put 150 mL to 200 mL petroleum spirit in flat bottomed flask as a unit and place it in the chamber of heater.
8. Extract for 6 hours at the rate of condensation at 3 to 4 drops per second.
9. By this process the fat of sample dissolves in petroleum spirit.
10. Stop the heating process; wait for 15 to 20 minutes.
11. Remove the sample packet from the Soxhlet; let it dry for 30 minutes at room temperature.
12. Again put this packet in the oven at 105 °C for two hours.
13. Remove the sample from the oven and put it in desiccator for 30 minutes
14. Weigh the sample(W0).

Calculation

$$\text{Crude fat (\%)} \text{ on the base of DM} = (W1-W0)/S \times 100$$

W1; Weight of (sample + filter paper) after drying

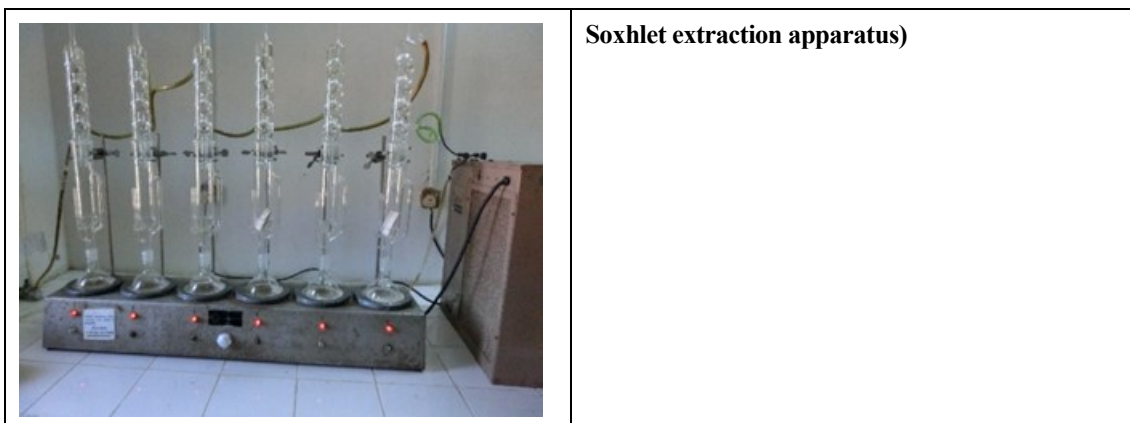
W0; Weight of (sample + filter paper) after extraction and drying

S; Sample weight (moisture free)

* Filter paper for this experiment contains approximately 6%*** of moisture. For that reason, filter paper has to be dried to get rid of moisture before extraction, otherwise crude fat value become higher than actual value.

** Do not hold a sample by hands to avoid any influence from water attached with fingers. Use tweezers for holding a sample.

*** This % of moisture varies in humidity in laboratories.



-Determination of crude fiber

1. Weigh dried crucible.
2. Weigh accurately approximate 1 g of moisture free and_ether extracted sample.
3. Place the sample in a crucible and set it onto an apparatus.
4. Add hot 100 mL sulfuric acid solution (1.25 %).
5. Install the beaker on fiber extraction unit for boiling; let it boil for 30 minutes.
6. After boiling filter the solution.
7. Wash with hot distilled water 4-5 times until it becomes acid free.
8. After washing, collect the sample, add hot 100 mL sodium hydroxide solution (1.25 %)
9. Boil the alkali solution for 30 minutes.
10. After boiling, filter the solution.
11. Wash the sample with 10 mL hot sulfuric acid solution (1.25 %).
12. Then, wash the sample with hot distilled water 4 to 5 times.
13. Wash the crucible with ethanol.
14. Put the crucible plus sample in an oven at 135°C for 2 hours.
15. Cool in desiccator for 30 minutes and weigh it (sample + crucible).
16. Put the crucible plus sample in the muffle furnace at 600°C for 30 minutes.
17. Cool in desiccator for 1 hour and weigh it.

Crude fiber (%)

$$= (\text{Residue weight} - \text{Ash content}) \times (\text{Sample weight} - \text{moisture} - \text{fat}) / \text{Sample weight} \times 100$$

Residue weight; The value got by the 14th operation

Ash content; The value got by the 17th operation

Fat; The value got by crude fat analysis

VAN SOEST DETERGENT FIBER ANALYSIS

-Acid detergent fiber(ADF)

Principal of ADF analysis; Sample is boiled in a treatment solution (acid detergent, AD), produced from a surfactant dissolved in 1N-sulfuric acid solution. Protein soluble carbohydrate and fat, etc. are dispersed in the solution and then digested by the acid solution. At the same time, hemicellulose and cellulose are hydrolyzed. Almost the whole hemicellulose is hydrolyzed, although the crystalline region of cellulose is not digested. Lignin is also not digested. Consequently, the residues obtained by the treatment contains mainly lignin and cellulose, and small quantity of protein as organic matter, and silicic acid (mainly plant opal) as inorganic matter. The organic portion of this treated residue is termed acid detergent fiber (ADF).

The analytical procedure is performed in the same way as determining the fiber content using the proximate method.

1. Reagents

- 1) Cetyltrimethyl ammonium bromide (CTAB)
- 2) Sulfuric acid
- 3) Decalin (Decahydronaphthalene)-used as antifoaming agent
- 4) Acetone

2. Acid detergent solution (AD solution);

Dissolve 20 g of CTAB in 1L of 1N sulfuric acid solution (dissolve 98 % sulfuric acid (assay grade), 51 g is in distilled water and make up into 1L solution).

3. Procedure

- 1) Weigh dried crucible.
- 2) Weigh accurately approximate 1 g of sample in a crucible and set it apparatus.
- 3) Add 100 mL of AD solution, and a few drops of decalin.
- 4) Boil this mixture solution for 1 hour.
- 5) Filter the solution and wash it 6 to 7 times with distilled water, followed by 3 times with acetone and dry it room temperature.
- 6) Allow to evaporate acetone from the residue in the crucible.
- 7) Dry it for 2 hours at 105°C and allow to cool it in a desiccator for 30 minutes and then weigh it.
- 8) The value obtained here is the sum of ADF and silicic acid.

- 9) After weighing, place the crucible in a muffle furnace, pre-incinerate, and incinerate at 600°C at 2 hours, then allow to cool it for 60 minutes in a desiccator and measure the residue content.

Subtracting the ash content from pre-determined residue weight gives acid detergent fiber content(ADF).

$$\text{ADF (\%)} = (\text{residue weight}-\text{ash content})/\text{sample weight} \times 100$$

-Neutral detergent fiber (NDF)

1. Neutral detergent fiber (NDF)

The NDF value is the total cell wall which is comprised of the ADF fraction plus hemicellulose. NDF values are important because they reflect the amount of forage the animal can consume. As NDF percent increases, the dry matter intake generally decreases.

2. Reagents

- 1) Heat-stable α -Amylase (ANKOM-made reagent)
- 2) Disodium phosphate
- 3) Sodium lauryl sulfate
- 4) EDTA-2Na
- 5) Sodium borate (di-Sodium tetraborate decahydrate)
- 6) Disodium phosphate (di-Sodium hydrogen phosphate dodecahydrate)
- 7) Ethyleneglycol monoethylether
- 8) Decahydronaphthalene (Decaline)
- 9) Sodium sulfite (Na_2SO_3)
- 10) Acetone

3. Neutral detergent solution (ND solution)

- (1) Dissolve Sodium lauryl sulfate 60 g, EDTA-2Na 37.2 g, sodium borate 13.6 g, disodium phosphate 23.0 g and ethyleneglycol monoethylether 20 mL in distilled water.
- (2) Make 2 L of the solution mentioned above (1).

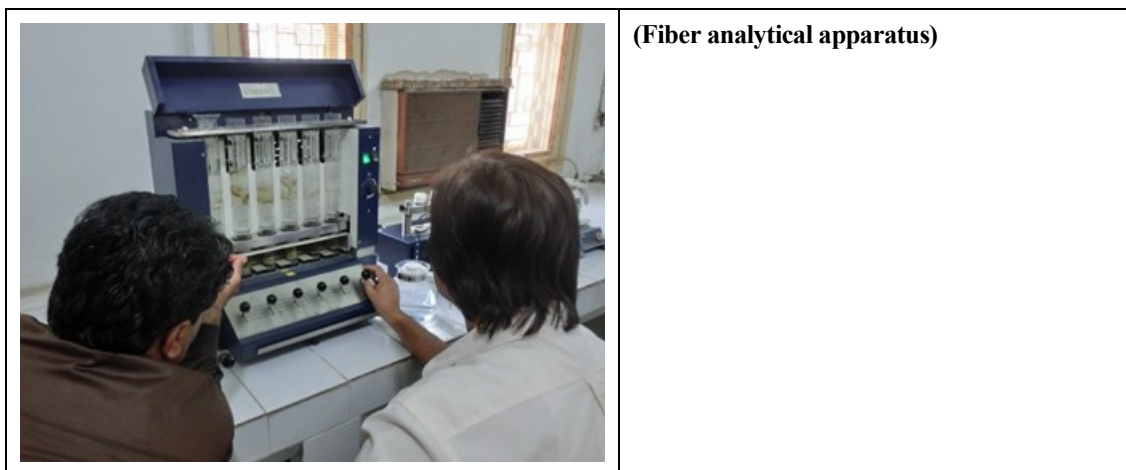
4. Procedure

- 1) Weigh dried crucible.
- 2) Weigh accurately approximate 1 g of the sample and 0.5g of Sodium sulfite in a crucible and set it onto a apparatus.
- 3) Add 100 mL of ND solution and a few drops of decalin.

- 4) Add 0.5 mL of heat-stable α -Amylase.
- 5) Boil the mixture (by heating so that the mixture refluxes gently) for 1 hour on the measurement apparatus.
- 6) After boiling, add 0.5 mL of heat-stable α -Amylase.
- 7) Filter the solution.
- 8) Wash 6 to 7 times with water, then wash 3 times with acetone.
- 9) Dry it at room temperature.
- 10) After allowing acetone to vaporize off, dry the residue and the crucible at 105 °C for 2 hours, leave them cool in a desiccator for 30 minutes, and then weigh it.
- 11) Place the crucible, pre-heat, and incinerate in a muffle furnace at 550~600 °C for 2 hours.
- 12) Leave the crucible to cool for 60 minutes in a desiccator, and weigh it.
- 13) Calculate NDF value by subtracting the ash content from the residue weight.

$$\text{NDF (\%)} = (\text{residue weight} - \text{ash content})(\text{g}) / \text{sample weight}(\text{g}) \times 100$$

Sample weight(g)-As received basis



ANNEX 1

Recording form for feedstuffs (format)

Sampling site(Manufacture)		Class of sample		Fodder		Growth stage (Grass, Fodder, etc.)	
District		Grass		Sorghum		Vegetative	
Talka		Crop		Maize		Booting	
Union Council		Grain		Millet		Flowering	
Village		By-product		Rice for fodder		Fruiting	
Farmer		Concentrate				Milky	
Proximate analysis		Residues		Grain		Yellow ripe	
Moisture				Maize		Dough ripe	
Crude ash				Sorghum			
Crude protein				Rice			
Crude fiber		Species of grass		Millet		Classification of fodder	
Crude fat		Gramineae				Green	
				By-product		Hay	
Detergent analysis				Cotton seed cake			
Acid detergent fiber(ADF)				Wheat bran			
		Leguminosae		Rice bran		Mowing (Grass, rice etc.)	
Natural detergent fiber(NDF)		Alfalfa		Rice polish		First	
		Berseem				Second	
		Jantar		Residues		Third	
				Rice straw		Fourth	
		Natural grass		Wheat straw		Fifth	
		Chabar		Cotton leaves			
		Drub		Cotton bud			
		Top		Banana leaves		Mowing date	
				Banana pseudstems		Year	month
						day	

Observations(Fertilization, irrigation etc.)

Moisture contents (%) of green fodder	
g/Sample of fresh fodder(A)	
g/60°C dried fodder(B)	
B/A=Pre-drying matter-%	

Sampling date	Year
	Month
	Day

Sample number	Note:
	PSLD+Number

ANNEX 2

Concept of “Dry matter” and “As fed” conversions

All feeds contain some water in practical feeding situations. The amount of moisture in any feedstuff directly affects in nutrient content. If we want to compare the nutritive value of feeds that vary in moisture content, the composition of the feed must be expressed on a “dry matter” or moisture free basis. For example

Feedstuff	% DM	As fed %CP	As fed %CF	Dry basis %CP	Dry basis %CF
Alfalfa pasture, pre-bloom	19.8	4.1	4.6	20.7	23.2
Alfalfa hay, pre-bloom	90,5	19.0	22.6	21.0	25.0

As fed – This refer to feed as normally fed to animals. On an as fed basis, feed may contain water ranging from 90 % water for lush pastures to 10 % for cereal grains.

Dry matter – Dry matter is the potion of feed which does not contains water. It is computed by determining the percentage of water and subtracting the water content from 100 %. On a dry matter basis, feed contains 0 % water.

$$\% \text{ dry matter} = 100 \% - \% \text{ water}$$

Converting feed composition data;

$$\% \text{ nutrient(dry)} = \% \text{ nutrient(as fed)} / \% \text{ dry matter} \times 100$$

$$\% \text{ nutrient (as fed)} = \% \text{ nutrient(dry)} / \% \text{ dry matter} / 100$$

Converting amounts of feed;

$$\text{Amounts feed (dry)} = \text{Amount feed (as fed)} \times \% \text{ dry matter} / 100$$

$$\text{Amounts feed (as fed)} = \text{Amount feed (dry)} / \% \text{ dry matter} \times 100$$

Useful rules;

1. The percentage of a nutrient on a dry matter basis will always be higher than it will be on an as fed basis.
2. The amount of feed on a dry matter basis will always be higher than the amount on an as fed basis.
3. When a nutrient is expressed in unit such as grams or calories (amounts), it is not changed by moisture collection

Reference:

Montana State University; <http://animalrange.montana.edu/>)

Following website is also useful.

Mississippi State University; <http://extension.msstate.edu/>

“Feedstuff Comparisons-As Fed versus Dry Matter”

ANNEX 3

Practical use of various chemical composition tables of feedstuff

1) “Feedipedia”*

- Data obtained from analysis can be compared with analysis results uploaded on this website, including minimum value, maximum value and average value.
- Nutrient value other than main components of target fodder, such as energy, mineral and vitamin can be checked on this website. Information such as influence on animal due to metabolic inhibitor included in fodder and manufacturing process of agricultural by-products are also available on this website.
- Information on this website can be used for feed calculation.

*Website; <http://www.feedipedia.org/>

2) Handbook of Dairy Nutrition-Pakistan

In this handbook, basic component value of roughage, grain and byproducts used in Pakistan were shown as ‘Feed composition tables’. This data in the table can be utilized for comparing analysis data and for feed calculation.

3) Nutrient Requirements of Dairy Cattle, 7 th revised edition, 2001 (NRC)*

In this document, component value of typical feed are shown in the ‘Nutrient Composition and Variability of some Feedstuffs commonly fed to Dairy cattle’.

*Website; <https://www.nap.edu/catalog/dairymodel/>



**The Project on Sustainable Livestock Development
for Rural Sindh “PSLD”
(JICA Technical Cooperation)**

**Textbook for Diagnosis and Treatment of
Reproductive Disorder of Dairy Cattle and Buffalo**



November 2018

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This textbook has been developed for the use of livestock professionals. The Livestock and Fisheries Department, Government of Sindh welcomes your comments and suggestion to improve this material.

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Preface

Livestock is the largest sub-sector in agriculture of Pakistan, contributing 11.4 percent to overall GDP of the country. Livestock plays vital role in rural economy and livelihood of rural poor, so as in rural Sindh. It is a source of cash income, nutrition and sometimes only asset for the rural and marginalized people.

The Project on Sustainable Livestock Development for Rural Sindh (The Project) is the 5 years technical cooperation project implemented in collaboration with the Livestock and Fisheries Department, Government of Sindh and Japan International Cooperation Agency (JICA), Government of Japan, aiming for creating foundations of sustainable livestock sector development in Sindh province, which benefit small scale dairy farmers who comprises more than 80 percent of the sector. The Project was initiated in February 2014 and implemented in 5 pilot districts, namely Matiari, Hyderabad, Tando Muhammad Khan, Tando Allahyar and Badin. The Project focused on development of appropriate technologies for dairy farming. Throughout five years of implementation, appropriate technologies were developed, piloted and verified for the use of small scale formers in Sindh province. Along with the appropriate technologies, useful basic technologies for livestock professional technicians were developed. The technologies range over 7 areas, namely, farm management, marketing, feeding management, fodder, animal health, animal reproduction and genetic improvement. The Project worked on effective utilization of livestock resources, i.e. calves and dry buffaloes in the commercial cattle colony as well. Method for salvation of calves and dry buffaloes were verified.

Technologies developed by the Project are compiled as textbooks, guidelines and booklets for wider application and dissemination to professional technicians, and ultimately to farmers. The Livestock and Fishery Department hope that these series of publications will widely be used by livestock professional technicians both public and private and dairy farmers in Sindh province for uplifting their livelihood.

Director General / Project Coordinator
The Livestock and Fisheries Department
Government of Sindh

Foreword

The Project on Sustainable Livestock Development for Rural Sindh is implemented in Southern parts of Sindh Province, Pakistan in collaboration with Livestock and Fisheries Department, Government of Sindh and Japan International Cooperation Agency (JICA). The Project was supported by the team of Japanese experts led by Mr. Hiroshi Okabe.

The baseline survey on small and medium scale dairy farmers conducted in the beginning of the Project revealed that majority of dairy farmers availed veterinary services only at the time of serious illness or dystocia of their animals. Dairy farmers apply traditional methods when their animals suffer from slight illness and do not use services of reproductive diagnosis and treatment for reproductive disorder of their animals. Reproductive disorder is not fatal disease and does not demand emergency treatment. Dairy farmers just wait without any diagnosis and treatment of unpregnant animals until they decide to cull at some point of time. This is normal practice which has been exercised in rural Sindh. Expertise on animal reproduction in the area was underdeveloped. The Project had to start technical guidance on animal reproduction from scratch.

To produce tangible results on improvement of conception rate of animals, both technical guidance to dairy farmers and to veterinary doctors are required in parallel. For dairy farmers, technical guidance on improvement of nutritious condition of animals, heat detection and reduction of stress are needed. For the veterinary doctors, they need to be trained as skilled technicians who can diagnose and treat reproductive disorder. Diagnosis and treatment of reproductive disorder through rectal palpation requires profound techniques which can be developed through untiring efforts over considerable time period. Training on animal reproduction organized by the Project is time-bound. Trainees are expected to obtain most essential basic knowledge and techniques in a training and continue making efforts to accumulate their experiences at farms to improve their skills by themselves after a training. The Project hopes that this text book will be of use for trainees to improve their skills in the field.

Japanese technical cooperation in the field of animal reproduction towards developing countries is increasing year by year. For smooth and proper technology transfer from Japanese experts to technicians in developing countries, 'Manual for diagnosis and treatment of reproductive disorder in dairy cattle' was developed by Japan Livestock Technology Association upon request of Japanese Ministry of Agriculture, Forestry and Fisheries. With the permission of Japan Livestock Technology Association, this textbook was composed of the extract from the above manual with some modification by Japanese experts and Pakistani technicians for the use of technicians in Pakistan. We express our gratitude to Japanese Ministry of Agriculture, Forestry and Fisheries as well as Japan Livestock Technology Association for their kind cooperation.

November 2018

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Abbreviation List

ACTH	Adrenocorticotropic Hormone
APG	Anterior Pituitary Gonadotropin
AU	Armour Unit
CCL	Cystic Corpus Luteum
CIDR	Controlled Internal Drug Release
CRH	Corticotropin Releasing Hormone
E	Estrogen
E ₁	Estrone
E ₂	Estradiol
E ₃	Estriol
E ₁ S	Estrone Sulfate
eCG	equine Chorionic Gonadotropin
EGF	Epidermal Growth Factor
EIA	Enzyme Immunoassay
ES Cell	Embryonic Stem Cell
FC	Follicular Cyst
GnRH	Gonadotropin Releasing Hormone
GTH	Gonadotropic Hormone
hCG	human Chorionic Gonadotropin
IGF	Insulin-like Growth Factor
IL-1	Interleukin-1
IU	International Unit
LC	Luteal Cyst
LH	Luteinizing Hormone
ng	Nanogram (10 ⁻⁹ g)
NGF	Neuro Growth Factor
OT	Oxytocin
P ₄	Pregesterone
PCF _{2a}	Prostaglandin F _{2a}
PCR	Polymerase Chain Reaction
Pg	Picogram (10 ⁻¹⁰ g)
PIH	Prolactin Release Inhibiting Hormone
PL	Placental Lactogen
PMSG	Pregnant Mare Serum Gonadotropin (equine Chorionic Gonadotropin)
PRH	Prolactin Releasing Hormone
PRID	Progesterone Releasing Intravaginal Device (Another name:CIDR)
PRL	Prolactin
Rab U	Rabbit Unit
RI	Radioisotope
RIA	Radioimmunoassay
SRY	Sex-determining Region Y
T	Testosterone
TGF	Transforming Growth Factor
μg	Microgram (10 ⁻⁶ g)

(Note) Estrogen and Progesterone ¹

¹ Estrogen: Number of E are OH groups (hydroxyl groups) in the steroid chemical formula.

Progesterone: There is the fourth double bond of steroid in chemical formula of progesterone, it is abbreviated as P₄.

Chapter 1 Reproductive physiology of dairy cattle & buffalo

1.1 Structure of reproductive organs

Female reproductive organs are roughly divided into the ovary, oviduct, uterus, uterine cervix, vagina and vulva. Their locations in the body are as shown in Figures 1-1 and 1-2.

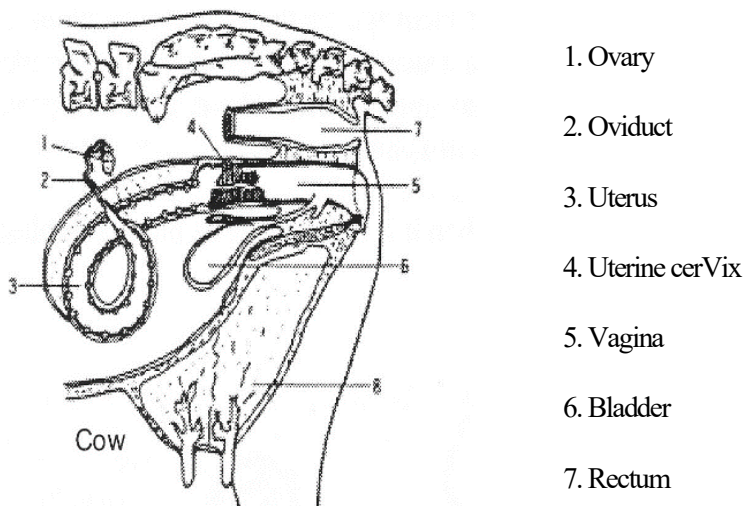


Figure 1-1 Reproductive organs of cows

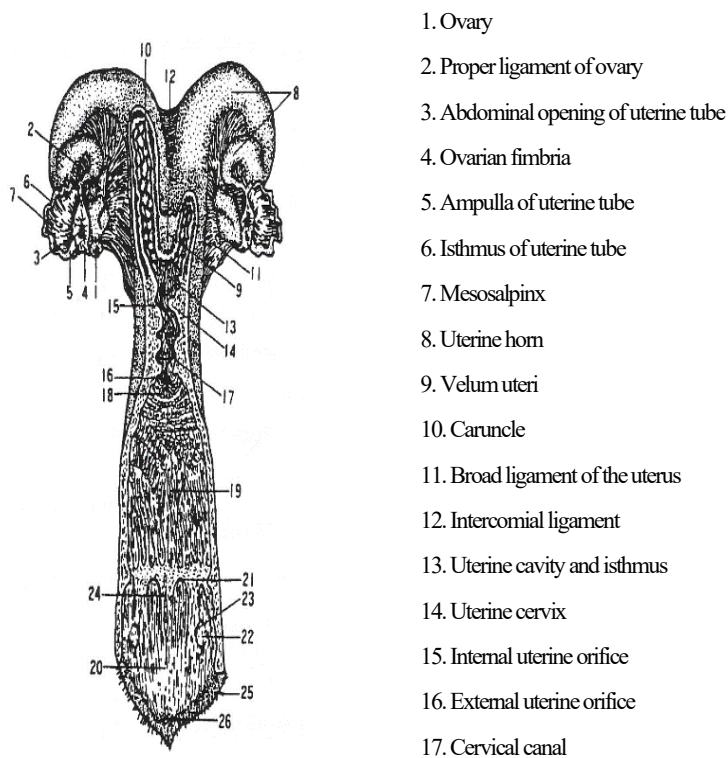


Figure 1-2 Reproductive organs of cows (partial section of the dorsal part)

1.1.1 Ovary

A cow has the left and right ovaries and follicular growth and maturation, ovulation, and luteal formation and regression occur in these ovaries of mature cows according to the estrous cycle.

1.1.2 Oviduct

The oviduct following the ovary serves as a route through which an emitted ovum is transported and is the location where the ovum encounter sperm and fertilization takes place. The oviduct consists of the infundibulum with fimbriae, ampulla and isthmus (see Figure 1-3). Fertilization occurs in the ampulla portion. A fertilized ovum descends within the oviduct and enters the uterus while undergoing cleavage. A fertilized ovum after the start of cleavage is generally referred to as an embryo.

A fertilized Ovum that started cleavage in the oviduct develops through the 2, 4, 8 cell stages into the morula stage. It further develops to form internal cavities (blastula cavities) in the gaps among cells where it stores protein-rich fluid. An embryo at this stage is referred to as a blastocyst.

An embryo enters the uterus when it is at the stage of morula or blastocyst, about 7 days after ovulation.

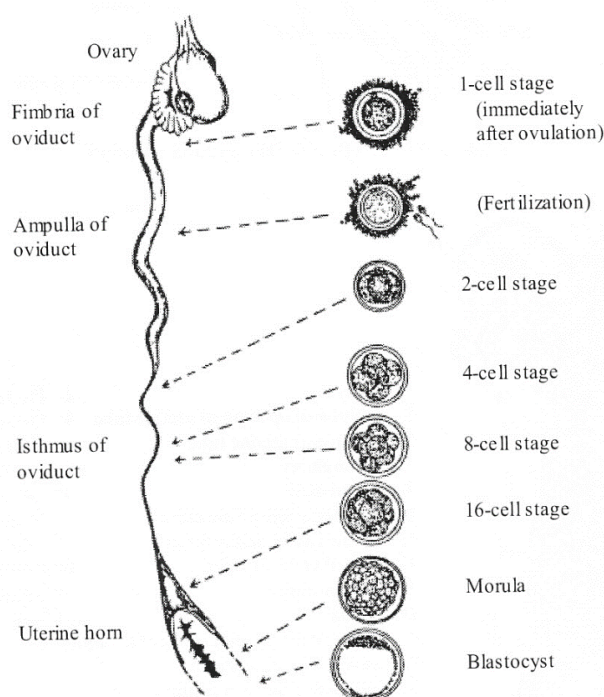


Figure 1-3 Descent of an Ovum in the oviduct (cow)

1.1.3 Uterus

An embryo that enters the uterus is implanted on the endometrium and continues to grow. It then gradually develops an external shape characteristic of adult cattle. The internal structures become similar to those of adult cattle to carry out functions. An embryo at this stage onward is referred to as a fetus. The pregnancy period is divided into the 1) ovum period, 2) embryonic period and 3) fetal period.



1.1.4 Uterine cervix

The lumen of the uterine cervix is referred to as the cervical canal. Circular folds are present on the internal surface of the cervical canal of cattle and the lumen is rigidly closed. The exit of the cervical canal on the uterine side is referred to as the internal uterine orifice and the one on the vaginal side the external uterine orifice.

1.1.5 Vulva

The pudendum refers to the end of the urogenital canal of female cattle and the exit to the outside of the body is referred to as the vulva.

1.2 Sexual maturity, estrous cycle, pregnancy, parturition, and return of estrus after parturition

1.2.1 Sexual maturity and breeding age

Sexually mature cows repeat estrus at certain intervals. In Holsteins, the ovary starts functioning at the age of 6-12 months (puberty) but female Holstein are usually capable of breeding after 18 months, and calving after the age of 28 months (Zebu cattle and buffalo reach puberty after 24 months and calving after 36 months). The first ovulation after puberty does not show any estrous signs in most cases and the first estrous cycle is short.

1.2.2 Estrous Cycle

(1) Emergence of estrous cycle

In non-pregnant sexually mature cows, a cycle consisting of follicular growth, ovulation, and luteal formation and regression is repeated in the ovary and estrus emerges when the ovarian follicle is mature. These periodical changes are referred to as the estrous cycle. The estrous cycle is generally divided into the estrous phase and the luteal phase, the latter of which is further divided into the luteal formation stage (early luteal phase), functional luteal stage (luteal peak phase) and the luteal regression stage (end luteal phase).

(2) Length of estrous cycle

In general, temperate zones including Japan, the length of the estrous cycle ranges from 18 to 25 days with that of heifer being 20 days and that of cow 21 days. This cycle is influenced by breed, season and age and extends to 22 days in old cows.

(3) Changes that occur in the reproductive organs during estrous cycle

1) Growth of ovarian follicles

A cow originally has several tens of thousands to a hundred thousand primordial ovarian follicles in its ovary. The process in which these primordial ovarian follicles mature is shown in Figures 1-4 (p.4) and 1-5 (p.4). They develop through the primary and secondary ovarian follicles into vesicular ovarian follicles (graafian follicles) and emit ova. However, not more than 200 primordial ovarian follicles mature and emit ova during a cow's lifetime and the remaining follicles degenerate in the ovary.

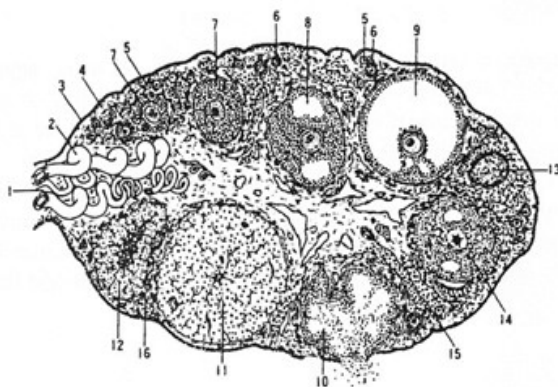


Figure 1-4 Schematic view of bovine ovary

1. Hilum of ovary
2. Blood vessel
3. Epithelium
4. Ovarian albuginea
5. Primordial ovarian follicle
6. Primary ovarian follicle
7. Secondary ovarian follicle
8. Growing mature ovarian follicle
9. Mature ovarian follicle
10. Ovarian follicle immediately after ovulation
11. Corpus luteum at functional luteal stage
12. Corpus luteum at luteolysis stage
13. Corpus albicans
14. Atretic follicle
15. Interstitial gland
16. Connective tissue

2) Maturity of ovarian follicles

A mature ovarian follicle is 12-24 mm in diameter and is enveloped with an external theca layer, internal theca layer and granulosa layer. An oocyte is enveloped with granulosa cells to form a germ cell and projects into the follicular antrum (see Figure 1-5 (p.4)). The follicular antrum is filled with follicular fluid.

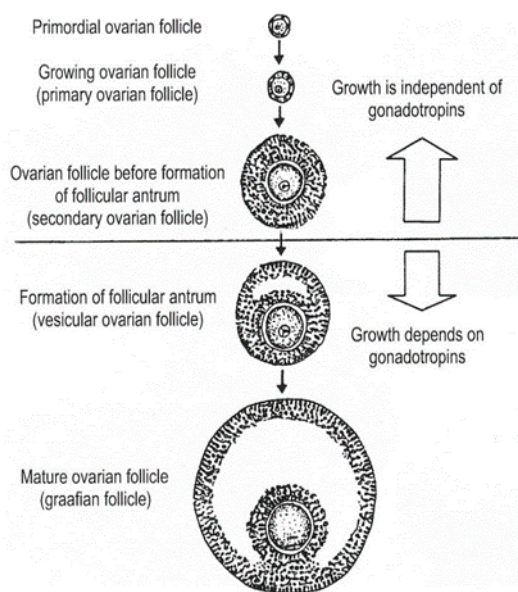


Figure 1-5 Development of ovarian follicle

Development from the primordial ovarian follicle to the stage before the formation of follicular antrum occurs in cows without hypophysis. The final development from the formation of follicular antrum to ovulation depends on gonadotropins. This second-stage development is shorter than the first-stage development. Maturity of an oocyte (resumption of meiosis and maturity of cytoplasm) only occurs after an LH surge.



3) Ovulation

Ovulation normally occurs after estrous and between 2 and 20 hours after estrous although it rarely occurs before the end of estrous. It most commonly occurs between 10 and 15 hours after estrus.

4) Formation and regression of the corpus luteum

Immediately after ovulation, the follicular antrum is filled with blood, some follicular fluid and leaked lymph fluid. Subsequently, luteal cells are formed by both surrounding granulosa and internal theca cells, the internal portion is enriched and the corpus luteum is formed. The corpus luteum is completed within 7-8 days of ovulation with a longitudinal length of 20mm functional corpus luteum. It continues developing and reaches a maximum longitudinal length of 20mm or more within 13-15 days of ovulation. After the functional corpus luteum stage, the corpus luteum starts rapid regression from the 17th to 18th day of the estrous cycle and shrinks and hardens. It also changes in color from orange during the functional corpus luteum stage to yellowish orange and finally to reddish brown (corpus luberum). The corpus luberum does not have the same function as the corpus luteum or excrete hormones. The pregnant corpus luteum remains on the ovarian surface for a long period after regression and is referred to as the corpus albicans.

(4) Estrous signs

Estrous signs in cows include a sharp look, increased sensitivity to sounds, reduced appetite, reduced rumination and loose stools. Estrous cows howl with a peculiar loud cry and wander about for bulls. They may mount on and be mounted by other cows raised together. They stand still and allow other cows to mount them when they are at estrous peaks. This behavior is referred to as a standing estrous and represents the estrous phase in a strict sense. The pudendum becomes congested and swollen and a large amount of mucus leaks from it.

(5) Optimum time of insemination

Identifying the start of estrous in cattle is important in determining the optimum time of insemination and achieving high conception rates. However, monitoring cattle continuously is difficult so various tools such as heat mount detectors, tail paint, chin balls and pedometers have been used and teasers (bulls for detecting estrus) that are treated in various ways have been experimentally introduced.

(6) Bleeding after ovulation

Some cows leak blood-like mucus or blood from the pudendum 1-4 days after the end of estrus. Leaks occur 2 days after the end of estrous in most cases and the incidence and amount of blood leaked is higher in nulliparae than in multiparae. Bleeding occurs at uterine mucous membranes. This bleeding indicates the end of estrus and helps predict the following estrus.

(7) Hormonal control of estrous cycle

Hormones that control the estrous cycle include those indicated in Table 1-1.



Table 1-1 Major hormones involved indicated in reproduction

Hormone-producing organs	Hormones	Chemical property	Molecular weight	Action
Hypothalamus	Gonadotropin releasing hormone (GnRH, LHRH)	Peptide	1,182	Promotes release of FSH and LH.
	Corticotropin releasing hormone (CRH)	Peptide	Approx. 4,900	Controls GnRH secretion (Controls gonad function under stress).
	Oxytocin (Stored in the posterior lobe of the pituitary gland. Also produced by the ovary)	Peptide	1,007	Promotes uterine contraction, calving, transportation of sperm and ova, and milk ejection. Most likely to have luteolytic action.
	Melatonin (Secrated by the pineal body)	Peptide	232	Involved in the seasonal expression of reproductive activity of seasonal breeders.
Anterior lobe of the pituitary gland	Follicle stimulating hormone (FSH)	Glycoprotein (heterodimer of and subunits)	41,000	Promotes follicular growth, spermatogenesis and estrogen secretion.
	Luteinizing hormone (LH)	Glycoprotein (heterodimer of and subunits)	29,000	Promotes ovulation and luteal function. Promotes secretion of progesterone, estrogen and androgen.
	Prolactin (PRL)	Simple protein	22,000	Promotes lactation and in some animal species, luteal function and progesterone secretion. Enhances maternal behavior. Promotes tissue and bone growth.
Placenta	Human chorionic gonadotropin (hCG)	Glycoprotein	14,500	Shows LH action. Maintains pregnant corpus luteum in primates.
	Pregnant mare serum gonadotropin (PMSG, eCG)	Glycoprotein	53,000	Shows mainly FSH action. Promotes formation of the accessory corpus luteum in horses.
	Placental lactogen (PL)	Glycoprotein	20,000 - 50,000	Controls nutritional supply from mother to fetus.
	Protein B			Unknown.
Gonad	Estrogen/follicle	Steroid (C-18)	270 - 290	Enhances female sexual activity. Promotes secondary sexual character, growth of reproductive tracts, uterine contraction and development of mammary ducts. Controls gonadotropin secretion. Promotes calcium absorption by bones. Shows assimilation action.
	Progesterone/corpus luteum	Steroid (C-21)	314	Promotes estrous behavior and helps reproductive tracts to prepare for implantation in conjunction with estrogen. Promotes secretion by the endometrium. Maintains pregnancy. Promotes growth of mammary glandular cells. Controls gonadotropin secretion.
	Testosterone/testis	Steroid (C-19)	Approx. 290	Promotes growth of and maintains accessory reproductive glands. Promotes secondary sexual character, sexual behavior and spermatogenesis. Shows assimilation action.
	Inhibin	Glycoprotein (heterodimer of and subunits)	14,000	Controls FSH release.
	Activin	Simple protein (homodimer of subunit)	Approx. 28,000	Promotes FSH release.
	Oxytocin	Peptide	1,007	Interacts with prostaglandin secreted by the endometrium to promote luteolysis.
	Relaxin	Peptide	Approx. 6,000	Involved in opening of the cervical canal, uterine contraction, maintenance of pregnancy and relaxation of pelvic symphysis.
Uterus	Prostaglandin F ₂ (PGF ₂)	Unsaturated fatty acid	Approx. 350	Causes uterine contraction and luteolysis.

Prepared based on Leeves, 1987, etc.

(8) Change in hormones levels in blood in the estrous cycle

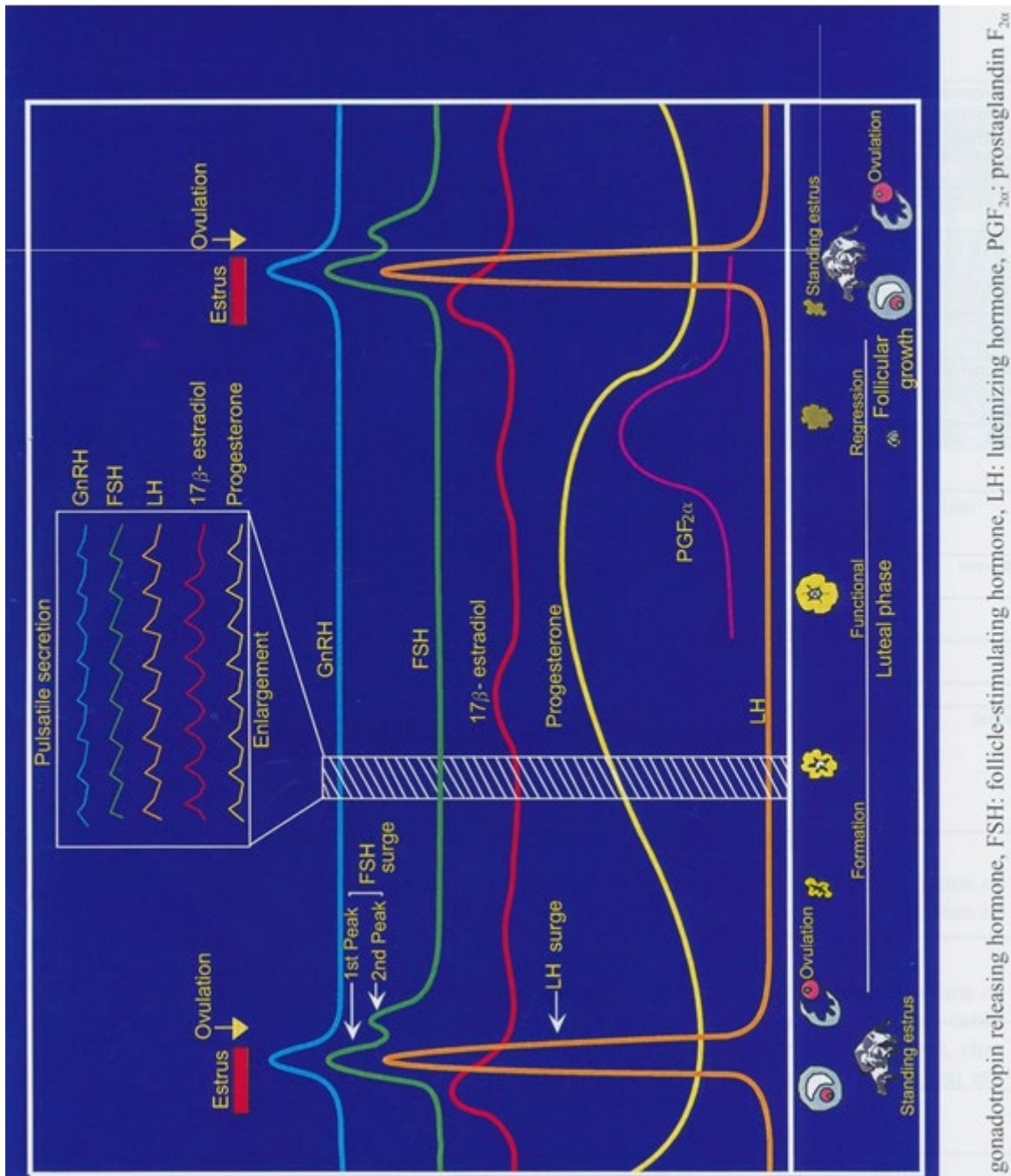


Figure 1-6 Changes in GnRH, FSH, LH, estradiol-17 β , progesterone, PGF₂₀ levels in the blood in the estrous cycle

The changes in the levels of these hormones in peripheral blood during the estrous cycle are illustrated in Figure 1-6. Gonadotropic hormone releasing hormone (GnRH), produced and secreted by the hypothalamus and directly transported to the anterior lobe of the pituitary gland through the pituitary gland portal vein, is involved in the secretion by the pituitary gland of follicle stimulating hormone (FSH) and luteinizing hormone (LH).

At the time of an LH surge by the pituitary gland during the estrous phase, large quantities of FSH are also released, forming the first FSH peak. Unlike LH, FSH levels in the blood increase after ovulation as well. This second FSH peak,



which is not as high as the first one, is produced because ovarian follicles that serve as a matrix for producing inhibin are lost as a result of ovulation and the control of FSH secretion is lost.

Ovarian estrogen (E) is secreted mainly by ovarian follicles, progesterone (P4) by the corpus luteum and testosterone (T) by the testes. These steroid hormones are biosynthesized from cholesterol through the pathway shown in Figure 1-7. These steroid hormones produced by the ovary work on the uterus and control its function. P4 along with E works on the reproductive tract at the implantation stage to help prepare for implantation of embryos and plays an important role in maintaining the pregnant status. At the time of delivery, blood P4 levels decrease and E levels increase in advance of delivery to form a birth canal and thus both hormones cooperate to facilitate normal delivery.

Prostaglandin $F_{2\alpha}$ ($PGF_{2\alpha}$) is a major hormone secreted by the uterus and is secreted from the endometrium at the luteolytic stage to facilitate luteal regression. It also facilitates the shrinkage of the uterus at the time of delivery.

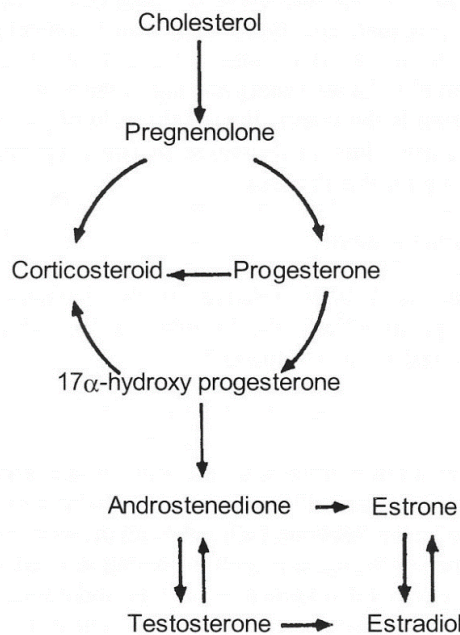


Figure 1-7 Biosynthesis pathway of sexual steroid hormones

Source: Niswender, 1974

1.2.3 Pregnancy

Pregnancy refers to the condition of cows during the period in which an emitted ovum is fertilized and develops and until a fetus is delivered.

(1) Gestation length

The gestation length of cattle is 278 ± 10 days on average; that for male fetuses is 1-2 days longer than for female fetuses, that for first and second delivery of young cows is 1~2 days shorter than for fetuses of middle-aged cows and that for twins is 3-6 days shorter than for monotocous fetuses. The gestation length of buffalo is 310 ± 10 days on average.



(2) Pregnancy diagnosis

Identifying the pregnant status as early as possible after fertilization or mating is important in improving productivity and reproductive disorders. Changes in the mother's body resulting from pregnancy and pregnancy signs showing the presence of a fetus are used in pregnancy diagnosis and the method used in pregnancy diagnosis should ensure early, accurate and simple diagnosis and must not involve harm to the mother's body or fetus. In practice, ultrasonography, non-return method, determination of milk or blood P4 levels, palpation of the amniotic sac, fetal membrane slip, asymmetry of uterine horns, swelling of the pregnant horn and fluctuation, cervical mucus tests and palpation of the fetus and placental lobes are performed.

(3) Maintenance of the pregnancy

Important factors for the maintenance of pregnancy include the progesterational proliferation of the endometrium, uterine expansion, reduction in the contraction of uterine muscle and uterine cervix closure. P4 and E are involved in all these factors. P4 levels in peripheral blood after conception are in the range of 4-8 ng/ml and the main source of P4 production is the corpus luteum throughout pregnancy. However, the P4 secretion from the corpus luteum decreases in late pregnancy and the placenta and adrenal glands make up for this decrease.

(4) Location of the fetus in the uterus

The location of the fetal body relative to the mother's body is expressed as "presentation" and "position" and the locational relationships of the fetal head and extremities are expressed as "fetal attitude".

1) Presentation

If the long axes of the fetus and the mother are parallel to each other, the presentation is referred to as "longitudinal lie" and if these axes cross, it is referred to as "transverse lie" or "oblique lie". A head presentation is when the head of the fetus faces the pelvic cavity; a breech presentation is when the breech of the fetus faces the pelvic cavity (also known as back or abdominal presentation). In cattle, about 90% of presentations are head presentations and 10% are breech presentations.

2) Position

A position indicates which of the uterine surfaces the fetal spine faces: superior, inferior or lateral. In cattle, fetuses assume the lateral position in late pregnancy.

3) Fetal habitus

Fetal habitus refers to the locational relationships of the fetal head/ neck part and fore and hind legs. During pregnancy, the fetus assumes a ventrally rounded posture according to the uterine shape. At the time of delivery, the fetus extends its fore legs, head and hind legs to pass through the tight birth canal.

1.2.4 Parturition

After the fetus develops sufficiently in the uterus to be able to live in the external environment, it is released from the mother's body. This process is referred to as delivery. Parturition is induced by the expulsive power generated by the combination of the contraction of uterine muscle, which is accompanied by labor pain, and abdominal pressure (straining) resulting from the contraction of abdominal muscle.

(1) Signs of Parturition

The pudendum is red due to congestion and soft because of swelling. The mucous plug that blocked the uterine cervix begins to soften from 2-3 days before parturition and is fluidized. It then flows into the inner part of the vagina and eventually leaks the vulva in the form of mucus similar to starch syrup. The intravaginal part of the uterus swells to the size of a fist and the external uterine orifice expands to the extent such that it allows 2-3 fingers to be inserted. Because the pelvic ligament relaxes as the parturition approaches, both sides of the tail head are depressed so that the tail head looks elevated. This is particularly apparent 2-3 days before parturition.

The swelling of the udder becomes increasingly noticeable as the delivery time approaches and trial milking may show that the initial relatively clear honey-like secretion changes to an opaque colostrum.

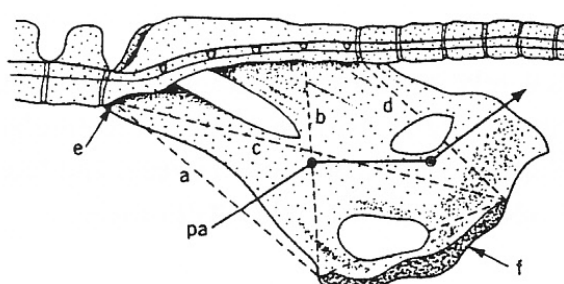
As parturition approaches, pregnant cows show uneasiness, look at their abdomen frequently, wander about inside the cow shed restlessly, repeat lying and standing up and scratch the floor with their fore legs. They urinate more frequently and leak urine sporadically.

(2) Parturition process

The birth canal is a route through which the fetus passes at the time of parturition and consists of the bony birth canal and soft birth canal. The bony birth canal is a pelvic cavity that is surrounded by the pelvis consisting of the hipbone, sacrum and coccygeal bone. The joints of these bones are fixed with ligaments but they relax by the action of E and relaxin as the delivery time approaches, resulting in an enlarged pelvis. The soft birth canal consists of the uterine cervix, vagina and vulva and is enlarged at the time delivery.

A virtual line along which the fetal vertical axis may pass the pelvic cavity is referred to as the pelvic

The fetus must be drawn along this pelvic axis. The pelvic axis of cattle is undulated vertically Figure 1-8; the fetus must be drawn upward until the fetal head emerges completely, horizontally until the chest emerges and downward until the full body emerges.



- pa: Pelvic axis
- a: True conjugate of the pelvic inlet (anteroposterior diameter)
- b: Vertical line of the pelvis
- c: Oblique symphysis of the pelvis
- d: True conjugate of the pelvic outlet

Figure 1-8 Bovine pelvis

Source: Stoss, modified by S. Hoshi and Y. Yamauchi, 1982

The delivery process is divided into the opening period (1st stage), expulsion period (2nd stage) and the afterbirth period (3rd stage). During the opening period, the birth canal is formed to prepare for delivery. In the expulsion period, the opening of the uterus is fully open and the fetus is delivered. The afterbirth period refers to a postpartum period until the afterbirth is discharged.



During the opening period, the fetal sac enters the cervical canal in advance of the fetus to dilate it. Opening labor pains last for a period of 3-6 hours, during which the fetus is more active and changes its position from lateral to superior positions.

The expulsion period starts with contraction or straining of the abdominal wall. Straining occurs 8-10 times every time the uterus contracts. The allantoic chorion ruptures since it is attached to the placenta and cannot move with the fetus. The amnion is relatively mobile so it is exposed outside the vulva and forms the foot sac. The rupture of the allantois is referred to as the first rupture of bag and that of the amnion as the second rupture of bag. Delivery is smooth once the fetal chest passes the vulva. The newborn's umbilical cord may be spontaneously broken at birth but it is not cut before the mother moves in some cases.

During the afterbirth period, contraction of the abdominal wall almost subsides but uterine contraction still continues. The contraction force is reduced but its frequency is increased. The fetal placenta is exfoliated and discharged as a result of afterbirth labor. It is normally discharged in 6-8 hours but may not be discharged in a fixed time. In these cases it is referred to as the retained placenta, which occurs frequently in cattle because of cotyledonary placenta.

(3) Major hormones involved in parturition

Parturition is induced by hormonal changes in the fetal hypothalamo-pituitary-adrenal system, as demonstrated by a study of sheep. As the parturition time approaches, adrenocorticotrophic hormone (ACTH) is probably secreted by the fetal pituitary gland and in response to this, a large quantity of cortisol is secreted by the fetal adrenal glands. This cortisol acts on the placenta to secrete a large quantity of estrogen (E) and to reduce the secretion of progesterone (P4). Increased estrogen stimulates the production and secretion of prostaglandin $F_{2\alpha}$ ($PGF_{2\alpha}$) by the placenta and also act on the maternal uterus to produce and secrete more $PGF_{2\alpha}$. In addition, estrogen and the relaxin secreted by the ovary help relax the birth canal. As a result of reduced P4 secretion and increased E secretion, the proportion of P4 and E levels in the maternal blood changes, the uterine muscle is more sensitive to oxytocin (OT) and contraction starts. After the start of parturition, the fetus stimulates the cervical canal wall to dilate and also stimulates OT secretion by the nervous lobe of hypophysis. As a result, the fetus is given birth. These mechanisms demonstrated in sheep are considered to be common to cattle.

(4) Physiology of puerperium

After parturition, involved organs such as the uterus try to reverse the changes produced by the effects of pregnancy and parturition and restore to their original state. This process is referred to as puerperium and normally lasts for 3-4 weeks. Involved in the restoration of reproductive organs are oxytocin (OT) and prostaglandin (PG). The PG level rapidly increases at delivery, reaches its peak within 3 days of parturition and returns to the baseline level in about 15 days. Uterine contraction disappears in 4 days and the pregnant horn is reduced to half in 5 days in breadth and in 15 days in length. The cervical canal tightens to the extent that inserting a hand is difficult in a day and narrows to the extent that it only allows two fingers to be inserted in 4 days. Liquid excretion, or lochia, is the most abundant between 2 and 3 days after parturition and disappears within 14-18 days of parturition. Uterine restoration in terms of size (uterine involution) is completed in 25 days or more but the normalization of the intrauterine bacterial flora may take 40-45 days.

(5) Return of estrus after parturition

The ovary is static immediately after deliver, however ovarian follicles start growing in about a week at the earliest and the ovary is activated quickly as soon as ten days have passed. The first ovulation takes place in about 2 weeks after

parturition at the earliest and about 20 days in most cases. Development of ovarian follicles is delayed in nursing cows compared to milking cows and the first ovulation occurs earlier in cows that take in more energy.

The mean number of days between parturition and the first estrus varies significantly from report to report, however it is estimated to be 20-70 days and is greatly affected by the age, parity, season and nutritional and lactation conditions. It is known to increase in high-lactation cows as well as in cows that suffer abnormal parturition and diseases.

The estrus at the time of the first ovulation after parturition is dull in nature and does not show estrous signs in many cases. However, the incidence of dull estrous is lower in cows that have experienced ovulation more times. The corpus luteum that is formed after the first postpartum ovulation generally grows poorly and is short-lived.

1.3 Latest progress in the studies of mechanisms of controlling reproductive function

1.3.1 Changes in hormone concept

Hormones have been conventionally considered to be chemical messengers that are secreted by endocrine organs and transported to remote target organs to transmit information. However, recent advances in research have revealed various substances that are difficult to differentiate from hormones. Studies of the mode of action have also demonstrated that a certain hormone not only exhibits an endocrine action but also plays an important role in facilitating reproductive function by means of paracrine and autocrine action and that neurotransmitters and immune-related substances that have not been considered hormones are involved in reproductive function (see next section). These substances include insulin-like growth factor (IGF), epidermal growth factor (EGF), transforming growth factor (TGF), nerve growth factor (NGF), immune-related cytokines such as interleukin 1 (IL-1) and neuropeptides such as dopamine, enkephalin and substance-P. These substances are now included as hormones and referred to as new hormones compared to conventional hormones, which are called classic hormones.

1.3.2 Hormonal mode of action

Recent advances in research have shown that hormones can act locally on cells adjacent to the hormone-secreting cells or, in some cases on the hormone-secreting cells themselves instead of being transported to remote locations. The mode of action of hormones is shown in Figure 1-9 (P.12). Signal messengers with paracrine and autocrine action that have not been considered hormones are now included as hormones.

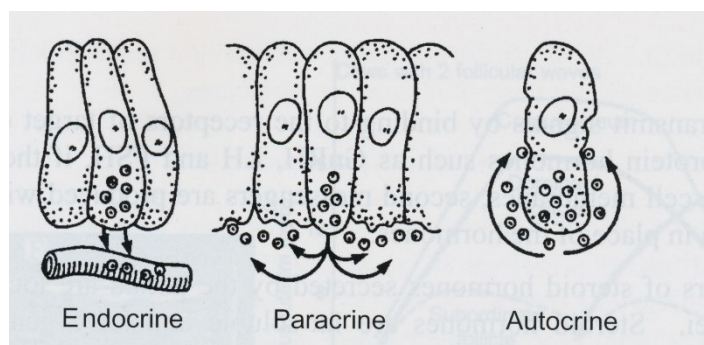


Figure 1-9 Mode of action of hormones Source: Kan Miyake, 1995

1.3.3 Feedback mechanisms

Reproductive function is controlled by hormones secreted by endocrine organs such as the hypothalamus, pituitary gland and gonad. An assumption is made that the mechanism depends on the hypothalamus-hypophyseal-gonadal axis and the hormones secreted by higher organs control the functions of lower organs. However, research shows that hormones

secreted by lower organs may control the functions of higher organs and these mechanisms are referred to as feedback mechanisms. Feedback mechanisms include promotive (positive) and suppressive (negative) ones (Figure 1-10).

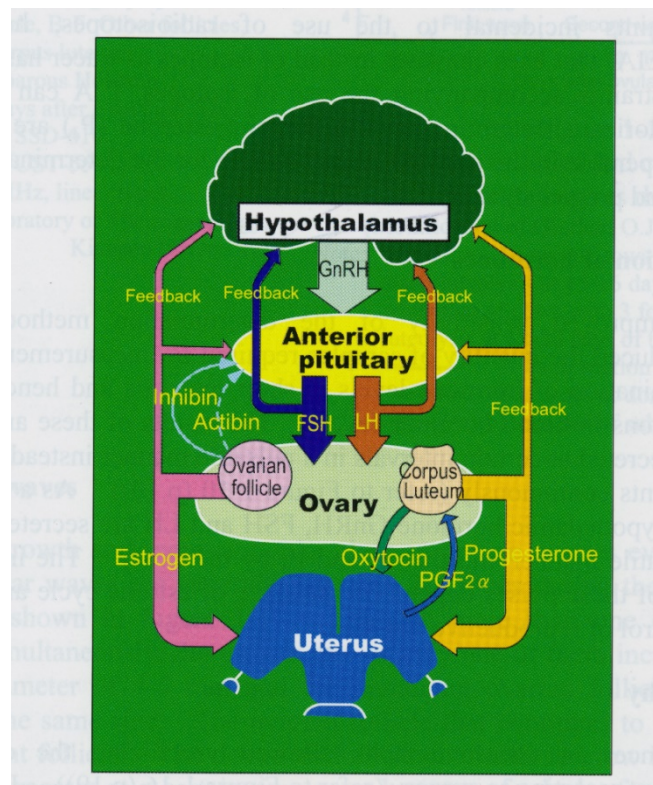


Figure 1-10 Relation between the mastitis for the secretion of major reproductive hormones and their target organs

1.3.4 Receptors

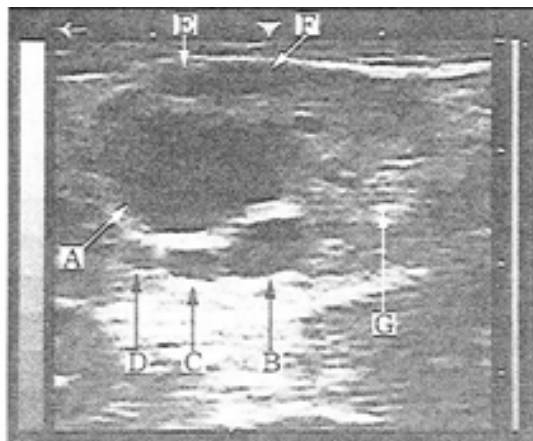
Hormones transmit signals by binding to the receptors of target cells. The peptide or protein hormones are such as GnRH, LH and FSH. These hormones bind to receptors on cell membranes, second messengers are produced within cells and control cell function in place of the hormones.

The receptors of steroid hormones secreted by the gonad are located on cytoplasm or within nuclei. Steroid hormones are fat-soluble and have generally low molecular weight so they easily pass through cell membranes and bind to intracellular receptors to transmit signals. Unlike peptide hormones, steroid hormones do not need second messengers.

Reproductive functional disorders have been attributed to lack of hormones but the latest studies show that these disorders include some cases of hormone irresponsiveness resulting from abnormal receptors and abnormal action after the binding of hormones and receptors.

1.3.5 Ultrasonography

Dramatic advances in ultrasonography allowed visualizing the organ and tissue structures without resorting to surgery (refer to Figure 1-11). Using this method, morphological changes in organs such as the development of the ovarian follicles and formation and regression of the corpus luteum can be visualized. Studies of morphological changes in the ovary using this method revealed that ovarian follicles are present even in the ovary of cows in the luteal phase and alternate between growth and regression regularly. This process is referred to as follicular waves.



A: Dominant follicle

B-F: Other follicles

G: Corpus luteum

Material cow: Multiparous Holstein

Estrous cycle: at 6 days after ovulation (Day 6)

Equipment: Aloka SSD 610

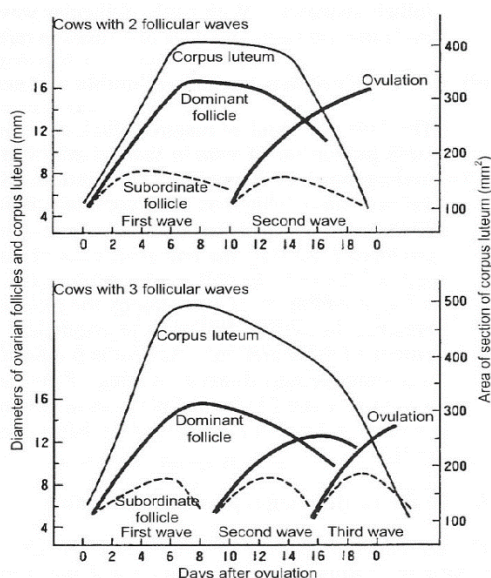
Probe: Aloka UST 556T-7.5 (7.5 MHz, linear type)

(Laboratory of Theriogenology, Kitasato University)

Figure 1-11 View of an ovarian follicle and corpus luteum of a cow in the estrous cycle using ultrasonography

1.3.6 Follicular waves

Follicular growth and regression take place in bovine ovaries even in the luteal phase and follicular waves are generally repeated 2-3 times during the estrous cycle. This process is shown in Figure 1-12. Although more than one ovarian follicle - starts growing simultaneously, the growth rate of only one of them increases rapidly when it reach a diameter of 4-5 mm and the remaining ovarian follicles stop growing and remain at the same size. The ovarian follicle that continues to grow is referred to as the dominant follicle. The dominant follicle continues to grow but in the luteal phase it begins to regress at a certain time point because of a lack of an LH surge and hence ovulation occurs due to high blood P4 levels. If this first-wave dominant follicle starts regression, the second-wave follicles begin to grow and follow the same process. If the growth of the second-wave dominant follicle falls in the estrous phase, there is an LH surge and resultant ovulation take place. If the second-wave dominant follicle regresses rather than ovulates, then the third wave occurs and the third-wave dominant follicle ovulates. With cattle, follicular waves take place 2-3 times during an estrous cycle in most cases and once or 4 times in rare cases.



Source: Modification of Ginther, O.J. et al., 1989, 1994

Note: The corpus luteum of cows with 2 follicular waves starts luteolysis at 15-16 days of the estrous cycle while that of cows with 3 follicular waves starts luteolysis at 18-20 days of the estrous cycle.

— Area of section of corpus luteum
 — Diameter of dominant follicle
 - - - Diameter of subordinate follicle

Figure 1-12 Fate of ovarian follicles and corpus luteum in cows with 2 or 3 follicular waves during an estrous cycle



1.3.7 Discovery of new hormones, inhibin and activin

The follicular fluid of mature follicles of cows has been found to contain a relatively large proportion of inhibin that inhibits FSH secretion by the pituitary gland. This finding indicates that unlike LH secretion, FSH secretion is dually controlled by GnRH and inhibin. Inhibin is a glycoprotein hormone with a molecular weight of about 32,000 and also a heterogeneous dimer consisting of α and β subunits. Inhibin is produced mainly by the granulosa cells of the ovarian follicle in cows and the Sertoli's cells of the testis in bulls and is transported via the blood flow to the pituitary gland, where it inhibits FSH secretion by the pituitary gland. Studies of inhibin revealed the presence of activin having a physiological function opposite inhibin, a function to promote FSH secretion. Activin is produced by the same organs as inhibin. Activin is a homogeneous dimer consisting of the same subunit as inhibin with a molecular weight of about 24,000 and plays an important role in cell differentiation as well. It is bound to follistatin in the blood so that it does not induce the pituitary gland to release FSH.



Chapter 2 Definition and types of reproductive disorders

2.1 Definition of reproductive disorders

A reproductive disorder is defined as a status in which the reproductive function of a female or male animal is temporarily or persistently suspended or disturbed and abnormal calves are produced. Causal factors include inappropriate feeding environments and methods, genetic defects, nutritional disorders, systemic diseases, reproductive anomalies and diseases, abnormal secretion of various hormones and inappropriate breeding management of reproductive disorders.

One type that leads to a failure of conception due to the anomalies and diseases of the reproductive organs is sometimes referred to as sterility and another type that leads to conception but results in an embryonic or fetal death and subsequent absorption and abortion is referred to as infertility.

2.2 Manifestations of reproductive disorders and reproductive diseases

2.2.1 A case in which an animal with anomalies of the ovary or uterus develops abnormal estrous conditions such as anestrus and fails to mate even if it has attained 12 months old or 40 days have passed since the last delivery

(1) Freemartin

In bovine unlike-sexed twin and multiple pregnancy, about 92% of female fetuses fail to have normal sexual differentiation and are likely to have anomalies of the reproductive organs that lead to absolute sterility. This sterile cow is referred to as freemartin.

The cause has not yet been clarified, however, one suggested reason is that the blood vessels of female fetal membranes are anastomosed with the blood vessels of male fetal membranes in the early embryonal phase to produce an exchange of blood so that the sex-determining region Y (SRY) deriving from the male, which masculinizes reproductive organs, masculinizes the ovarian primordium of the undifferentiated female fetus and induces the secretion of androgen.

Findings in clinical diagnosis include the length of the vagina being 1/3 the normal length or less, hypertrophy of the clitoris and rough and long pubic hair. In a vaginal examination of calves, a test tube 2 cm in diameter and 20 cm long can be inserted 12-18 cm into the vagina in normal calves but only 8- 10 cm into the vaginal vestibule in freemartins since they lack a vagina. By rectal palpation, a hard cylinder/ cone-shaped object is normally felt 5- 10 cm in front of the vaginal vestibule, but the cervical canal, uterus and ovary are not palpable. There is no cure and conception is not possible.

(2) Ovarian functional disorder

A state in which nulliparous cattle or buffalo within 12 months of birth (for animals reared in developed countries), 24 to 30 months of birth (for animals reared in tropical developing countries where animal growth is slow) and 40 days after delivery (for multiparous cattle or buffalo) develop no ovarian follicles or ovarian follicles develop to some extent but repeat atresia and regression without ovulating, resulting in continued anestrus. This disorder is divided into ovarian hypoplasia, ovarian quiescence and ovarian atrophy. These disorders are closely related with nutritious condition of animals. Nutritious conditions of animals need to be evaluated with BCS and adjust feed to improve nutritious condition, if necessary.



1) Ovarian hypoplasia

Ovarian hypoplasia is a case that nulliparous cattle or buffalo do not show estrus sign. Both the right and left ovaries grow insufficiently and are extremely small, flat and inelastic. Growth of the uterus is inadequate.

2) Ovarian quiescence

Ovarian quiescence is a case that sexually matured nulliparous cattle or buffalo do not show estrus sign or a case multiparous cattle or buffalo do not show estrus sign even after 2 months or more from last parturition. The shape of the ovary is normal; however, the ovarian follicles do not grow or grow to some extent but repeat atresia and regression without ovulating. The uterus is small and inelastic in some cases and is normal in shape in some cases. In multiparous cow, postpartum uterine involution is delayed in many cases.

3) Ovarian atrophy

Ovarian atrophy is a case multiparous cattle or buffalo that do not become old-age do not show estrus sign. Both the right and left ovaries are dwarfed, indurated and flat with smooth or wrinkled surfaces and they neither form ovarian follicles or corpus nor ovulate. The uterus is small and inelastic.

The direct cause of this disorder is a reduction in the ability of the anterior lobe of the hypophysis to secrete gonadotropins (GTH), i.e. follicle-stimulating hormone (FSH) and luteinizing hormone (LH), and this condition is related to a reduction in gonadotropin-releasing hormone (GnRH) secretion due to the suppressed function of the hypothalamus. The predisposing causes include inappropriate feeding and management such as, in particular, qualitative and quantitative deficiencies of feed and an inferior feeding environment, and in nulliparous cows, parasitic diseases of the alimentary canal during the raising stage and in multiparous cows, systemic wasting diseases during the perinatal period. Genetic factors are also involved in ovarian hypoplasia in nulliparous cow.

Diagnosis should be based on rectal palpation and if the first diagnosis fails, an additional examination should be performed 7-14 days afterwards. Diagnosis should be made by confirming that nothing has changed compared to the findings in the previous examination of the right and left ovaries.

If poor health is caused by inappropriate feeding and inferior feeding environments, farmers should be instructed to improve these predisposing factors to eliminate causes. If systemic diseases are causing the disorder, these diseases should be treated, and normal nutritional and health conditions restored. Hormone preparations should be administered after or in parallel with these procedures. Complicating uterine diseases should be treated.

Efficacy of the treatment with hormone formulations depends on the stage of the follicular wave at the time of administration. Thus, if rectal palpation reveals a growing ovarian follicle 10-15 mm in diameter in the ovary, 1,500-3,000 international units (IU) of human chorionic gonadotropin (hCG) or 100 µg fertirelin acetate or buserelin acetate at a dosage of 10-20 µg as buserelin, both gonadotropin-releasing hormone analogues (GnRH analogues), should be administered once by intramuscular injection for the purpose of inducing follicular maturation and ovulation and forming corpus luteum afterwards. The interval between the first and second ovulation after hormone therapy is usually in the range of 8-15 days, which is shorter than normal. Therefore, farmers should be instructed to observe estrous signs 8, 20 as well as 30 days after treatment.

If no growing ovarian follicle is present in the ovary, intramuscular or subcutaneous injection of 500-1,000 IU of pregnant mare serum gonadotropin (PMSG) or simultaneous injection of 500-1,000 IU each of PMSG and hCG should be administered once for the purpose of inducing follicular growth, maturation and ovulation and forming



corpus luteum. In addition, intravenous or intramuscular injection of 200-400 Rab.U of bovine anterior pituitary gonadotropin (APG) or intravenous injection of 20-40 A.U. of swine anterior pituitary follicle-stimulating hormone (APFSH) should be administered once. Mating with a cow with estrus that appears several days after PMSG administration may lead to a multiple pregnancy due to superovulation.

In addition, for the purpose of normalizing GTH secretion from the anterior lobe of the hypophysis in 'cow' with ovarian quiescence, controlled internal drug release device (CIDR) and progesterone releasing intravaginal device (PRID: capsule containing estradiol-17 β), which are indwelling types of luteal hormone sustained-release preparation, were inserted into the vagina and maintained in the same position for 12 days with good results.

A normal estrous cycle after treatment indicates that the treatment was successful. In spite of treatment with hormone preparations, some ovarian follicles fail to ovulate and fall into atresia and regression and some ovaries fall into quiescence even if the corpus luteum is formed after ovulation. Thus, if rectal palpation for luteal formation 7-14 days after treatment reveals the absence of efficacy, the type and dosage schedule of hormone preparations should be reconsidered. If repeated treatment of ovarian hypoplasia in nulliparous cow by this method has no effect on the ovary, then the prognosis is diagnosed as poor.

(3) Ovarian cyst

Ovarian cyst refers to a condition in which an ovarian follicle grows to more than 2.5 cm in diameter without ovulating and is divided into follicular cyst and luteal cyst. The frequency of follicular cyst is higher than that of luteal cyst.

1) Follicular cyst

An ovarian follicle grows to more than 2.5 cm in diameter without ovulating, persists for a long time and then regresses. This process is repeated.

Because this disorder occurs in obesity due to oversupply of concentrate feed and deficiency of exercise and in poor nutrition due to qualitative and quantitative deficiency of feed. Stress from inappropriate feed types and feeding management as well as the oversupply of feed containing estrogen-like materials and genetic factors such as predisposition to follicular cyst are known to be involved in the disorder.

The direct cause of the disorder is abnormal secretion of GTH due to reduced function of the anterior lobe of the hypophysis, or transient mass release of LH that induces ovulation, that leads to a failure of LH surge. This indicates that it may be caused by an abnormality in the LH releasing mechanism resulting from decreased sensitivity to a rise in estradiol concentrations in the hypothalamus-anterior lobe of the hypophysis system. Another mechanism is that progesterone secreted by the adrenal gland acts on the higher-level organ hypothalamus to suppress the release of GnRH.

Symptoms include 1) nymphomania in which estrous signs appear constantly or frequently and 2) sexuality increases or a sign in which estrous signs appear irregularly, but 3) estrous signs are absent in many cases. In the case of a long-term process, the both sides of the tail bead are depressed, and the tail head is elevated due to loosened Lig. Sacrotuberale Latum.

The disorder is diagnosed if one or more large-size ovarian follicles 2.5 cm or more in diameter are present in one or bilateral ovaries by rectal palpation (Photograph 2-1 (p.42)), these follicles increase in size or remain at the same size at the time of reexamination 7-14 days later and the corpus luteum is absent. Ovaries with growing ovarian follicles are swollen


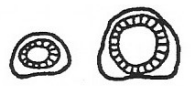





and contractile and those with degenerating ovarian follicles are relaxed. The disorder is complicated by endometritis in many cases.

Care must be taken because there is an ovarian condition similar to this disorder in which a luteal cyst, cystic corpus luteum, a large-size ovarian follicle and corpus luteum (a large-size ovarian follicle and a normal growing ovarian follicle in the estrous) are coexistent as seen in Table 2-1 and Photograph 2-2 to 2-6 (p. 42). If differentiating between these conditions is difficult, reexamination should be performed 7 - 14 days later. Diagnosis of follicular cyst is made if ultrasonography reveals that no luteal layers are present near the follicular fluid of the ovary or a large-size ovarian follicle and if progesterone concentrations are 5 ng/ml or lower in whole milk and 1 ng/ml or lower in plasma and skimmed milk.

Various ovarian cyst are shown in the table 2-1. It is difficult to differentiate follicular cyst and luteal cyst. First, suspect a case as a follicular cyst and inject HCG. If a case is follicular cyst and endocrinological characteristics is 'a', i.e. granulosa layer present in cyst, luteinization occurs with HCG injection. If no effect is observed through rectal palpation 10 days after HCG injection, suspect the case as luteal cyst. Inject PGF_{2a} to regress corpus luteum in case of luteal cyst. When cattle or buffalo is pregnant, abortion happens with PGF_{2a} injection. Injection, therefore, is better to be given after confirmation of unpregnant through rectal palpation.

Table 2-1 Differences in secretion of steroidal hormones in ovarian cysts and similar forms

Classification		Schematic section views of the ovary (left and right)	Endocrinological characteristics
Ovarian cyst	Follicular cyst (FC)		a: high levels of OE ₂ and BE ₂ , granulosa layer present or growing b: low levels of OE ₂ and BE ₂ , granulosa layer degenerated or lost c: intermediate type of a and b
	Luteal cyst (LC)		OE ₂ low being expressed in pg/ml and OP high being expressed in µg/ml BP at the level of 1-3 ng/ml (luteal layer present in cystic cavity)
Cystic corpus luteum (CCL)			OE ₂ mostly low being expressed in pg/ml. OP high being expressed in µg/ml, BP at the luteal phase level being 3-10 ng/ml, lower than normal on average (OE ₂ and OP indicate levels in the luteal cavity fluid)
Coexistence of large-size ovarian follicles and corpus luteum (FCL)			OE ₂ mostly low being expressed in pg/ml OP mostly at 100-800 ng/ml levels BP at the luteal phase level being 3-10 ng/ml
Estrus (ES)			Similar to follicular cyst (FC)

(Cited from Hoshino)

Notes

1: OE₂, OP, BE₂ and BP represent estradiol and progesterone levels in cystic follicular cavity fluid and peripheral blood, respectively.

2: Steroidal hormone levels were determined by radioimmunoassay.

O: ovary, B: blood



In some cases within 40 days postpartum in which an ovarian follicle that grew to 2.5 cm in diameter or larger persists for some time and undergoes regression to atresia while another ovarian follicle that grew anew ovulates, the disorder may be healed spontaneously but reexamination should be performed 7-14 days later and the disease treated as needed.

If the cause of this disorder is related to feeding and management, and especially inappropriate feeding, farmers should be instructed to improve such conditions. In addition, 100-200 µg of fertirelin acetate or buserelin acetate at a dose of 10-20 µg as buserelin, both GnRH analogues, should be administered once by intramuscular injection for the purpose of inducing the anterior lobe of hypophysis to cause endogenous LH surge. 5,000-10,000 IU of hCG should also be administered once by subcutaneous or intramuscular injection to supplement GTH that has LH action. If these treatments fail, intravenous or intramuscular injection of 200-400 Rab.U bovine APG or intravenous injection of 20-40 A.U. swine APFSH or subcutaneous or intramuscular injection of 40-60 A.U. swine APFSH should be administered once. Administration of these hormone preparations when a new ovarian follicle grows in the follicular wave of an ovarian follicle coexisting with the cystic follicle induces ovulation and subsequent luteinization so the efficacy of the hormone therapy can be enhanced. Care must be taken when using hCG, bovine APG and swine APFSH preparations because antihormones are produced in the body and reduce therapeutic effect if they are used repeatedly.

For the purpose of normalizing the release of GTH, especially LH, from the anterior lobe of the hypophysis, CIDR was inserted into the vagina and retained at the same position for 12 days with good results. If rectal palpation performed 7-14 days after treatment with the aforementioned hormone preparations reveals luteinization in the ovary, then the treatment is diagnosed as effective.

The responses of the ovary to treatment include one in which an ovarian follicle less than 2.0 cm in diameter coexisting with the cystic ovarian follicle ovulates and forms the corpus luteum, one in which the cystic ovarian follicle ruptures and the corpus luteum is formed afterwards and one in which the cystic ovarian follicle degenerates to atretic corpus luteum or undergoes retrogression to atresia. The response in which the formed corpus luteum regresses within 25 days of administration, estrus emerges as ovarian follicles develop and normal corpus luteum is formed after ovulation is diagnosed as healed.

Farmers should be informed beforehand that there are some cases in estrus appears around 10 days after administration and an estrous cycle duration of about 10 days is repeated. At the time of the first estrus around 20 days after treatment, findings suggest as if the disorder is not yet healed because liquid content of the cystic ovarian follicle that was present in the ovary at the time of treatment remains as is without being absorbed. However, if clear appears and new ovarian follicles 1.5-2.0 cm in diameter are present in the insemination should be performed without hesitation.

If treatment fails or the disorder recurs, the type of hormone preparation and dosage schedule should be reconsidered for additional treatment. If the disorder recurs in spite of various treatments mentioned above, the case should be judged as having no chance of healing.

2) Luteal cyst

A state in which ovarian follicles grow to 2.5 cm or larger but do not ovulate or the entire formed cystic follicle walls luteinizes and the cystic follicle forms an internal cavity that retains fluid. Once formed, a luteal cyst continues to exist for a long time and suppresses the growth of normal ovarian follicles so an anestrus state persists.



The disorder is often complicated by follicular cysts so its diagnosis should follow that of follicular cysts. Differentiation from follicular cysts or cystic corpus luteum formed after ovulation and from normal corpus luteum is often difficult if rectal palpation reveals luteal layers on part or the entire cystic walls (Photograph 2 2&3 (p.42)) and thick luteal layers, respectively. The diagnosis of this disorder is made ultrasonography reveals the presence of luteal layers around the cavity contain fluid or the determination of progesterone levels in milk or plasma reveals that the level in whole milk and that in plasma and skimmed milk are more than 5 ng and 1 ng/ml, respectively, and reexamination 14-20 days later reveals no changes.

The disorder is likely to be confused with cystic corpus luteum, however, differentiation is possible because of the fact that cystic corpus luteum is formed after ovulation so that it has processus (photograph 2-4 & 5 (p.42)) and maintain a normal estrous cycle. Care must be taken, however, because rectal palpation may fail to detect the processus of a cystic corpus luteum with the major axis of at least 3.0 cm.

As a treatment for luteal cyst, either one of prostaglandin (PG) $F_{2\alpha}$ preparations, 12-15 mg of dinoprost or tromethamine dinoprost at a dose of 15-25 mg dinoprost, or one of $PGF_{2\alpha}$ analogues, i.e. 500 μ g of cloprostenol or 5 mg etiproston tromethamine, should be administered once by intramuscular injection. Alternatively, 1 mg of fenprostalene should be administered by subcutaneous injection to facilitate the regression of the luteal layers of the cystic walls and the growth of ovarian follicles.

If ovarian follicles develop within 10 days of treatment, followed by the occurrence of estrus and ovulation, and a normal corpus luteum is subsequently formed, the case is diagnosed as healed. Care must be taken when making a diagnosis because cavity fluid sometimes remains after the disappearance of the luteal layers of a luteal cyst appearing as if it shifted into a follicular cyst.

(4) Silent heat

A clinical condition in which in spite of the normal ovarian cycle, i.e. periodic follicular growth, ovulation and luteinization, estrus does not occur normally will regress the corpus luteum and follicular growth. Because of unclear estrous signs, the condition disturbs mating and causes a reproductive disorder but conception by insemination is possible by identifying the optimum time for insemination from information about internal estrous signs and the follicular growth status obtained from vaginal and rectal inspections.

Possible causes include abnormal secretion of GTH, quantitative imbalance between estrogen and progesterone, the high threshold level of sex hormones for nervous excitation involved in the expression of estrous behavior and psychological factors, although the direct cause is not well understood. Silent heat frequently occurs in cows with high milk yield, fat cows, cows raised in cowsheds under unfavorable feeding management conditions, low-class cows in a herd and cows with algetic diseases of the hoof.

If rectal palpation reveals that internal estrous signs are clear with mature ovarian follicles present in the ovary but they ovulate without external estrous signs and if the corpus luteum is present in the ovary, a reexamination 7-14 days later reveals changes in the location and shape of the corpus luteum and external estrous signs are not present during this period, then the case is diagnosed as silent heat. In making a diagnosis, the fact that many cases of the first and second postpartum ovulation in the ovarian cycle are quiet ovulation and that there are many cases in which careless farmers overlook external estrous signs should be noted and care must be taken as to the differentiation between a retained corpus luteum and pregnancy.

To treat a case in which rectal palpation reveals the corpus luteum that was formed after silent heat, either



one of PGF_{2α} preparations, i.e. 12-15 mg of dinoprost or tromethamine dinoprost at a dose of 15-25 mg as dinoprost, or one of the PGF_{2α} analogues, i.e. 500 µg of cloprostenol or 5 mg of etiproston tromethamine, should be administered once by intramuscular injection. Alternatively, 1 mg of fenprostalene should be administered by subcutaneous injection. Studies showed that the administration of a GnRH analogue, fertirelin acetate, at a dose of 100 µg 54 hours after treatment with the aforementioned drugs followed by insemination 18-24 hours later generally provided satisfactory conception rates. Intramuscular injection of 2-5 mg of estradiol benzoate, a follicular hormone preparation, in the cases with a regressive corpus luteum and growing ovarian follicles induced estrous signs. An infusion of 30-50 ml of povidone iodine solution (containing 20 mg of povidone iodine or 2 mg of effective iodine per milliliter) into the uterus in the luteal phase induced clear estrous signs 6-11 days later. In addition, to normalize endocrine abnormalities by adjusting blood progesterone levels, CIDR was inserted into the vagina and retained in the same position for 7 days with good results.

Insemination should be performed if estrus occurs after treatment. In some cows with poor nutritional and health conditions or algetic diseases of the hoof, quiet ovulation occurs after treatment, development of ovarian follicles that occurs simultaneously with luteolysis is quite late or ovarian follicles undergo regression to atresia without ovulation and shift to ovarian quiescence. Thus, causal factors must be improved before treatment.

(5) Retained corpus luteum (persistent corpus luteum)

A clinical condition in which the functioning corpus luteum continues to exist for a longer period than normal in the estrous cycle in the absence of pregnancy. Progesterone secreted by the corpus luteum suppresses the growth of ovarian follicles resulting in an extended period of anestrus. PGF_{2α} injection is highly effective for retained corpus luteum. PGF_{2α}, however, cause abortion if it is injected when cattle or buffalo are pregnant. Confirmation of pregnancy before injection is important.

There are two possible mechanisms for the disorder. One mechanism is that the presence of foreign materials such as a mummified fetus, pus and mucus in the uterus or abnormalities in the endometrium such as chronic inflammation inhibit the production and/or release of luteolytic factors by the uterus. Another is abnormal secretion of GTH from the anterior lobe of the hypophysis and this mechanism may be involved in the disorder of the type occasionally seen in high-lactation cows that is not accompanied by uterine abnormalities.

Diagnosis should be made by confirming that rectal palpation reveals the corpus luteum in the ovary and a reexamination 10-14 days later reveals no changes in the location or shape of the corpus luteum. Diagnosis of the disorder is also made if the progesterone level does not decrease to lower than 5 ng/ml and 1 ng/ml in whole milk and plasma and skimmed milk, respectively, in the examination of progesterone levels in milk or blood that is performed continuously at 3 to 4-day intervals for more than 25 days.

Care must be taken because there may be foreign matter in the uterus. If the presence of mucous matter in the uterus is suspected, ultrasonography should be performed and as required, a sample of the content of the uterus should be taken via the cervical canal for the study of its properties. This must be distinguished from the early stage of pregnancy.

As a treatment for the disorder, either one of PGF_{2α} preparations, i.e. 12-15 mg of dinoprost or tromethamine dinoprost at a dose of 15-25 mg as dinoprost, or one of PGF_{2α} analogues, i.e. 500 µg of cloprostenol or 5 mg of etiproston tromethamine, should be administered once by intramuscular injection to facilitate luteolysis and growth of ovarian follicles. Alternatively, 1 mg of fenprostalene should be administered by subcutaneous injection. The



corpus luteum was enucleated with fingers through the rectal walls in an old-fashioned treatment for the disorder, however, this method must not be employed because ovarian function may be impaired due to bleeding, and occasionally lethal bleeding, from the ovary and adhesions near the ovary. Foreign matter in the uterus must be removed.

If luteolysis occurs within 10 days of treatment with the above-mentioned drugs and ovarian follicles develop and ovulate followed by the formation of a new corpus luteum and a normal estrous cycle, then the case is diagnosed as healed. Treatment must be made if the corpus luteum that was present at the time of treatment is still present 10 days later. Care must be taken because a shift to ovarian quiescence and an ovarian cyst may occur after treatment or a fluid such as mucus may be retained within the uterus and result in recurrence of the disease.

(6) Pyometra

A condition in which pus or purulent exudate collects in the uterine cavity. This occurs because purulent exudate resulting from purulent endometritis is not expelled into the vagina because the cervical canal is closed. The disease often follows delayed recovery of the uterus due to dystocia and retained placenta in the perinatal period and it sometimes results from infection by bacteria such as *Actinomyces pyogenes* and protozoans such as *Trichomonas fetus* that enter the uterus at the time of insemination of a pregnant cow showing estrous.

Purulent exudate that collected in the uterine cavity suppresses the production of luteolytic factors by the uterus and causes retained corpus luteum resulting in an extended anestrous period. A vaginal examination often reveals dry vaginal mucous membranes and a closed external uterine orifice presenting findings similar to the pregnancy period. Rectal palpation reveals that the uterus is expanded, subsiding into the abdominal cavity, presenting fluctuations and has no contractibility with thin uterine walls. The uterus feels similar to the one in the second to third month of pregnancy in many cases so differentiation from pregnancy is necessary. If a differential diagnosis fails, reexamination must be performed a few weeks later. Changes in the uterus according to the number of days after mating are observed in the case of pregnancy but not in the case of pyometra. Systemic symptoms and changes in blood properties are absent if a large amount of pus accumulates in the uterus. Ultrasonography reveals the pus in the spherically enlarged uterine cavity as a hypoechoic image but it does not show the presence of the fetus or conceptus in that area.

In case of pyometra, corpus luteum can always be found. Check corpus luteum. Fetal membrane slipping cannot be detected. PGF_{2α} injection is highly effective. Penicillin injection after intrauterine irrigation is effective, as well (As for penicillin injection, refer to 2.2.4. Endometritis). It is better not to inject iodine solution since uterine wall is thick in case of pyometra.

As a treatment for the disorder, either one of PGF_{2α} preparations, i.e. 12-15 mg of dinoprost or tromethamine dinoprost at a dose of 15-25 mg as dinoprost, or one of PGF_{2α} analogues, i.e. 500 µg of cloprostenol or 5 mg of etiproston tromethamine, should be administered once by intramuscular injection to facilitate luteolysis and the growth of ovarian follicles. Alternatively, 1 mg of fenprostalene should be administered by subcutaneous injection. Luteolysis occurs in 3-5 days after treatment, an ovarian follicle develops to produce estrogen, the cervical canal relaxes and dilates, uterine contraction is enhanced and the purulent exudate in the uterus is expelled. Treatment procedures for endometritis should be followed as required if the purulent exudate is still present after treatment.



The judgement of recovery should be made in the same way as endometritis. The possibility of recovering and conception is greater if the diagnosis is made and treatment is given earlier. If the discovery and treatment of the disease is late, the endometrium is destroyed, the uterine walls become fibrous and a complete recovery and conception may be difficult to attain.

(7) Mucometra and hydrometra

A condition in which various amounts (30 milliliters to several liters) of fluid is retained in the uterus. These fluids include various types of liquid ranging from watery and viscous mucus to semifluid mucous masses containing denatured tissue fragments.

The disorder is considered to be unrelated to microbial infection. Histopathological findings show cystic degeneration of the endometrium and atrophy of the uterine walls although their causes are unknown. The disorder accompanies follicular cysts and occurs in individual animals with anomalies of the uterus, cervical canal and vagina and persistent, rigid and imperforate hymen.

Rectal palpation reveals that both of the uterine horns are enlarged and thick, uterine walls are thin and have fluctuation and liquid matter is present in the uterine cavity. A viscous property of the liquid indicates mucometra and a watery property hydrometra. In some nulliparous cows with persistent hymen, the vagina as well as uterus is expanded.

Ultrasonography reveals a near circular or irregular-shape echo-free mass (liquid matter) in the uterus that includes a low-level echo (mucus) or minute high-level echoes (cells, tissue fragments).

The disorder is accompanied by a retained corpus luteum in many cases and causes the host to remain in an anestrous state so care must be taken not to make a misdiagnosis by confusing with pregnancy or pyometra.

Persistent hymen must be removed, if present, for treatment. In case the corpus luteum is present in the ovary, either one of PGF_{2α} preparations, i.e. 12-15 mg of dinoprost or 20-33 mg of tromethamine dinoprost (15-25 mg as dinoprost), or one of PGF_{2α} analogues, i.e. 500 μg of cloprostenol or 5 mg of etiprostion tromethamine, should be administered once by intramuscular injection. Alternatively, 1 mg of fenprostalene should be administered by subcutaneous injection. Follicular cysts must be treated if they are complicating the disorder.

The disorder is diagnosed as healed if the liquid matter retained in the uterus has disappeared within 40 days of treatment. In general, the disorder often recurs after apparently successful treatment and there are few cases in which treatment results in complete recovery and conception. In cases in which persistent hymen was removed for the treatment of the disorder, care must be taken because scars formed after treatment may lead to vaginal stenosis and resultant dystocia.

2.2.2 A case in which estrus and mating does not lead to conception due to the disorders of the vagina, cervical canal, uterus, oviduct and ovary

(1) Vaginitis

Inflammation of the vagina, this disorder results from infection by bacteria or vaginal irrigation with irritating disinfectant and high-temperature wash, associated with dystocia, vaginal prolapse, coitus and insemination. It also occurs as a result of retention of the placenta, endometritis and cervicitis in many cases. In the case of bacterial infection, major causal bacteria include indigenous bacteria in the vulva and vestibule of the vagina such as



Staphylococcus spp., *Streptococcus* spp., *E. coli* and *Actinomyces pyogenes*. Vaginitis inhibits conception if the disorder accompanies endometritis and cervicitis but it heals spontaneously if it is mild in severity and without complications.

In many of the cows with the disorder, pyoid or cloudy mucus discharges from the vulva irregularly and the vaginal mucous membrane is congested, swollen and has pyoid mucus on the vaginal walls. In the case of severe vaginitis, stimulation from a vaginal examination and so forth causes pain. In the case of complications by cervicitis and endometritis, discharge of pyoid exudate from the external uterine orifice and congestion of ectocervical mucous membranes are present.

For treatment, vaginal irrigation with less irritant physiological saline or a zwitterionic or cationic detergent should be performed and drugs such as sulfanilamides and antibiotics applied to or infused into the vagina. The disease requires some time to heal but the prognosis is generally good. Diseases that are secondary to endometritis and cervicitis can be healed by treating these diseases.

(2) Urovagina

A condition in which part or most part of the urine flows backward into the vaginal floor and is retained temporarily or persistently. The disorder occurs because the broad ligament of the uterus and supporting tissues near the vagina that support the uterus and vagina relax due to aging, weakness, malnutrition and perinatal injuries and the inner part of the vagina sinks due to a loss of strength. The disease is accompanied by impaired ovarian function such as follicular cysts and ovarian subfunction in most cases and occurs rarely in animals with a normal estrous cycle. Thus, its close relationship to the secretion of sex steroid hormones is suggested.

In cows with the disease, the vulva faces upward because the vagina sinks forward so the urine is retained in the inner part of the vagina submerging the exterior uterine orifice. The vaginal mucous membrane is reddened and emits a strong urinary odor and the cervical mucus is suspended from the vulva like a thread since it is mixed with urine and rendered watery. Cervicitis or endometritis follows if the disease lasts long.

Treatment must be tailored for the individual causes of the disease because urine collects in the vaginal floor soon after it is removed. Thus, marasmus and malnutrition must be improved by supplementing with nutrients and providing sufficient exercise and care. Appropriate treatments must be given to cows with inflammation of the uterus, cervical canal and vagina. For cows with mild urovagina in which urine is retained in the vaginal floor temporarily, the urine should be removed and the vagina irrigated with physiological saline or 5% glucose solution before infusing semen into the inner part of the cervical canal or the internal uterine orifice area. Surgery has been tried to restore the vagina if the vagina sinks to a serious extent, however, the disease recurs in many cases.

There are chances of conception in mild cases or cases of temporary retention of urine. In cases in which the disease results from marasmus and malnutrition, the improvement of constitution is needed and takes a significantly long period. There are no chances of recovery in cases of a depressed back due to aging and emaciation.

(3) Cervicitis

Inflammation of the cervical canal. It often accompanies endometritis and results from bacterial infection at the time of abortion, dystocia and retained placenta. It also results from injuries, and especially sticking injuries, to the cervical walls due to inappropriate handling of equipment for insemination and the diagnosis / treatment of uterine diseases.



The ectocervical part is congested and swollen and the third plicae circularis of the cervical canal is congested and, because it is swollen, turned over, exposed outside the external uterine orifice showing complicated morphology with its mucous membrane turned red or dark purple. A pyoid exudate discharges from the external uterine orifice. In some cases of old cervicitis, the external uterine orifice is maintained wide open and allows access to the uterus even during the luteal phase. Care must be taken because cervicitis is present independently quite rarely and is complicated by endometritis and vaginitis in most cases.

For treatment, the ectocervical part must be washed with warm water containing less irritant disinfectant or physiological saline and povidone iodine solution or an antibacterial agent applied to or infused into the cervical canal. The disease may heal spontaneously after repeated estrous cycles so care should be taken to maintain normal ovarian function while at the same time treating complicating endometritis and vaginitis.

The disease is diagnosed as healed if the congestion of the ectocervical region disappears and normal cervical mucus is present. If the disease is accompanied by endometritis, however, diagnosis of it being successfully treated is also necessary. The prognosis is generally satisfactory.

(4) Endometritis

Endometritis refers to inflammation of the endometrium and is the most frequently occurring disease of all uterine diseases, being one of the major causes of conception failure. The disease inhibits sperm from ascending by reducing their motility inhibits the growth of embryos and, if implantation is attained, Cause early fetal death and abortion.

The disease is divided into either the infectious type that is caused by bacterial, viruses, fungi and protozoans or the noninfectious type. In most cases of the infectious type, causal bacteria are *Staphylococcus* spp., *Streptococcus* spp., *E. coli*, *Actinomyces pyogenes*, *Pseudomonas aeruginosa* and other noninfectious indigenous bacteria that are present in the vulva, vestibule of the vagina, cow's body and cow sheds. Mixed infection with two or more bacterial species often occurs. Infectious bacteria include *Campylobacter fetus* and *Bruce/la abortus*. Bacterial endometritis is mainly caused by spontaneous or artificial infection of the uterus with bacteria through the vagina that results from coitus, insemination, embryo transfer and examinations and equipment for the diagnosis and treatment of uterine diseases or from procedures for perinatal disorders such as dystocia and retained placenta. The mechanism of bacterial infection of the uterus is related to the nutritional and health conditions of cows and is closely related to sex steroidal hormones. Thus, estrogen acts by protecting the uterus against bacteria and progesterone acts by suppressing this protective action and making the environment suitable for bacterial growth. The uterus in the early luteal phase is known to be particularly susceptible to bacterial infection and endometritis. The causes of endometritis of the noninfectious type include artificial factors such as the infusion of an irritable chemical solution into the uterus and uterine irrigation with high-temperature physiological saline.

Endometritis is divided into the acute and chronic types according to clinical findings and the type that is associated with discharging of abnormal secretion is referred to as secretive endometritis and the type that is not latent endometritis. Secretive endometritis is further divided into catarrhal endometritis in which hyaline mucus or hyaline mucus containing grayish-white streaks discharges from the external uterine orifice and purulent endometritis associated with discharging of purulent mucus.

Diagnosis is based mainly on a vaginal examination and, as required, on diagnostic uterine irrigation and an endometrial biopsy.



As a basic treatment, the inside of the uterus is washed with sterilized physiological saline (40-42 °C, a total of 2-4 liters) to remove its content and an intrauterine infusion for endometritis is administered. In cases of mild endometritis that are not associated with a large amount of abnormal secretion, omitting uterine irrigation from the treatment procedure mentioned will not reduce the efficacy. In the absence of high effectiveness, however, uterine irrigation must be performed instead of uselessly repeating medications. For intrauterine infusions, penicillin and iodine solution are highly effective. The quantity of infusion should be 30-50 ml, a sufficient amount to cover the entire surface of the endometrium. If antibacterial agents are used for treatment, the relevant standards for use must be followed considering the possibility of these agents remaining in the body and appearing in the milk. To promote the self-cleaning action of the uterus associated with the appearance of estrous, tromethamine dinoprost, a PGF_{2a} preparation, at a dose of 15-25 mg as dinoprost was administered once intramuscularly in the luteal phase with satisfactory results. However, uterine irrigation and intrauterine administration should be performed as required. Ovarian diseases such as ovarian cysts must be treated if they are present.

The disease is diagnosed as healed if an examination performed in the estrous period or 7-14 days after treatment according to the diagnostic method mentioned above reveals a loss of abnormal findings. The prognosis is generally satisfactory, however it is poor in cases in which the disease persists and the uterus is extremely loosened and suspended and the uterine wall is extremely thinned or thickened.

(5) Myometritis and perimetritis

These refer to inflammation of the myometrium and perimetrium, respectively, and Myometritis is often accompanied by endometritis or perimetritis.

Some cases of these diseases result from severe endometritis, injuries of the uterus and cervical canal at the time of dystocia, injuries of the uterus at the time of the correction of presentation, embryotomy and cesarean section and rough excision of retained placenta. Some cases result from injuries such as perforations in the uterus due to medical instruments at the time insemination, embryo transfer and the diagnosis and treatment of uterine diseases. Perimetritis sometimes results from peritonitis.

In the case of Myometritis, rectal palpation reveals thickening and induration of the entire or localized part of the uterine wall and, in some cases, abscesses. Abscesses range from 2 cm to the size of a child's head and some sink into the abdominal cavity because of their weight. In the case of perimetritis, on the other hand, connective tissue fibers grow on the surface of the perimetrium (serous membrane) in the form of strings in some cases, both the uterine horns adhere to each other in some cases and the uterine horn adheres to the oviduct, ovary, broad ligament of the uterus, peritoneum, bladder or rumen in some cases. In acute cases, the disease shows the same symptoms as peritonitis and an examination of the uterus by rectal palpation causes pain.

For treatment, the disease is treated according to the same method as endometritis in case the disease is secondary to endometritis and no abscess is present. In the case of early-stage Myometritis that was initially caused by perforations in the uterus, an antibacterial agent is infused into the uterus or injected focally. If any abscesses are present, however, the disease is unlikely to be healed.

The disease does not impede conception as long as adhesions and induration do not affect uterine function. However, if the adhesion is extensive and severe and an abscess persists after treatment, there is little chance of recovery and conception or, if conception is attained, abortion may occur.



(6) Salpingitis

Salpingitis refers to inflammation of the oviduct. The disease causes infertility because inflammatory changes occur in the oviduct, an exudate collects within the duct, mucous membranes are thickened, the duct is closed and the movement of sperm and the ovum and thus fertilization are inhibited.

If the cause of the disease is bacterial infection, it results from endometritis or pyometra and from the ascent of the causal bacteria of retained placenta or puerperal metritis. If the cause of the disease is artificial, it results from inflammation associated with a perforation in the uterus produced at the time of uterine irrigation, insemination or embryo transfer and from repeated manual rupture of cystic follicles at the time of rectal palpation, rough excision of the corpus luteum and violent palpation of the oviduct.

The diagnosis of the disease is based on the examination of the oviduct by rectal palpation and requires years of experience and careful observation. In cases of mild Salpingitis, differentiation from the normal oviduct is difficult. In acute cases, the swollen oviduct can be felt since an exudate is retained in the lumen. In chronic cases, induration of the oviduct resulting from the growth of connective tissues is felt. If the atresia of the oviduct is suspected, tubal insufflation is performed. The percentage of antemortem detection of Salpingitis by clinical examinations is low. The disease is detected as a result of autopsies in most cases.

If the disease is mild, the treatment method for endometritis is followed. If the atretic oviduct occurs unilaterally, insemination after confirming the growth of an ovarian follicle in the ovary on the same side as the normal oviduct may lead to conception. If the atretic oviduct occurs bilaterally, embryo transfer may be considered after confirming the normal functions of the ovary and uterus since there is no chance of fertilization.

(7) Hydrosalpinx and pyosalpinx

Hydrosalpinx refers to a condition in which adhesion of the mucous membranes of oviduct and atresia of the lumen occur and a transparent and watery secretion is present in the atretic lumen. If the secretion is purulent, the condition is referred to as pyosalpinx.

Both diseases are secondary to Salpingitis in many cases. Hydrosalpinx is sometimes present in the cases of congenital anomalies of the reproductive organs due to a recessive gene.

The diagnosis of the disease is based on the examination of the oviduct by rectal palpation. With Hydrosalpinx, the oviduct enlarges to 1.2 cm or more in diameter. If there is a large amount of secretion, the oviduct wall is thinned and has fluctuation so that the condition is sometimes misdiagnosed as an ovarian cyst. With pyosalpinx, the fimbria of oviduct adheres to the ovary or tissues surrounding the ovary in many cases and the oviduct expands to the size of the little finger or larger due to retention of secretion. However, distinguishing between these diseases by rectal palpation is not possible. Ultrasonograms of the secretion in the oviduct may help differentiate these diseases. There is no cure for the diseases.

(8) Ovulation failure

Ovulation failure refers to an abnormality in the ovulation process and includes delayed ovulation and anovulation.

1) Delayed ovulation

A condition in which there is a long period between estrus onset and ovulation although ovarian follicles grow in the ovary, estrus emerges and ovulation eventually occurs.



2) Anovulation

A condition in which ovarian follicles undergo regression to atresia, atretic corpus luteum or cysts without ovulating although ovarian follicles grow and estrous signs appear. This disorder is directly caused by abnormal LH secretion from the anterior lobe of the hypophysis or the delay, lack or loss of LH surge, but may also be related to abnormal secretion of FSH and estradiol.

The diagnosis of ovulation failure involves repeating rectal palpation over the estrous period to confirm the presence/ absence of ovulation by major ovarian follicles in the ovary. The diagnosis of delayed ovulation is made if ovulation occurs 36 hours after estrus onset followed by luteinization since ovulation normally occurs 2 hours after estrus onset in cows. Because estrus is detected by using the swelling and congestion of the vulva and the discharge of mucus from it as indicators, insemination is often repeated from several days before estrus onset and a misdiagnosis of the disease is made. The diagnosis of anovulation is made if ovulation does not occur after the presence of estrous signs and follicular growth, as indicated by rectal palpation, and findings in an examination of the ovary performed 7-10 days after the loss of estrous signs reveal follicular atresia, regression or cysts and a lack of luteinization.

If growing ovarian follicles are present, treatment includes administering 100-200 µg of fertirelin acetate or 10-20 µg of buserelin, both GnRH analogues, once intramuscularly to stimulate the anterior lobe of the hypophysis to induce endogenous LH surge as a means of remedying abnormal LH secretion. In addition, to supply LH, an intramuscular or subcutaneous injection of 1,500-3,000 IU of hCG or an intravenous or intramuscular injection of 200-400 Rab. U of bovine APG or an intravenous injection of 20-40 A.U. of swine APFSH is administered once.

Insemination is performed 9-24 hours after administration of hormone preparations depending on the status of estrus before and after the hormone administration. If insemination results in a failure and estrus returns, the hormone preparations mentioned above are administered within a short period from estrus onset and insemination is repeated. Administration of the aforementioned hormone preparations before estrous onset results in ovulation 30-36 hours after the administration. Thus, occurrence of ovulation 2 days after administration indicates that the treatment was effective. If ovulation occurs within 24 hours of administration, the ovulation was triggered by an LR surge that was induced by endogenous GnRH and not by exogenous hormones. In the case of absence of ovulation after treatment, rectal palpation is performed 7-14 days after treatment to see if additional treatment is necessary because a shift to ovarian quiescence or ovarian cysts may have occurred.

(9) luteal hypoplasia

Luteal hypoplasia refers to a condition in which luteal tissues are formed insufficiently after ovulation. It is divided into Hypoplastic corpus luteum and cystic corpus luteum depending on the shape of the corpus luteum.

1) Hypoplastic corpus luteum

The diagnosis of the disease is made if the corpus luteum grows insufficiently after ovulation, secretes progesterone insufficiently and undergoes regression too early with the estrous cycle shortened to about 10 days. A corpus luteum like this is often formed after the first ovulation following birth or delivery and after treatment of cows with ovarian quiescence with hCG or GnRH analogues. After the treatment of follicular cysts or in the cases of urovagina and endometritis, an estrous cycle of about 10 days is sometimes repeated due to insufficient luteinization after ovulation.



Because of poor luteinization, possible causes include reduced ability of the anterior lobe of the hypophysis to secrete LR and a lack of LH receptors in the ovarian follicles that ovulated and the corpus luteum that was formed later. Because the disease occurs in cases of urovagina and mild endometritis, luteolytic factors that are produced during the recovery phase of transient inflammation associated with endometritis in the early luteal phase may be one of the causes.

For treatment, 1,500 3,000 IU of hCG is administered intramuscularly or subcutaneously or 100-200 µg of fertirelin acetate or 10 20 µg of buserelin, both GnRH analogues, is administered intramuscularly during the period from onset of the following estrous to ovulation. Administration of the aforementioned hormone preparations to cases with existing hypoplastic corpus luteum may not prolong the estrous cycle in many cases. If present, urovagina and endometritis must be treated concurrently. The disease is diagnosed as healed if a normal corpus luteum is formed after treatment.

2) Cystic corpus luteum

For several days in the early luteal phase, a cavity retaining fluid is often present in the central part of the bovine corpus luteum but the cavity gradually becomes occupied by luteal tissues as the corpus luteum grows until finally it is lost. Cystic corpus luteum refers to a condition in the functional luteal stage in which the cavity within the corpus luteum is so large that the surrounding luteal layer is thin, and the cavity retains fluid.

Diagnosis of the disease is made if by rectal palpation at 2-3 days after ovulation, i.e. in the early luteal phase, the corpus luteum is found to be larger than normal and a sense of strain or fluctuation is felt because of fluid retention and if these conditions persist until 7-14 days after ovulation. Palpation presents findings quite similar to those of ovarian cysts in many cases. Processus of the corpus luteum protruding from the ovarian surface like a mushroom are present (Photograph 2-4&5 (p.37)) because the disease develops after ovulation but rectal palpation may fail to detect them. The length of the estrous cycle is within the normal range. An ultrasonography examination of the corpus luteum reveals inside a circular or irregular-shaped echo-free image 1.0 cm or more in diameter. The thickness of the luteal layer ranges from extremely thin to thick depending on the case. The range of progesterone levels in blood varies from normal to low. Views differ as to whether fluid is retained in the luteal cavity because of decreased ability to form the corpus luteum due to abnormal function of the anterior lobe of the hypophysis to secrete LH or if luteinization is insufficient because of fluid retention after ovulation.

Treatment is unnecessary if the luteal layer of the cystic corpus luteum is thick because such corpus luteum retains normal function. If the cavity inside the corpus luteum is exceptionally large and the surrounding luteal layer extremely thin, a solid corpus luteum can be formed in 3-4 days by eliminating the fluid inside the luteal cavity by pressing with fingers from over the rectal wall or by aspirating it with an ovarian syringe. Eliminating the fluid inside the luteal cavity by the seventh day from insemination is effective in achieving conception if the fluid was formed after insemination. The disease is healed if a normal corpus luteum is formed after treatment.

(10) Ovaritis

Ovaritis refers to inflammation of the stroma of the ovary and adhesion of the ovary to the surrounding tissue often occurs. Although ovarian follicles grow and estrous occurs in the early stage of the disease, these ovarian follicles cannot achieve ovulation and undergo atresia and regression or, in some cases, degenerate to cysts. In the case of chronic Ovaritis, connective tissue grows on the stroma of the ovary and inhibits growth of ovarian follicles,



resulting in anestrus due to a loss of ovarian function. Abscesses are rarely formed. Artificial causes include violent palpation of the ovary in rectal palpation, rupture of ovarian cysts and cystic corpus luteum by pressing with fingers and removal of the Corpus luteum. The disease also results from bacterial endometritis and Salpingitis and from peritonitis associated with injuries due to metal foreign matter and tuberculosis.

Diagnosis in the early stage of the disease is relatively easy because rectal palpation reveals slightly to severely swollen ovaries and mild pain is present. In chronic cases, adhesion of the ovary to the surrounding tissue impedes palpation but diagnosis is possible because it is shrunk and inelastic.

No appropriate treatments are available. The disease may heal spontaneously if the degree of inflammation and adhesion to surrounding tissue is mild. The prognosis is poor if the disease occurs bilaterally and severely, but if the disease occurs unilaterally and estrus and growing ovarian follicles are present, insemination may lead to conception. If farmers choose conception, delivery and milking in spite of poor prognosis, embryo transfer may be tried after confirming the normal estrous cycle and ovarian function.

2.2.3 A condition in which no abnormality is present in the reproductive organs but no conception occurs even after three times of mating

(1) Repeat breeder

Repeat breeder refers to an infertile condition of unknown cause in which in spite of the normal estrous cycle and normal results of examinations of the ovary and accessory reproductive organs, no conception occurs after three times of mating at each estrus. The causes of the disease vary but fertilization failure and early embryonic death are considered to be the main causes. The causes of fertilization failure include congenital or acquired anomalies or infectious diseases of accessory reproductive organs such as the oviduct and uterus as well as reduced fertility of the Ovum and sperm due to poor properties of semen and untimely insemination. The causes of early embryonic death include mild bacterial infection of the uterus and abnormalities in the environment of the oviduct and uterus due to quantitative imbalance between estrogen and progesterone involved in movement, growth and implantation of the embryo. Involvement of chromosomal aberration is also probable.

Because of a lack of definitive diagnostic criteria, infertile cows are indiscriminately diagnosed as the disease in some cases. Examinations performed from different angles may reveal that some of these cases are caused by other disorders such as ovulation failure, atretic oviduct and latent endometritis.

Treatment includes improving the feeding environment and breeding management, which are thought to be predisposing factors. If early embryonic death is considered to be the cause, underlying factors are assumed and the following diagnostic treatment procedures are performed. If mild bacterial infection of the uterus is suspected, uterine irrigation is performed ♂ and a drug containing an antibacterial agent is infused into the uterus in the luteal phase before insemination or within 12 days of insemination, according to the treatment method for endometritis. To promote luteinization, 1,500 3,000 IU of hCG is administered intramuscularly or subcutaneously or 100-200 µg of fertirelin acetate or 10-20 µg of buserelin, both GnRH analogues, is administered intramuscularly at the time of insemination or within 3-7 days of ovulation. If implantation failure of the embryo due to reduced luteal function is suspected, 200 500 mg of long-acting progesterone is administered intramuscularly 4-5 days and 10-12 days after insemination. Healing of the disease is diagnosed if conception occurs after the improvement of the feeding environment



and breeding management or treatment. If no conception occurs in spite of the treatments mentioned above, there is no chance of recovery.

2.2.4 Abnormalities during the pregnancy and perinatal periods

(1) Fetal death

1) Fetal mummification

A condition in which a fetus that died in the mid-pregnancy period, fetal fluid, fetal membrane and placenta shrink and harden and turn chocolate color because body fluids from them are absorbed aseptically and remain in the uterus for a long period. Causes of fetal death vary. Malnutrition, summer heat, infection with bovine viral diarrhoea mucosal disease (BYD-MD) virus and *Neospora caninum*, torsion of umbilical cord and a recessive gene on the autosome are known to cause the disease. Estrus is absent because the production of luteolytic factors by the endometrium is suppressed and the corpus luteum is retained.

A vaginal examination reveals pregnancy findings, rectal palpation reveals a failure of growth of the fetus and uterus matching the fetal age, fetal fluid is quite little or lost and the uterus lacks fluctuation. The uterine wall is thin and rough, the placenta is not palpable and the fetus feels like a hard body. Vibrations characteristic to the mid-pregnancy period are not felt on the uterine artery and the persistent corpus luteum is present in the ovary. These conditions occur one or more months after fetal death when the fetus has undergone sufficient mummification. In practice, fetuses in various stages of mummification are found.

For treatment, either one of PGF_{2α} preparations, i.e. 12-15 mg of dinoprost or tromethamine dinoprost at a dose of 15-25 mg as dinoprost, or 500 µg of cloprostenol, a PGF_{2α} analogue, is administered once by intramuscular injection to facilitate regression of the retained corpus luteum and growth of ovarian follicles and promote contraction of the uterus and dilation of the cervical canal to expel the mummified fetus. PGF_{2α} is highly effective and promotes self-cleansing action of uterus, resulting in conception in many cases.

The mummified fetus is usually expelled in 2-4 days after injection. If the mummified fetus is retained in the vagina with a colicky symptom, the fetus is removed with a hand. If these procedures fail, a cesarean section is performed. The disease is diagnosed as healed if estrus occurs after the mummified fetus has been expelled.

2) Fetal maceration

Fetal maceration is one of the postmortem changes that occur when the fetus dies in the uterus but abortion does not occur and is characterized by a condition in which the fetus dissolves without the action of bacteria leaving in the uterus a thick, viscous cream-like fluid and the fetal skeleton. The cervical canal is closed during the early stage but relaxes gradually until bacteria enter the uterus and decompose the fetus. In many cases the cause of fetal death is unidentified.

Estrus is absent. By a vaginal examination, the exterior uterine orifice is slightly open and a dirty, bad smelling fluid discharges from it. In cases in which a long time has passed since fetal death, this fluid may contain fetal hair, hoof or bone fragments. Rectal palpation reveals the hard fetal skeleton in the lowered pregnant horn. The persistent corpus luteum is often present in the ovary. Normally, no apparent systemic symptom is present.

Treatments are the same as fetal mummification if the dead fetus is in the uterus and the corpus luteum is retained in the ovary. If the decomposition of soft tissue advances and bones are separated, administration of PGF_{2α} preparations will result in some of the bone fragments being retained in the uterus in many cases. If the macerated fetus is removed, treatment methods for endometritis are followed. However, removing all the bone fragments is difficult



whether they are removed through the cervical canal or through an incision in the abdominal wall. Although conception is possible if the macerated fetus is discovered in the early stage and eliminated, chronic endometritis persists due to remaining bone fragments. Prognosis is poor if the degree of uterine relaxation and thickening is significant.

(2) Abortion

Abortion refers to a condition in which the fetus is delivered live or dead before reaching the stage of viability and in which the delivered fetus is generally of a macroscopical size. A case in which a viable fetus is delivered before the completion of gestation period is referred to as premature birth and a case in which a nonviable fetus is delivered during this period or a fetus dies immediately before or during the delivery process as stillbirth.

Abortion is divided into infectious abortion that is caused by infection with pathogens such as bacteria, viruses, protozoans and fungi and noninfectious sporadic abortion depending on the cause. Infectious diseases of the reproductive organs that cause infectious still abortion in cows, pathogens, clinical conditions, diagnosis and countermeasures are summarized in Tables 2-2 (p.35) and 2-3 (p.35). Sporadic abortion is caused by falling of the fetus in the uterus, bruising in the abdomen, low nutrition and poisoning, serious systemic diseases, a shortage of progesterone secretion, increased secretion of adrenocortical hormones due to stress, inappropriate handling of the uterus during gestation period and genetic factors such as fetal chromosomal aberration.

Eliminating causes and predisposing factors is the basis of treatment. In the case of infectious abortion, hygienic management is important, and vaccination is employed. To prevent habitual abortion in which abortion occurs at the same stage each time in spite of a lack of infection or exogenous sensitization in particular, 50-200 mg of progesterone is administered several times intramuscularly at 2 to 3-day intervals starting from 2 to 3 weeks before the abortion-prone period or 300-600 mg of its depot preparation (long-acting preparation) is administered 3 or 4 times. Occurrence of abortion of 5% or higher is a serious matter requiring diversified examinations of causes for the establishment of a proper treatment method.



Table 2-2 Abortion in cows due to viruses and protozoans
(modified from Gibbons, 1972)

Name of diseases	Pathogen	Clinical conditions	Diagnosis	Countermeasures
Akabane disease	Akabane virus	Abortion, premature birth, stillbirth, malformation (hydranencephaly, articular curvature of calves)	Viral isolation Serologic reaction Fluorescent antibody technique	Vaccination
Chuzan disease	Chuzan virus	Abortion, premature birth, stillbirth, malformation (hydranencephaly, cerebellar hypoplasia of calves)	Viral isolation Serologic reaction Fluorescent antibody technique	Vaccination
Aino virus infection	Aino virus	Abortion, premature birth, stillbirth, malformation (cerebellar hypoplasia, articular curvature and wryneck of calves)	Viral isolation Serologic reaction Fluorescent antibody technique	Vaccination
Infectious bovine rhinotracheitis (IBR)	Bovine herpes-virus 1	Abortion, respiratory symptoms, pustular vulvovaginitis, balanoposthitis	Viral isolation Serologic reaction Fluorescent antibody technique ELISA	Vaccination Isolation Discontinuation of mating
Bovine viral diarrhea mucosal disease (BVD-MD)	BVD-MD virus	Enteritis, diarrhea (primary), abortion, mummification, malformation (cerebellar hypoplasia)	Viral isolation Serologic reaction	Vaccination Isolation
Rift valley fever	Rift valley fever virus	Abortion, hepatic necrosis	Viral isolation Serologic reaction	Eradication of external parasites Restriction of movement
Trichomoniasis	<i>Trichomonas foetus</i>	Sterility, pyometra, abortion (1-4 months of pregnancy)	Detection of <i>Trichomonas</i> sp. by culture of preputial content	Insemination Treatment of infected cows
Neosporosis	<i>Neospora caninum</i>	Abortion, stillbirth, mummification, non-purulent encephalomyelitis, non-purulent myositis	Histopathological study Immunohistochemical examination of interstitial protozoans	Prevention of approach of dogs

Table 2-3 Abortion in cows due to infection with bacteria, Chlamydia spp. and fungi
(modified from Frank and O' Berry, 1966)

Name of diseases	Pathogen	Clinical conditions	Diagnosis	Countermeasures
Brucellosis	<i>Brucella abortus</i>	Abortion (6-9 months of pregnancy) Conception failure Orchitis, Epididymitis	Serological reaction Bacterial isolation Clinical conditions	Vaccination* Examination and slaughter Isolation, disinfection
Campylobacteriosis	<i>Campylobacter fetus</i>	Temporary sterility Abortion (4-7 months of pregnancy)	Agglutination test of vaginal mucus Bacterial isolation	Artificial insemination Treatment of infected cows
Leptospirosis	<i>Leptospira pomona</i> Others	Hemolytic anemia Abortion (late gestation period) Agalactia	Serological reaction Bacterial isolation	Vaccination* Treatment (antibiotics)
Listeriosis	<i>Listeria monocytogenes</i>	Encephalitis Abortion	Bacterial isolation Clinical condition Histopathological study	Isolation, disinfection
Chlamydiosis	<i>Chlamydia psittaci</i>	Abortion (late gestation period) Hepatic lesions of the fetus Orchitis, Seminal vesiculitis	Isolation of pathogen Serological reaction Fluorescent antibody technique	Isolation Elimination of stress (prevention)
Mycotic abortion	<i>Aspergillus fumigatus</i>	Abortion	Fungal isolation Lesions of aborted fetus and placenta	Avoid using moldy feed

Note * Not practiced in Japan.



(3) Prolonged gestation

Prolonged gestation refers to a condition in which the gestation period far exceeds the normal range without signs of delivery or the start of delivery. Gestation with a period of 300 days or longer is generally recognized as being the disease. The fetus is excessively large or malformed in most cases.

The cause of the disease on the part of the dam is thought to be the failure of a series of endocrine mechanisms. These mechanisms include increased secretion of fetal hypophysis-derived adrenocorticotrophic hormone that triggers delivery, increased secretion of fetus-derived adrenocortical hormone, an increased estrogen level in the dam's blood, production of $\text{PGF}_{2\alpha}$ in the placenta, increased contraction of the uterus due to a drop-in progesterone secretion and an increase in oxytocin receptors in the uterus and the start of labor. Causes on the part of the fetus include a recessive gene on the autosome that is supposed to be a predisposing factor of the abnormality in the hormone secretion mechanism mentioned above. Manifestations of the disease occurring from this cause include a giant fetus, facial malformations, cerebral deficiency, hypophysis deficiency, severe adrenal hypoplasia or deficiency as well as stunting and malformation of the fetus. An example of nonhereditary congenital malformation is an outbreak of prolonged gestation associated with fetal malformation due to alkaloidal intoxication resulting from ingestion of *Veratrum stamineum* by pregnant cows.

Diagnosis is made if prepartum prodromal signs are absent when the due date of calving has passed, such as mammary tension, relaxation of the sacroiliac and sacrotuberous ligaments, shift to a depressed state, significant loosening of the vulva and discharge of cloudy, viscous mucus.

For treatment, either one of $\text{PGF}_{2\alpha}$ preparations, i.e. 12-15 mg of dinoprost or tromethamine dinoprost at a dose of 1525 mg as dinoprost, or 500 μg of cloprostenol, a $\text{PGF}_{2\alpha}$ analogue, is administered once by intramuscular injection. Alternatively, 1 mg of fenprostalene is administered subcutaneously. If parturient signs do not appear within 72 hours of injection, injection is retried at the same dose as above or 10-20 mg of dexamethasone is administered once intramuscularly. In addition, 10-20 mg of estroil or 5-8 mg of estradiol benzoate may be administered concurrently. If diagnosis was delayed and the fetus grew too large, delivery through the birth canal is significantly difficult in many cases if delivery is induced. In these cases, cesarean operation should be performed from the beginning. Dexamethasone is known to temporarily reduce immunocompetence of the body so the presence of infection should be confirmed beforehand and useless repeated administration avoided.

The disease is healed if the fetus has been delivered. In the case of induced delivery by means of medication, the fetus may die because labor pains are so mild that delivery takes a long time. Thus, continuous observation is necessary after a procedure to induce delivery has been performed. Care must be taken because fetal malformation, and especially malformation of the head, may lead to dystocia. Retained placenta occurs more frequently in the case of induced delivery than in spontaneous delivery.

(4) Uterine torsion

A condition in which the pregnant uterus is twisted around its long axis. Because the great curvature of the bovine uterine horn is not supported by the broad ligament of the uterus, a pregnant uterus that has sunk into the abdominal cavity in the form of a sac is easily moved by the action of the stomach and intestines. As the gestation period advances, factors such as the growth of the fetus, fetal membrane and placenta and an increase in fetal fluid cause imbalance in weight and size between the pregnant and non-pregnant horns. An increased estrogen



level in the late gestation period also relaxes supportive tissue such as the broad ligament of the uterus. In these circumstances, torsion of the pregnant uterus is likely to occur as a result of spontaneous straining associated with the lying and standing behavior of the dam, fetal movement and labor.

The disease that occurs in the mid-gestation period (6-7 months of gestation) occurs in the uterine body in front of the interior uterine orifice. Symptoms include sudden restless behavior, decreased appetite and tympanites. Rectal palpation reveals a strained uterus with reduced fluctuation, folds that show the direction of torsion and strained bilateral broad ligaments of uterus and uterine arteries. The disease that occurs during the period from the opening to expulsion periods is without uterine torsion because the fetus has moved to the uterine body and is likely to occur in the uterine cervix that has become elastic, relaxed and open. Labor pains persist for a long time but the fetal sac and fetus are not seen from the vulva. By palpation with a hand in the vagina, a number of spiral folds are felt formed on the vaginal wall running from the posterior to anterior portions. The direction of torsion is identified from the clear folds formed on the upper vaginal wall or from the fact that the pudendal lip on the opposite side of torsion (left pudendal lip in the case of right torsion) is swollen.

For treatment, the most appropriate method of reducing and delivering a fetus for the case in question must be determined by taking into account fetal size and the clinical conditions of the dam. If the torsion is slight (around 90°), the fetus is drawn according to the methods for dystocia. The fetal head (the hip in the case of posterior presentation) is guided from the uterine cervix to the vaginal birth canal. If the fetal hoof and head are palpable, repositioning is performed in a standing posture. If the uterine body is twisted, the uterine cervix is twisted without dilating sufficiently, the fetus is impalpable, the dam is unable to assume a standing posture due to weakness or reposition is unfeasible in a standing position, reposition is performed by letting the dam lie on the same side as torsion with the fore and hind legs bound separately and turning the cow quickly. If these methods are found to be ineffective, a cesarean section is performed. A cesarean section is applicable only when the uterus is not necrotized.

The prognosis of the dam and calf is satisfactory if the torsion was detected in the early stage and remedied but poor if the torsion was severe and lasted long.

(5) Dropsy of fetal membrane

This condition, in which a large amount of fetal fluid is retained in the fetal membrane cavity divides into hydramnios and Hydrallantois. These occur independently but are sometimes combined. Hydrallantois is thought to occur more frequently than hydramnios.

1) Hydramnios

This disease is associated with a genetically or congenitally abnormal fetus. Because the swallowing of amniotic fluid is impeded in an abnormal fetus, an increasing amount of amniotic fluid collects in the amniotic cavity resulting in an expanded amniotic cavity. Thus, expansion of the abdomen occurs in the late gestation period and gradually becomes noteworthy. Dystocia often occurs due to expansion of the uterus, uterine inertia and fetal malformation and the fetus is abnormal and dies without exception.

In mild cases, observation is continued while waiting for delivery. In severe cases, abortion is induced by administering PGF_{2α} or a PGF_{2α} Analogue or dexamethasone according to the treatment method for prolonged gestation. The prognosis of the reproductive ability of the dam is satisfactory.



2) Hydrallantois

This disease is usually associated with uterine diseases. The placenta is significantly swollen with edematous and necrotic changes. The cause of the disease is thought to be abnormalities in the allantoic chorion function including the permeability of vessels that exudate and absorb body fluids.

The disease may be unnoticeable until delivery if it is mild. In severe cases, symptoms suddenly appear during a period of 5-20 days after the mid-gestation period with significant expansion of the abdomen that may suggest twins or triplets. The dam shows reduced appetite, a rest of rumination, constipation as well as fibrillated pulsation and rapid breathing. Rectal palpation reveals an unusually expanded uterus but the fetus is impalpable. The abdomen continues to expand as the disease progresses and the dam will be weakened and eventually unable to stand. Dystocia is likely to occur due to malpresentation and uterine inertia and the fetus dies within the uterus or immediately after birth.

For treatment, abortion is induced immediately as in hydramnios. Severe cases may require cesarean section. Because of severe dehydration, the dam needs a large amount of transfusion. The prognosis of the reproductive ability of the dam is poor if it escapes death.

(6) Dystocia

Dystocia refers to a condition during the delivery process in which the first stage (opening period) or the second stage (expulsion period) is so prolonged that delivery is difficult or impossible without assistance.

Dystocia occurs from causes derived from the fetus more frequently than from those derived from the dam. Causes derived from the fetus include faulty fetal disposition, fetal gigantism and fetal malformation and those derived from the dam faulty uterine disposition and abnormalities in the birth canal and labor.

Diagnosis should include inquiring of farmers about the number of times of delivery, time that has passed since delivery, the presence/ absence of discharge of fetal fluid and actions that have been taken to relieve dystocia. If a long time has passed since delivery onset, the general condition of the dam should be examined carefully. Disinfected fingers are inserted slowly through the birth canal to check for injuries, the degree of dilation of the uterine cervix, status of the fetal sac and fetal presentation and position. To check whether the fetus is alive or not, palpation of the fetus is performed from over the fetal membrane if rupture of the bag has not yet occurred or directly if the rupture has occurred at the time of examination.

The procedure includes performing reposition and assisting in delivery if the cause is faulty fetal disposition. When infeasible and when the cause is fetal gigantism and malformation, cesarean section is performed. When the fetus is dead, the fetus is delivered by means of fetotomy.

If the cause is uterine hernia of the dam, the fetus is delivered quickly by cesarean section and so forth. If the cause is an abnormality in the birth canal, the procedure involves moistening the birth canal with mucilage using disinfected fingers, relaxing and dilating the insufficiently dilated portion by massage and trying to deliver gradually. When infeasible and when the cause is severe stricture and obstruction, the fetus is delivered by incision of the insufficiently dilated, constricted or obstructed part or by cesarean section. If the cause is uterine inertia, after confirming that the birth canal is secure, labor is promoted by administering oxytocic, or stimulating the dorsal part of the transitional zone between the vestibule of vagina and vagina, or administering 20-150 units of oxytocin, an uterotonic, intravenously, intramuscularly or subcutaneously or 1.7-12.0 mg/kg of spiriting sulfate subcutaneously or intramuscularly.



The prognosis is satisfactory if the fetus is delivered with assistance or by fetotomy without injuring the birth canal. Sequelae include puerperal metritis, puerperal fever and peritonitis and severe cases of these conditions result in poor prognosis. If the birth canal is severely injured and healed, stricture of the cervical canal and vagina may lead to recurrence of dystocia.

(7) Vaginal prolapse

This refers to a condition in which part or the entire vaginal wall protrudes from the vulva. It tends to occur during the mid- to late gestation period and sometimes after delivery. The possible mechanism is that increased abdominal pressure presses the uterus and vagina backward and high amounts of estrogen produced by the placenta relaxes the supportive tissue of the vagina and vulvar sphincter. If the birth canal and vulva is injured or relaxed due to dystocia, the disease is likely to occur frequently during the following gestation. A long period of raising on an inclined floor with the front part higher and the rear part lower is a major cause of the disease that occurs in the mid- to late gestation periods.

In infertile cows, the disease often occurs during the estrous phase but infrequently during the luteal phase. Involvement of estrogen in the pathogenicity of the disease is also suggested by the fact that it often accompanies follicular cysts.

During the last stage of pregnancy, a reddened vaginal membrane is often exposed from the vulva in a hemispherical form when in a prone position but is reduced in a standing position. In severe cases, the entire vaginal wall along with the ectocervical portion protrudes to produce a mass the size of a human head, which will not be reduced if in a standing position. As time advances after the prolapse, the vaginal membrane degenerates to necrosis in summer and dries to necrosis in winter due to insufficient blood supply, contamination with feces, mechanical stimulation and drying. In some cases, the back part of the prolapsed vaginal wall serves as a hernial sac, into which the bladder and fatty tissue enter. Cases in which the bladder enters the reversed vaginal sac are prone to dysuria.

In mild cases, the disease heals spontaneously after delivery with satisfactory prognosis but tends to recur in the following gestation. Treatment of severe cases of the disease involves disinfecting the vulva and surrounding parts with cationic or zwitterionic detergent, washing the prolapsed vagina with physiological saline or mildly irritating disinfectant and reducing in a low-front and high-back standing position. A vulvar truss is installed after reduction. In the case of poor results with straining induced, vulvar suture is performed, or opening of the pudendum is rejected by passing a tape underneath the skin surrounding the vulva and both ends are ligated, or abdominal fixation or these methods are combined. When present, follicular cysts are also treated. If the entire vaginal wall prolapses, spontaneous healing is unlikely and reduction may not improve conception failure.

(8) Uterine prolapse

Uterine prolapse refers to a postpartum condition in which part or the entire uterus is reversed and prolapses from the cervical canal to the outside of the vulva.

The disease is often caused by dystocia due to fetal gigantism, postpartum persistent labor pain, retained placenta and relaxation of the uterus and birth canal. Raising pregnant cows on a floor with a steep high-front and low-back slope is known to be a major predisposition to the disease.

In some cases, the uterus is reversed and prolapses outside the vulva in the form of a dark red sac, which



has a number of placentas lined in parallel on its surface. Part or most of these placentas have fetal placentas attached to them or all of them have lost fetal placentas. The prolapsed uterus is contaminated with blood and feces, has congestion and edemas due to a circulation failure, and these conditions worsen as time passes resulting in necrosis. The disease is sometimes associated with secondary laceration, perforations or partial defects of uterine tissue. Straining occurs repeatedly during the period shortly after prolapse but gradually weakens and disappears in the long run. Appetite decreases with the passage of time and pulse and respiration rates increase, causing dysstasia and, in some cases, collapse.

Farmers should be instructed to keep the prolapsed uterus clean while covering it with a moistened cloth or a plastic sheet to protect it from drying. Reduction should be started immediately if only a short time has passed since prolapse, the uterus has no or few injuries and the congestion and edema are mild. If a long time has passed and the uterus has injuries and advanced congestion and edema with clear systemic symptoms.

Reduction is performed carefully in combination with symptomatic treatments by use of cardiotonics and transfusion. When performing reduction, the cow is made to assume a low-front and high-back standing posture, when feasible, and in the case of strong straining, extradural anesthesia of the coccygeal vertebrae is performed beforehand.

Reduction involves irrigating the surface of the prolapsed uterus with moderately warm sterile physiological saline or a mildly irritating disinfectant followed by wiping. If the fetal membrane placenta is attached, it is detached with fingers but should not be detached forcibly. The prolapsed uterus is placed on a disinfected broad and strong rubber cloth, which is held by two assistants, and is held slightly higher than the vulva. The operator reduces the prolapsed uterus gradually from the cervical canal by taking advantage of the pauses of straining. Meanwhile, the uterus is sometimes irrigated with sterile saline or Ringer's solution to keep it clean and warm and prevent it from drying. After reduction, the uterus is redressed with fingers inserted deep inward. After redressment, 1-2 g of Aureomycin is infused into the uterus to prevent infection of the uterus. In addition, 30-50 units of oxytocin is administered intravenously, subcutaneously or intramuscularly as an uterotonic. To prevent uterine prolapse from recurring, the cow with a vulvar truss installed is tethered on a floor with a low-front and high-back slope and, as required, vulvar sutur is performed. Increases in which the injuries and contamination of the prolapsed uterus are serious, an antibacterial agent is administered locally and systemically for 3-5 days and symptomatic treatments are continued because puerperal metritis is likely to follow.

If injuries of the prolapsed uterus are absent or mild and systemic symptoms are absent, the disease does not affect the following conception in many cases. However, because adhesion and induration may remain on the reproductive organs, farmers should be guided to receive examinations of the reproductive organs 20-30 days after delivery.

(9) Retained placenta

The placenta is usually expelled 3-8 hours after delivery of the fetus. In some cases, the placenta is not expelled within more than 12 hours of delivery of the fetus. This condition is referred to as retained placenta.

The causes of this condition are varied and have not yet been clarified. In some cases it occurs because detachment of the fetal placenta from maternal placenta is difficult because of placental inflammation, in some cases it occurs because the detached placenta is not expelled due to early contraction of the cervical canal and uterine inertia. Generally speaking, it preferentially occurs in cows with high milk yield, cows that are obese during the dry up period and cows that take insufficient exercise. It frequently occurs in cows that have undergone abortion, premature birth, stillbirth, dystocia, twin and triplet delivery and induced delivery. The disease is sometimes caused by lack of selenium and vitamin E.

Diagnosis includes confirming that part or the entire fetal placenta is retained in the uterus and part of the



fetal membrane is suspended from the vulva when 12 hours passed since delivery of the fetus. The detached placenta may be simply retained in the vaginal floor so the fetal membrane suspending from the vulva should be pulled lightly to determine whether the placenta is detached or not. General conditions should also be checked.

Although there is a controversy, no treatment procedures are performed for retained placenta, in principle, if there are no systemic symptoms such as fever and anorexia. If the retained placenta is left untreated while waiting for spontaneous extrusion and the fetal membrane suspended from the vulva is likely to cause odors and contamination of cowsheds, the fetal membrane is cut at the vulva while pulling the membrane lightly. Part of the placenta remaining in the uterus softens and liquefies spontaneously as time passes, discharges as exudate-like lochia and is expelled within 7-10 days of delivery. If the placenta liquefies and remains in the uterus without being expelled, a PGF_{2α} preparation or a PGF_{2α} analogue is administered. An antibacterial agent for endometritis is infused into the uterus after expulsion. Systemic symptoms are present, an antibacterial agent is administered into the uterus systemically.

The conventional manual removal of the placenta is no longer employed because it causes injuries of the uterus, if however great care is taken, and bacteria that infect the injuries cause puerperal metritis and peritonitis associated with systemic symptoms. The method is also likely to cause persistent diffuse adhesion and induration of the reproductive apparatus resulting in reproductive inability. The method must not be used in the presence of systemic symptoms because the condition may worsen rapidly.

If the fetal placenta and lochia are removed without problems and the uterus recovers satisfactorily, the disease has no effects on the following conception. In the case of poor recovery, intrauterine administration or uterine irrigation is performed within one month of delivery according to the treatment method for endometritis. If the disease is accompanied or followed by puerperal wound infection, various diseases occur one after another resulting in poor prognosis.

(10) Puerperal metritis

Puerperal metritis refers to inflammation of the myometrium or perimetrium. Myometritis is often accompanied by endometritis or perimetritis. It is caused by bacterial infection of the injuries of the uterine wall due to rough procedures for repositioning of the fetus, cesarean section and fetotomy at the time of dystocia and for retained placenta. Perimetritis also follows peritonitis. The disease that occurs from delivery to the puerperal period shows a serious infectious systemic symptom with the inflammation spreading from the endometrium to perimetrium and to the surrounding region. Causal bacteria include *Staphylococcus* spp., *Streptococcus* spp., *E. coli*, *Actinomyces pyogenes* and *Clostridium* spp.

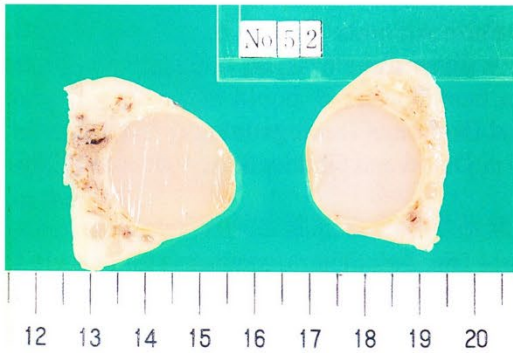
The disease is characterized by bad smelling reddish-brown discharge from the uterus and is identifiable mainly by rectal palpation. In the case of myometritis, thickening, induration and, in some cases, abscesses of the entire or localized part of the uterine wall are palpable. Abscesses reach from 2 cm to the size of a child's head in diameter and may sink into the abdominal cavity because of their weight. In the case of perimetritis, fibrous connective tissue grows on the perimetrium in the form of strings in milder cases. In severer cases, both the uterine horns adhere to each other and the uterine horns adhere to the oviduct, ovaries, broad ligament of the uterus, peritoneum, bladder or rumen. In addition to rectal palpation, hematology to identify the characteristics of the disease and bacteriological examination. Of the discharge at the external uterine orifice are performed as appropriate.



In cases in which systemic symptoms such as fever and anorexia are present, systemic and local administration of antibacterial agents is performed to the full. Where a large amount of lochia is retained in the uterus and systemic symptoms will not disappear, a $\text{PGF}_{2\alpha}$ preparation or a $\text{PGF}_{2\alpha}$ analogue is administered to expel the retained matter. If the treatment fails, a soft rubber is used to siphon the retained matter.

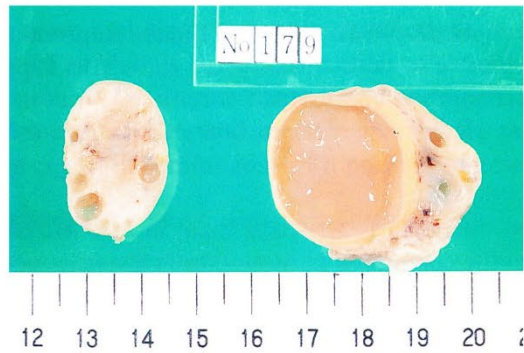
In case in which abscesses are absent and adhesion and induration are of a severity that does not affect the uterine function, the disease will not impede conception. If adhesion is extensive and strong and abscesses remain after treatment, the disease results in sterility.

Photograph 2-1 - 2-6 Ovary that shows an ovarian cyst and similar forms



Photograph 2-1 Follicular cyst (FC)

A cystic follicle is present in each ovary.



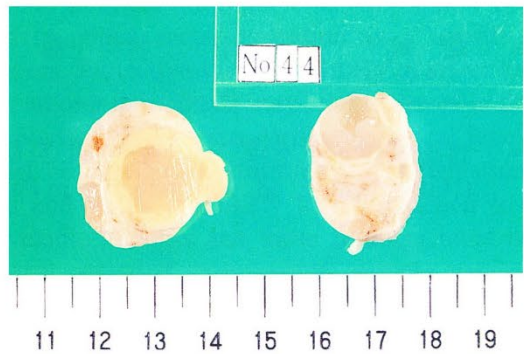
Photograph 2-2 Luteal cyst (LC)

Atretic corpus luteum derived from a cystic follicle is present in the right ovary.



Photograph 2-3 Luteal cyst (LC)

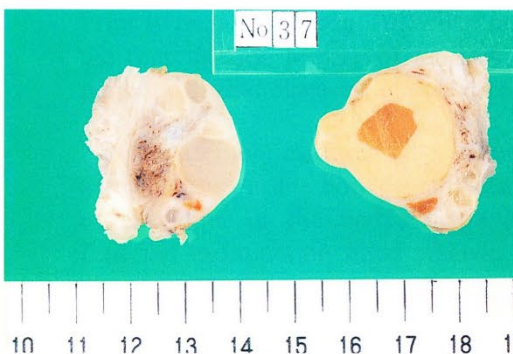
Part of the cystic wall that luteinized is present in the lower part of the right ovary and a cystic follicle undergoing regression to atresia is present in the upper part.



Photograph 2-4

Cystic corpus luteum (CCL)

Corpus luteum with a thin luteal layer that has processus and retains fluid at the center is seen in the left ovary and an ovarian follicle is seen in the right ovary.



Photograph 2-5

Cystic corpus luteum (CCL)

Corpus luteum with a thick luteal layer that has processus and retains fluid at the center is seen in the right ovary and an ovarian follicle is seen in the left ovary.



Photograph 2-6 Coexistence of a gigantic ovarian follicle and corpus luteum (FCL)

A gigantic ovarian follicle undergoing regression to atresia and normal corpus luteum with processus are seen in the left ovary.



Chapter 3 Diagnostic method for reproductive disorder

Diagnostic methods for reproductive disorders in cows include external examination, vaginal examination, rectal palpation, ultrasonic examination as well as the determination of steroidal hormone levels in blood, bacteriological examination of the uterine content and endometrial biopsies. Of these, external examination, vaginal examination and rectal palpation are the most frequently used techniques when performing clinical examinations of a number of cows in the field. This chapter describes rectal palpation, which is the most commonly used a clinical setting.

3.1 Rectal palpation

Rectal palpation is the most widely used in making diagnoses of reproductive disorder in cows and pregnancy diagnosis. It is basic technique that will remain a main reproductive examination if a simple method of determining blood steroidal hormone levels in field and ultrasonic examination are introduced. However, since rectal palpation is a sensitive examination that relies on the sensation of the fingers, subjective views are likely to affect the result and difference in experience and sensation among individuals may lead to errors in the results. To eliminate this problem as much as possible to standardize technical levels and improve accuracy, the following points must be noted in performing rectal palpation.

First, the finding of the uterus, cervix, vagina and vulva are likely to be regarded low compared to a finding of an ovary showing dynamic changes, but these findings must be examined comprehensively. Thus, in this chapter, external examination, simple vaginal examination and internal examination are included in rectal palpation. Next, findings should be recorded in a unified format so that they can be shared among technicians.

3.1.1 Methods of rectal palpation

Prior to rectal palpation, sufficient information is obtained from farmers, including reproduction history of the sick cow, dates of conditions of delivery, history of perinatal period diseases, observations of estrus and insemination and treatment history.

Next, external examination is performed to check nutritional condition (BCS), hair, abnormalities in the hooves and feces as well as the presence/absence of spilled mucus on the floor or the body, shape of the labium and condition of labium mucosa.

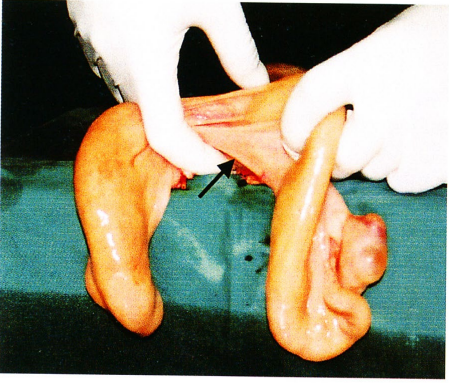

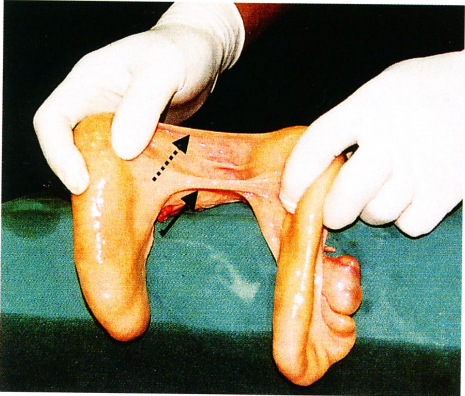

External examination must precede internal examination because findings external examination change to some degree after internal examination.

When inserting a hand, the arm must be kept in parallel to the rectum to avoid generating a sense of incongruity. The feces are removed from the rectum. Simply pulling the rectal wall will not be sufficient to relax the rectal wall so the rectal wall must be pushed with the hand inserted to the inner part of the rectum. This operation is repeated several times to relax the rectal wall sufficiently. The rod-shaped uterine cervix under the rectum is held and drawn near. With the hand moved forward, the uterine horns are held between the thumb and middle finger at the point where the horns separate, the forefinger is placed under the ventral ligamentum interconuale (photograph 3-1 (p. 43)) and the entire uterus is lifted into pelvic cavity (Photograph 3-2 (p. 43)) so that the uterus is turned over. The forefinger must be placed under the ventral and not dorsal ligamentum interconuale because the dorsal ligamentum interconuale is so thin that it might be torn (Photograph 3-3 (p. 43)). This method allows detailed palpation of the uterine horns and oviduct because only the hand is left in the rectum at the time of palpation so that rectal tenesmus is reduced. If holding the uterine horn between the thumb and middle finger is not possible, the hand is placed under the uterine horn on the same side as the hand, the hand is lightly held to lift, and turned over so that the end of the horn comes to the fore. The opposite horn, which is slightly lifted at this time point, is



lifted similarly and turned over. The uterus is lifted onto the pelvis and turned over. Detailed palpation is also possible with this method. Inability to lift the uterus by these methods indicates the possibility of adhesion of the uterus and broad ligament of the uterus.

Palpation of the uterus involves applying light pressure to the horn while holding it between the thumb and other fingers and sliding the thumb across the horn. Palpation is performed on both horns to see if there is any difference. The ovaries are also lifted into the pelvic cavity along with the uterus. Palpation of the ovaries is performed by holding and fixing the proper ligament of the ovary between the middle and ring fingers (Photograph 3-4) and pressing lightly with the thumb, forefinger and middle finger. The intensity of the pressure should be such that when a spoon held with the thumb and forefinger is shaken lightly it does not move. By doing this, the depth in the ovary (size) and hardness (softness, hardness) of the corpus luteum or fluctuation of ovarian follicles are palpable. If the pressure is too low distinguishing the corpus luteum from ovarian follicles may be difficult resulting in a misdiagnosis. However, the pressure should not be so high as to eliminate to corpus luteum or rupture the ovarian follicle.

	
<p>Photograph 3-1 Method of lifting the uterus The forefinger is placed under the ventral Ligamentum interconuale, which is at the point where the horns separate, and the entire uterus is lifted to this side. The arrow indicates the ventral ligamentum interconuale.</p>	<p>Photograph 3-2 Palpation of uterus The lifted uterus is held with the thumb and other finger as if to enclose it and is palpated.</p>
	
<p>Photograph 3-3 Points to note when lifting the uterus</p>	<p>Photograph 3-4 Palpation of the ovary</p>

<p>Ligamentum interconuale are divided into dorsal and ventral ligamentum interconuale. The dorsal ligamentum interconuale is thin and weak so it may rupture if the uterus is lifted by this portion. Thus, the finger must be placed under the ventral ligamentum interconuale. The arrow indicates the ventral ligamentum interconuale and the dotted arrow the dorsal ligamentum interconuale.</p>	<p>The proper ligament of the ovary is held with the middle and ring fingers and palpated with the thumb, forefinger and middle finger.</p>
--	---

3.1.2 Recording rectal palpation findings

(1) Properties of spilled mucus

An observation is made to see if mucus or blood is attached to the pubic hair, tail, hind legs or floor. The property spilled mucus is classed as 3 class of 1) watery, 2) sticky or 3) starchy. Spilled mucus in each class is examined for color degree of 1) transparency, 2) opacity and the presence/absence of purulent or bloody matter. Blood or pus may be present instead mucus. If purulent matter is present, vaginoscopy is performed with a vaginal speculum to examine If vaginitis, cervicitis or endometritis is present.

(2) Shapes of labium

The shape of labium is classified into four grades as shown in Figure 3-1. The shapes of labium is affected by estrogen (E_2) and progesterone (P_4) labium swell and relax, if estrogen is dominant, and tight, if progesterone is dominant. Thus labium is ①Loose and ②swollen during the estrous phase and is loose in the case of follicular cysts. It is ③contracted and ④tight during the luteal phase.

(Note) Zebu cattle and Buffalo are not as described this way. Therefore, this shape of labium is a reference degree.

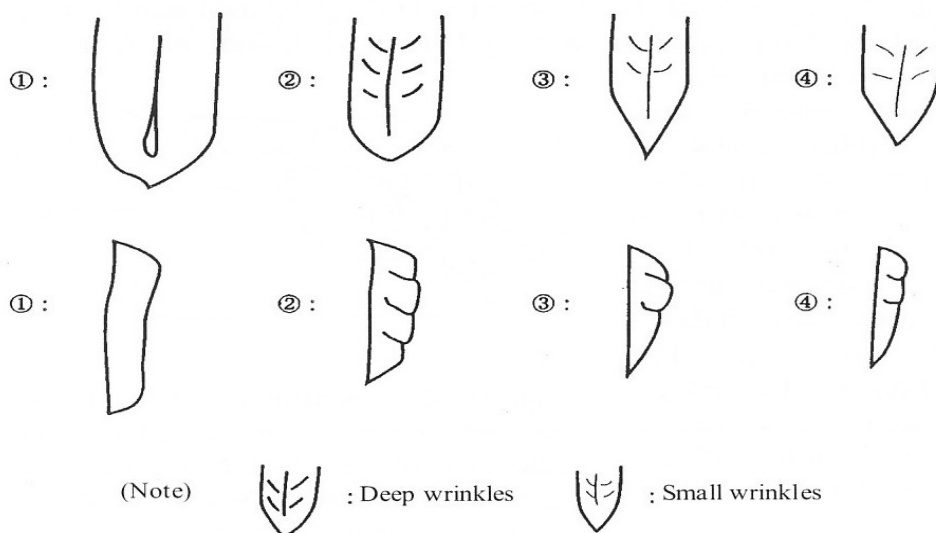


Figure 3-1 shape of labium

(3) Finding the labium mucous membrane

The labium is opened slightly with fingers and the labium mucous membrane is observed to see whether there is congestion or not and whether the mucosal surface is wet or dry. The labium mucous membrane is congested and moist when E_2 is dominant and is free from congestion and dry when P_4 dominant. Examination by a vaginoscope should be

performed as required because mucus, blood or pus can be detected in cows without sign of spilled mucus if the labium is opened.

(4) Finding in the Vagina

In normal condition the vaginal mucous membrane shows findings similar to those of the labium. If the vaginal mucous membrane has inflammation, however, it reddens and swells more than the labium and occasionally has abscesses. In general vaginitis, numerous millet-like tubercles 1-3 mm in diameter are present on the vaginal mucous membrane. Morphological abnormalities such as stricture and trabeculation are rarely present in the vagina. Vaginal examination may reveal a double external os of the cervix.

(5) Finding in the uterine cervix

The diameter of the cervix is measured at the point indicated by Δ in Figure. The size is generally 3-4 cm (intermediate) and may be expressed as larger (large) or smaller (small). The large size is often observed in the case of delayed uterine involution or cervicitis and the small size in the case of contraction due to hormonal abnormalities. The diametral size of the cervix is expressed in terms of finger width as compared to the forefinger. It can also be expressed in terms of centimeters.

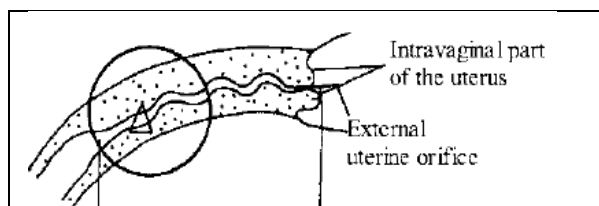


Figure 3-2 Location of the uterine cervix for palpation

(6) Finding the uterus

The uterine horns are examined at the part between * and ▲ as shown in Figure 3-3 for the size, shape, contraction and elasticity, thickness and internal condition and finding in the examination are recorded. Both of the right and left horns are examined. The size of the uterus is recorded in terms of finger width, by comparing with the forefinger, or to the nearest x cm. The uterus during the estrous phase is generally swollen and is 1.0-1.5 finger width in normal nulliparous cows and 1.5-2.5 finger widths in multiparous cows. The size during the luteal phase smaller than that during the estrous phase and is around 1.0 finger width and 1.5-2.0 finger widths, respectively. The uterine horns involute until both of them are the same size within 30-40 days of delivery. In some cows with dystocia, retention of fetal membrane and postpartum disease, however, the involution process tends to be slow and the right and left horns have different sizes

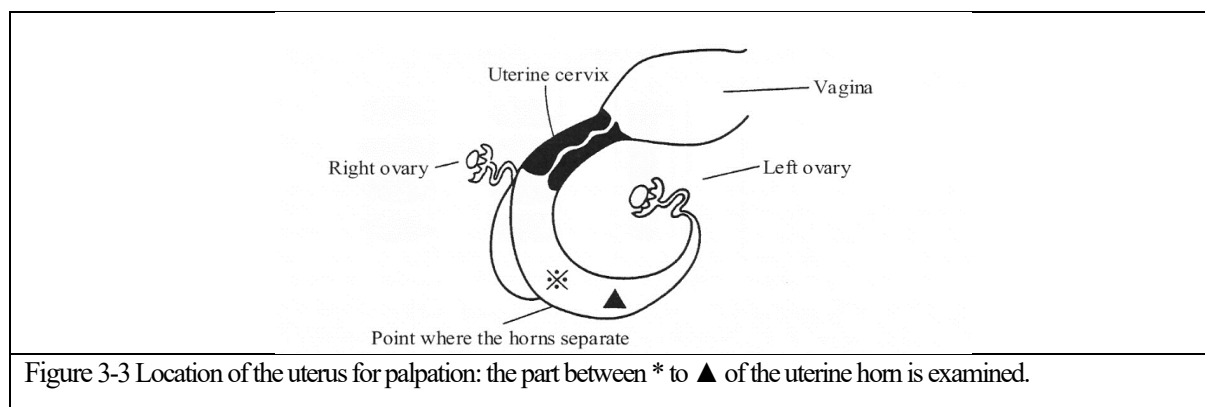
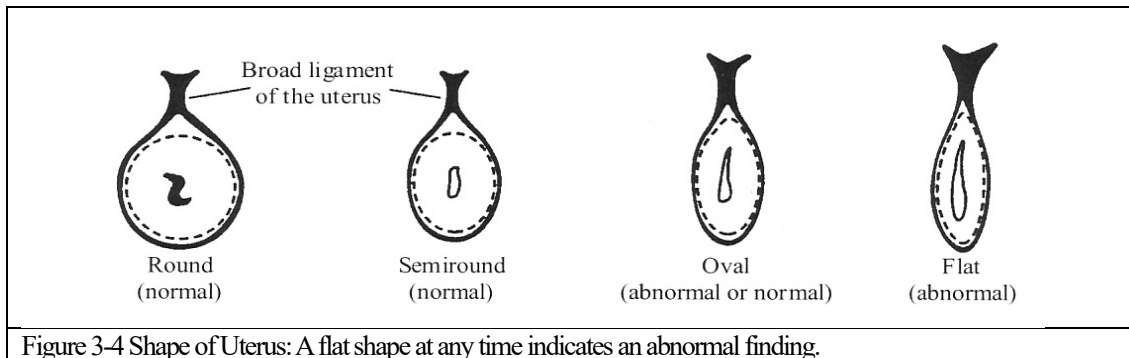


Figure 3-3 Location of the uterus for palpation: the part between * to ▲ of the uterine horn is examined.

(7) The shape of the uterus

The shape of the uterus is recorded according to the sectional shape of the uterine horns as shown in Figure 3-4. During the estrous phase, when the uterine cavity expands and the endometrium thickens, the shape is round or semiround in heifer and semiround in multiparous cows. During the luteal phase, the shape is semiround in heifer and semiround or oval in multiparous cows. A flat status is abnormal and is present in the case of ovarian quiescence and prolonged follicular cyst.



(8) The contraction and elasticity

The contraction and elasticity of the uterus is particularly strong during the estrous phase when secretion of estradiol (E_2) increases and secretion of P_4 decreases.

+++ : Rectal Palpation directly causes strong and continuous contraction of the uterus which feel like a round sausage.

++ : Rectal Palpation causes contraction but strong contraction does not continue.

+ : Rectal Palpation causes mild contraction and can identify the outline of the uterus.

± : Stimulation as strong as that caused by palpation does not induce contraction. Strong massage causes contraction of the uterus but it loosens as soon as stimulation is removed.

- : Strong massage does not cause contraction.

The rating for normal cows during proestrus is from +++ and the contraction will gradually become intermittent during postestrus. The rating is normally + during the luteal phase. Contraction finding and elasticity finding are almost the same.

(9) The thickness

The thickness of the uterus represents the thickness of the uterine wall (the thickness from the perimetrium to endometrium) and is recorded according to Figure 3-5. The rating of ++ is normal during the estrous phase and the rating of + during the luteal phase. The rating of ++ during the luteal phase suggests acute uteritis or luteal hypo function. The rating of - is abnormal whether during the estrous or luteal phase.

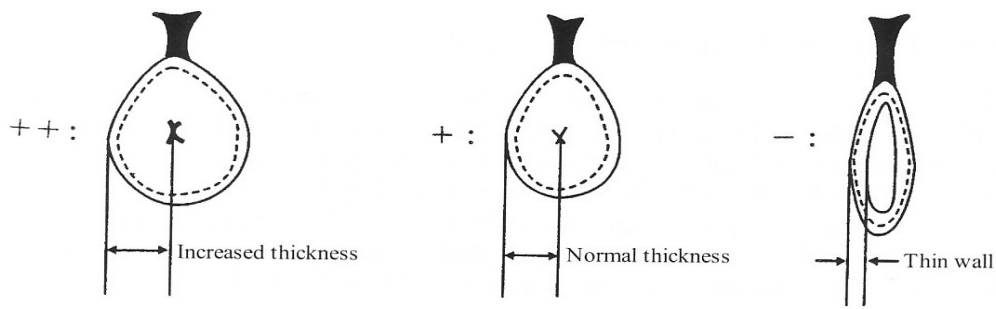


Figure 3-5 Thickness of the uterus

++; the uterus look like an edema and thickens and swells during the estrous phase when progesterone levels decrease and estrogen levels increase.

+; a normal state of the luteal phase of a cow receiving a sufficient effect of progestogen.

-; A condition during estrous and luteal phases in which the uterus is weak and thin is abnormal. This condition occurs in the cases of prolonged endometritis and follicular cysts. However, care must be taken because the pregnant horn 30-45 days after insemination is also thin.

(10) The internal condition

The internal condition of the uterus are recorded according to figure 3-6. Internal condition include fluctuating of sticky retained fluids (mucus, pus, etc), a dead fetus, fetal membrane and fetal fluid. The rating of normal cows during the proestrus is + due to the retention of watery secretion but the rating is - is during other periods.

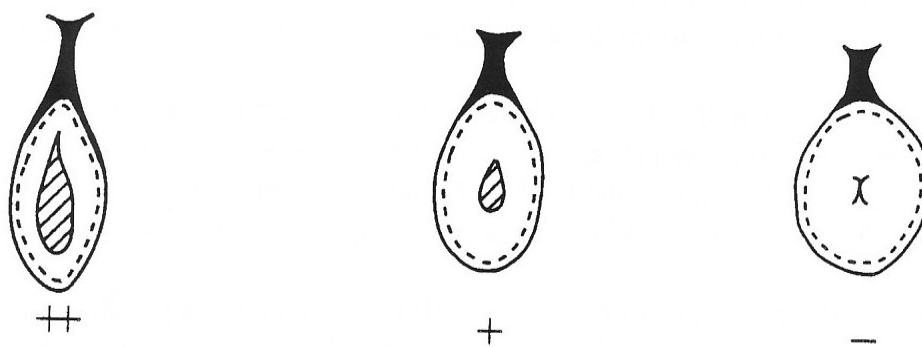


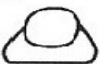





Figure 3-6 Internal condition of the uterus:









Note: The part from * to ▲ of Figure 3-4 (P.48) is examined. Otherwise the retained matter is not palpate.

(11) Finding the ovaries

The ovaries are examined mainly for major follicles, the corpus luteum, indurated parts and other important findings and the results are visualized by means of, for instance, illustration. The illustration does not need to be realistic but may be simplified as long as it is understandable.

As a general rule, the shape of the ovary expressed as a section plane on the long axis of the ovary by placing ovaries such that either the mesovarium edge is at bottom and the proper ligament of ovary is inside or the mesovarium edge is vertical and the both proper ligament of ovary is at the bottom. Finding in the examination of follicles, the corpus luteum and the indurated parts of ovaries induration are recorded according to Figure 3-7.

< Ovary in the estrous phase >	
<p>① </p> <p>② </p> <p>③ </p>	<p>1) Part of the estrous follicle protrudes from the ovary.</p> <p>2) Regressed corpus luteum is painted black all over. The process must be indicate as well.</p> <p>3) Confirm the ovulation are by pressing on it lightly with the finger tips and mark it with a wedge mark. Make sure to confirm the regressed corpus luteum in painted black all over to be recorded.</p>
<Ovary in the luteal phase> Corpus luteum on days 3-5	
<p>① </p> <p>② </p> <p>③ </p>	<p>1) Confirm the new corpus luteum by pressing on it tightly with the fingers. Enter two oblique lines in the corpus luteum of this stage. Make sure that the regressed corpus luteum is painted black all over to be recorded.</p> <p>2) If the presence of fluid in the luteal cavity is confirmed, the corpus luteum is illustrated as shown in 2). A broken corpus luteum is illustrated as shown in 3).</p>

<p><Ovary in the luteal phase> Corpus luteum and follicles on days 6-15</p>	
<p>① </p> <p>② </p> <p>③ </p> <p>④ </p> <p>⑤ </p>	<p>1) The corpus luteum is examined by pressure palpation for fragility, hardness and the presence/ absence of internal fluid. A fragile corpus luteum is marked with a few oblique lines and a solid corpus luteum is marked with oblique lines that increases as the solidity increases. If the corpus luteum is broke, a line is entered that shows the breakage.</p> <p>2) If the presence of fluid in the luteal cavity confirm (Cystic corpus luteum), the severity is illustrated as shown in 2.</p> <p>3) If the process of a corpus luteum that is palpable on days 12-15 is coated with the epithelium superficial, draw the outline of the ovary up to the as shown in 4). The shape of the process is drawn as accurately as possible.</p> <p>5) Enter oblique line more densely in a hard corpus luteum. If follicles coexistent with the corpus luteum are palpated, determine the size, Phase and number of the follicles and whether they are dominant or subdominant follicles, and illustrate them inside the outline of the ovary as shown in 1) - 5).</p>
<p><Ovary in luteal phase> Corpus luteum on days 16-19</p>	
<p>① </p> <p>② </p> <p>③ </p>	<p>1) The sign of luteolysis is identified by palpating the process of the corpus luteum. The process with palpable hardness is painted black all over.</p> <p>2) The inside of a corpus luteum that feels hard all over because of advanced regression is drawn with oblique crosslines.</p> <p>3) A suspected next-time estrous follicle is illustrated as shown in 3). The inside of the regressed and hard corpus luteum is densely drawn with oblique crosslines.</p>










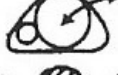

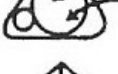

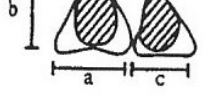
<Other Ovaries>		
<p>① </p> <p>② </p> <p>③ </p> <p>④ </p> <p>⑤ </p> <p>⑥ </p> <p>⑦ </p> <p>⑧ </p>	<p>1) Follicles other than estrous follicles are drawn inside the outline of the ovary as shown in 1) and 2) if they look protruding.</p> <p>3) Abnormal follicles such as follicular cysts are drawn inside the outline of the ovary.</p> <p>4) The outline of a follicle with a thick membrane is drawn thick.</p> <p>5) If a luteal cyst is suspected and confirmed by removal of the internal fluid and perforation, mark it with an arrow. It must be distinguished from a cystic corpus luteum with a process.</p> <p>6) The indurated part is painted black all over.</p> <p>7) An ovary with no clearly palpable follicles or corpus luteum is illustrated as shown in 7).</p> <p>8) Palpable abnormalities on or near the oviduct are illustrated as shown in 8).</p>	
[Symbols]		
<p>① </p> <p>② </p> <p>③ </p> <p>④ </p> <p>⑤ </p> <p>⑥ </p>	<p>1) A follicle was ruptured by finger during palpation.</p> <p>2) Internal fluid was removed by perforation.</p> <p>3) The corpus luteum fell or dropped during palpation.</p> <p>4) Internal fluid was removed by perforation and aspiration and a drug was injected into the follicular cavity.</p> <p>5) Insemination (mating)</p> <p>6) The size of the ovary: Expressed as a (long axis) x b (height) x c (thickness) and recorded to the nearest x mm by comparing with the thumb.</p>	

Figure 3-7 Recording ovarian findings

(12) Record Sheet for rectal Palpation

The record sheet we use in the rectal palpation is like the one in Figure 3-7. All information from farmers and finding in the ovaries must be entered. The sheet is devised to avoid entering omissions by adopting a system in which the appropriate answer is circled for items from the properties of spilled fluid to uterine finding. By analyzing rectal palpation



finding comprehensively, estimating time in the estrous cycle is possible. Thus the expected date of the next estrus can be indicated. By trying to follow this process, more sophisticated rectal palpation will be possible.



Record sheet of PSLD for rectal palpation				The project on Sustainable Livestock Development for Rural Sindh "PSLD"				Front	
ID Number:		Name of Farmer:		Species		Name of Animal or Proper Number		Date of Birth	
Parity No.		Parturition condition:		Retained placenta:		History:			
Number of service (MN or AI)		Date of Last service (MN or AI)		Current milk yield:		Information from Farmer:			
				Kg					
Date:				Uterus				Left	Right
Spilled mucus		Size: 1.0 1.5 2.0 2.5 3.0							
Absent Clear Purulent Bloody Watery		3.5 More than 3.5							
Little sticky Scurvy		Form sharp:							
External vulva		Round Semiround Oval Flat							
Form of shape: Loose Swollen Contracted Tight		Contraction: +++ ++ + ± -							
Mucosa of Labium and vaginal		Thickness: ++ + -							
Congested ++ + - Wet Semi-wet Dry		Internal condition: ++ + -							
Cervix		Abnormalities in leg: Normal Present							
Size: 1.0 1.5 2.0 2.5 3.0 3.5 More than 3.5									
B.C.S: 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0		Abnormalities in leg: Normal Present							
Treatment and instructions:									
Date:				Uterus				Left	Right
Spilled mucus		Size: 1.0 1.5 2.0 2.5 3.0							
Absent Clear Purulent Bloody Watery		3.5 More than 3.5							
Little sticky Scurvy		Form sharp:							
External vulva		Round Semiround Oval Flat							
Form of shape: Loose Swollen Contracted Tight		Contraction: +++ ++ + ± -							
Mucosa of Labium and vaginal		Thickness: ++ + -							
Congested ++ + - Wet Semi-wet Dry		Internal condition: ++ + -							
Cervix		Abnormalities in leg: Normal Present							
Size: 1.0 1.5 2.0 2.5 3.0 3.5 More than 3.5									
B.C.S: 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0		Abnormalities in leg: Normal Present							
Treatment and instructions:									

Figure 3-8 Record Sheet for rectal Palpation (Front)



Record sheet of PSLD for rectal palpation				The project on Sustainable Livestock Development for Rural Sindh "PSLD"	Back
ID Number	Date of Diagnosis	Name of Farmer	Species	Name of Animal or Proper Number	Date of Birth
Date:					
Spilled mucus		Uterus			
Absent	Clear	Purulent	Bloody	Watery	Size: 1.0 1.5 2.0 2.5 3.0
Little sticky	Sterchy	3.5 More than 3.5			
External vulva		Form sharp:			
Mucosa of Labium and vaginal		Round Semicircular Oval Flat			
Congested ++ + - Wet Semi-wet Dry		Contractions: +++ ++ + ± -			
Cervix		Thickness: ++ + -			
Size: 1.0 1.5 2.0 2.5 3.0 3.5 More than 3.5		Internal conditions ++ + -			
B.C.S: 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0		Abnormalities in leg: Normal Present			
Treatment and instructions:					
Date:					
Spilled mucus		Uterus			
Absent	Clear	Purulent	Bloody	Watery	Size: 1.0 1.5 2.0 2.5 3.0
Little sticky	Sterchy	3.5 More than 3.5			
External vulva		Form sharp:			
Mucosa of Labium and vaginal		Round Semicircular Oval Flat			
Congested ++ + - Wet Semi-wet Dry		Contractions: +++ ++ + ± -			
Cervix		Thickness: ++ + -			
Size: 1.0 1.5 2.0 2.5 3.0 3.5 More than 3.5		Internal conditions ++ + -			
B.C.S: 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0		Abnormalities in leg: Normal Present			
Treatment and instructions:					
Left		Ovary		Right	
Left		Ovary		Right	

Figure 3-9 Record Sheet for rectal Palpation (Back)

3.1.3 Basic diagram of estrus cycle

Diagram below shows estrus cycle of an ovary. Practice on drawing estrous condition properly like in this diagram.

Estrous cycle		First pattern	Second pattern	
		Case that follicle is found in one ovary and Regressed corpus luteum is found in the other ovary	Case that both follicle and regressed corpus luteum are found in one ovary	
Estrous phase	Estrous			
	Ovulation			
Luteal phase	Days 3~6 (New corpus luteum)			
	7~15 days			
	16~19 days (Regressed corpus luteum)	(1)		
		(2)		
		(3)		

Figure 3-10 Basic diagram of estrus cycle

Source Tominaga (2018)



3.1.4 Pregnancy diagnosis by rectal palpation

Pregnancy diagnosis is the most important technique of reproductive examination and require the most careful attention of technician. Early and accurate pregnancy diagnosis provides an effective means of performing breeding management for farmers.

A cow undergoing conception show the process as indicated in Table 3-1 and diagnosis of pregnancy by rectal palpation is possible from 30 days after insemination. Diagnosis is quite easy from 35 days after insemination if the uterus is turned over and the uterine horn can be palpated up to its end.

The pregnant horn swells and the uterine wall at the swelling point thin in the days from 30 days after insemination. Fluctuation due to fetal fluid, the fetal membrane and the vasa that develop into the fetal membrane can be palpated at the swelling point.

Pregnancy diagnosis involves holding the swelling part of the horn with the thumb and forefinger, applying low pressure two or three times to examine whether fluctuation is present, closing the finger lightly and sliding them across the horn and confirming the fetal membrane and thread-like vasa that develop into the fetal membrane.

The size of the pregnant horn in 2.0-2.5 finger widths 30 days after insemination, 2.5-3.0 finger width 35 days and 3.5 finger widths 40 days after insemination. The non- Pregnant horn also swells around 40 days after insemination. The labium and cervical canal contract and soft and large corpus luteum is present in the ovary on the same side as pregnant horn.

Table 3-1 Change in the findings in the ovaries, uterus and so forth from insemination to the 35th day of pregnancy

	Estrus (insemination)	After 10 days	After 18 days	After 21 days	After 26 days	After 35 days
Ovary						
Uterus	Size	1.5 to 2.0	1.0 to 2.0	1.0 to 2.0	1.0 to 2.0	Pregnant horn 1.5 to 2.0
	Shape	Round	Round to semiround	Round to semiround	Round to semiround	Round to semiround
	Contraction and Elasticity	++ to +++	+	+	+	+
	Thickness	++ to +++	+	+	+	+
	Internal condition	+	-	-	-	Fetal fluid + (fluctuation)	Fetal fluid ++ Vasa +
Cervical canal	Open	Contracted	Contracted	Contracted	Contracted	Contracted
Vaginal mucosa	Wet	Dry	Dry	Dry	Dry	Dry
Labium	Swollen	Contracted	Contracted	Contracted	Contracted	Contracted

If rectal palpation 30-40 days after insemination reveals that the corpus luteum is present in both of the ovaries, both the uterine horns swell to the same extent and the fetal membrane and vasa that develop into the fetal membrane are palpable, twin pregnancy indicated.

If swelling of the uterus is 2-3 days delayed or the corpus luteum is small and hard or the labium cervix are loosened, an hCG or P₄ preparation should be administrated and reexamination performed because embryonic death or abortion is likely. The disease likely to be mistaken for pregnancy finding include pyometra and mucometra. Differential diagnosis for distinguishing these disease is shown in Table 3-2.



Table 3-2 Difference in uterine finding from rectal palpation among the cases of pregnancy, pyometra and mucometra

	Pregnancy	Pyometra	Mucometra
Size of the horn	Asymmetric except in the case of twin pregnancy	Symmetric in many cases	Symmetric or asymmetric
Contraction	Observable until the 3 rd month of pregnancy	Weak	Absent
Thickness	Present in location, other than swollen part, which is thinned.	Present or absent	Absent
Endometrium	Flat. Rough at 70 days of gestation onwards because of growth of caruncles	Coarse textured	Flat
Fetal membrane and vasa that develop into feta membrane	At 30 days of gestation onwards	Absent	Absent
Medium uterine artery	Develops on the pregnant horn side and shows clear pulsation at 3 month of gestation onwards	Does not develop and is of the same size on both sides	Does not develop and is of the same size on both sides

An accurate diagnosis is made 30-45 days after insemination by the presence of the fetal membrane and vasa that develop into the fetal membrane. All technicians must master this skills.

3.2. Ultrasonic Examination

Like rectal palpation, ultrasonic examination is advantageous in that it can be performed on the same subject without invading living tissues. Unlike rectal palpation findings, the images generated are objective, which is the greatest advantage of ultrasonic examination. The method is especially useful when the ovaries and uterus cannot be examined by rectal palpation because of obesity. However, the difference in the hardness of the corpus luteum in the ovary and elasticity of the uterus, which can be felt by rectal palpation, are difficult to evaluate by this method. It also takes longer to obtain images for use in diagnosis than for rectal palpation so examining a number of subjects on the same occasion is difficult.

3.2.1. Advantage and Disadvantage of the Ultrasonic Examination

The advantages and disadvantages mentioned fallow must be considered when performing ultrasonic examination as used in reproduction examination.

(1) Advantage

- 1) Like rectal palpation, ultrasonic examination is advantageous in that it can be performed on the same subject without invading living tissues. It is also many times repeatedly.
- 2) Unlike rectal palpation findings, the images generated are objective, which is the greatest advantage of ultrasonic examination.
- 3) The method is especially useful when the ovaries and uterus cannot be examined by rectal palpation because of obesity.




(2) Disadvantage

- 1) The difference in the hardness of the corpus luteum in the ovary and elasticity of the uterus, which can be felt by rectal palpation, are difficult to evaluate by this method.
- 2) It also takes longer to obtain images for use in diagnosis than for rectal palpation.
- 3) The examining a number of animals on the same occasion is difficult.

3.2.2 Ultrasonograph

Mobility is an important factor in performing ultrasonic examination of cows in the clinical setting. The equipment must be compact so a portable type of ultrasonograph is often used. A knapsack type of ultrasonograph has been developed recently and its mobility is improved.

Many types of probes are available varying depending on the frequency, scanning system and shape. Ultrasonic examination as used in reproduction examination is performed via the rectum so a small-size probe of the linear or convex type with a frequency of 5 MHz or 7.5 MHz is suitable.

	<p>FHK company Model HS-101V for cattle Probe: Small linear type</p>
<p>Photograph 3-5 Knapsack type of Ultrasonograph</p>	

3.2.3 Examination methods

- 1) A cow to be examined is retained in some facility.
- 2) The tail fixed to the body.
- 3) The feces in the rectum are removed.
- 4) The rectal wall is sufficiently relaxed.
- 5) A probe is inserted into the rectum and pressed on the rectal wall to visualize the cervix, uterus and ovaries.
- 6) The reproductive organs are kept as is during examination.
- 7) (When the cross section of the uterine horn is examined, however, the uterus is turned over as in rectal palpation to obtain satisfactory images.)
- 8) When visualizing the ovaries, rectal palpation is performed before hand to obtain ovarian findings. Based on these findings, the probe is operated along the long axis of the ovary such that the image of the corpus luteum and follicles are maximized.

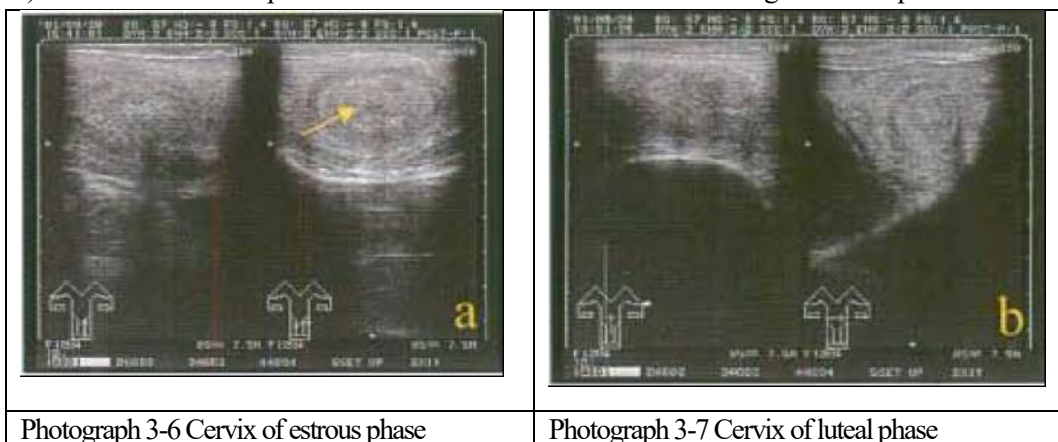
3.2.4. Findings in ultrasonic examination

- Reading ultrasonographic images requires skills like other diagnostic imaging methods.
- One must be familiar with the images of normal reproductive organs before attempting to examine whether there are abnormalities in images.

(1) Findings in the normal estrous cycle

1) Uterine cervix

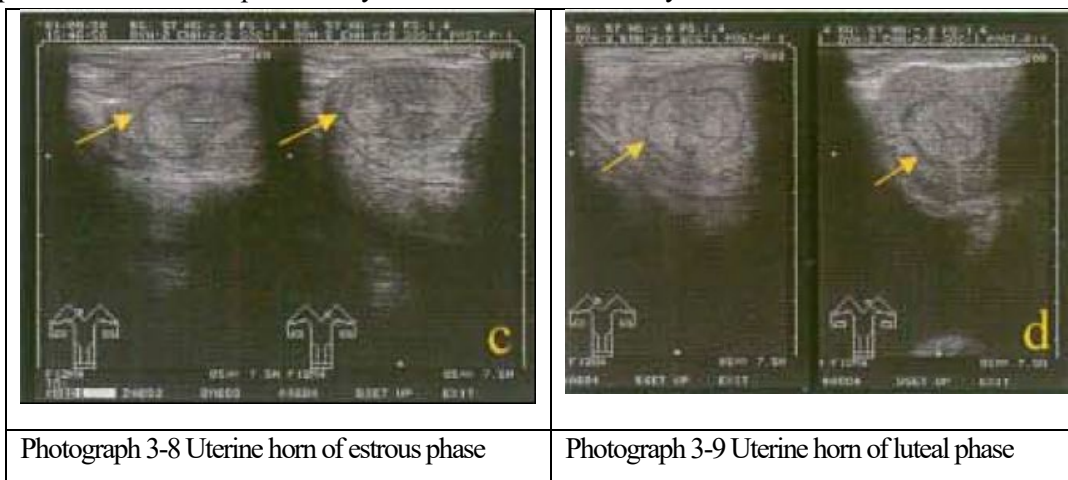
The vertical section image of the cervix is rectangular and the plicae circularis is echogenic (photograph 3-6 and 3-7). The lower part of the cervix is sometimes undulated during the luteal phase. This indicates a condition in which the cervix is contracted by the effect of P₄. The cervix is thicker during the estrous phase compared to the luteal phase and the lower part appears linear. An echo-free line resulting from retention of mucus is present in the cervix of the estrous phase. The circular muscle layer appears as slightly echogenic circle in a cross sectional image of the cervix (on the right of photograph 3-6 and 3-7). The echo free central part of the cervical canal is often visualized during the estrous phase.



[The cervix is thicker and the circular muscle layer is larger during the estrous phase (a) than the luteal phase (b)]

2) Uterus

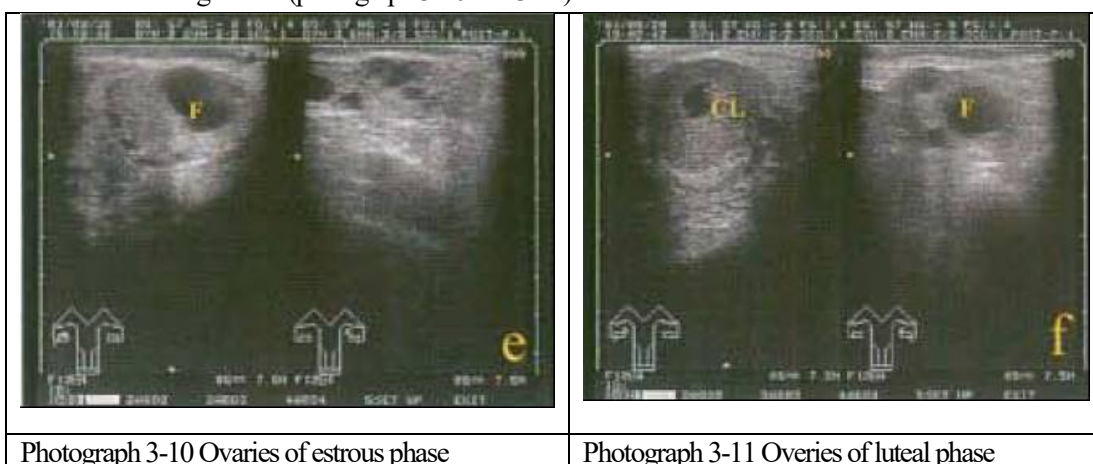
Because the uterine body is short, ultrasonic examination of the uterus focuses on the uterine horns. Vertical sectional imaging of the horn shows a long-curved image. However, the shape varies depending on the location of the uterus so comparing images directly is difficult. On the other hand, cross sectional imaging shows a round or elliptical image with a slightly echogenic elliptical layer (circular muscle layer) at the center of the uterine wall (photograph 3-8 and 3-9). Thus comparing individual images is easier with cross section than vertical sections. During the estrous phase, the uterine cavity often, appears as an echo-free expanded body due to the retention of watery secretion.



[The cross section of the uterine horn reveals an expanded circular muscle layer in the estrous phase (c) compared to the luteal phase (d) as in the cervix.]

3) Ovary

- a. Ultrasonic images of the ovary distinguish follicles, corpus luteum and stroma of ovary.
- b. Follicle appear as echo-free circular images because of the presence of follicular fluid.
- c. Those immediately prior to ovulation may appear as elliptic images.
- d. Follicles 2-3 mm in diameter or longer can be identified although it depends on the equipment (frequency of the probe) used.
- e. The corpus luteum appears as a slightly echogenic homogeneous image. Cystic corpus luteum is often viewed even during the normal estrous cycle. An ultrasonic image shows an echo-free portion within slightly echogenic corpus luteum.
- f. The stroma of the ovary is more echogenic than the corpus luteum. Its out line may not be well defined because of the surrounding tissues (photograph 3-10 and 3-11).



[This indicates thickening of the endometrium. Within the ovaries (e and f) the follicle (f) is echo-free and the corpus luteum (CL) is slightly echogenic. A small amount of echo-free fluid is retained in the cavity of CL in the right picture.]

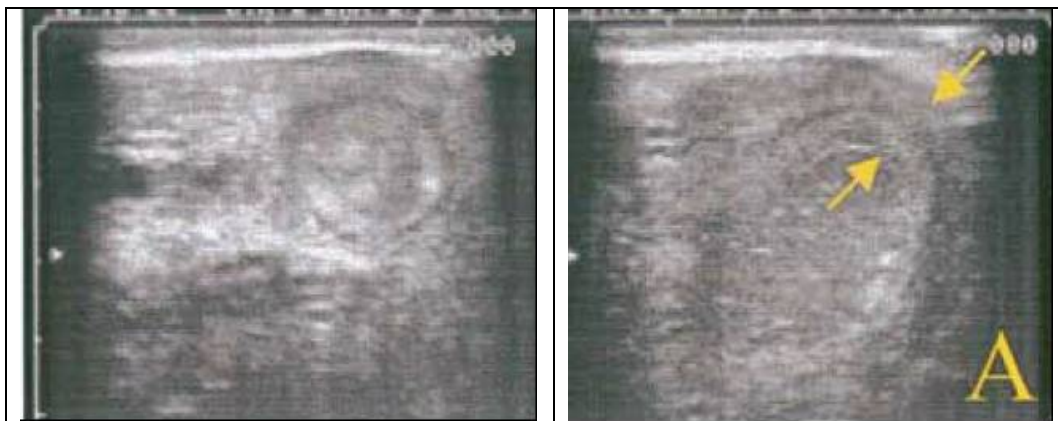
(2) Abnormal findings

1) Uterine cervix

- a. Ultrasonography rarely reveals malformation in the cervix but usually discloses, if any, acquired cervical cysts secondary to injuries and tears.
- b. This refers to a retention cyst of the cervical mucosa and appears as an echo-free circle 1-5 cm in diameter. Cervical abscesses resulting from injuries and tears are echogenic.
- c. Thus, ultrasonography distinguishes between cysts and abscesses of the cervix.

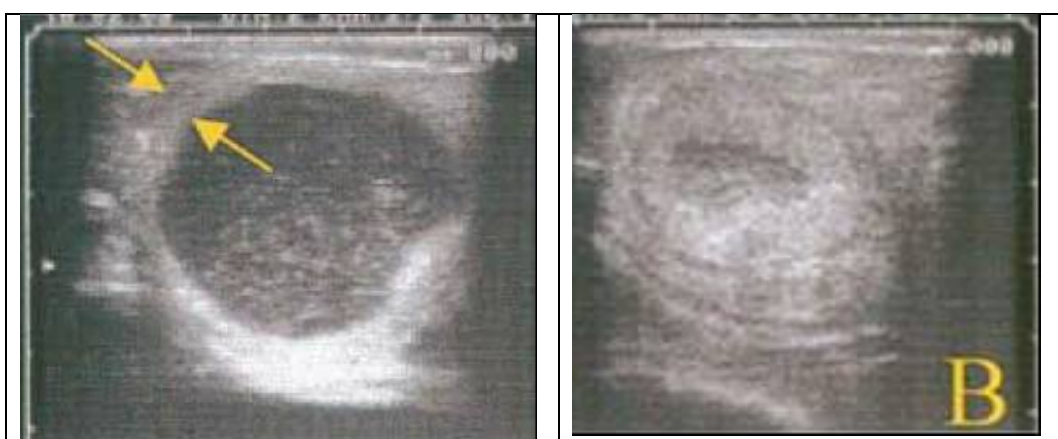
2) Uterus

Abnormalities in the uterus can be identified by ultrasonography only when there is abnormal retained matter in the uterine cavity such as when pyometra or mucometra is present. With pyometra, the uterine cavity is dilated and heterogeneously echogenic. The uterine wall either is or is not thickened. The endometrial surface may be irregular and ill defined. With mucometra, the uterine cavity is dilated as in pyometra but is echo-free. The uterine wall is thin and the endometrial surface is well defined (fallow photograph)



Photograph 3-12 Left and right of pyometra

[In the case of pyometra, the uterine lumen is echogenic and its boundary is ill defined. The uterine wall is not thinned in this case.]



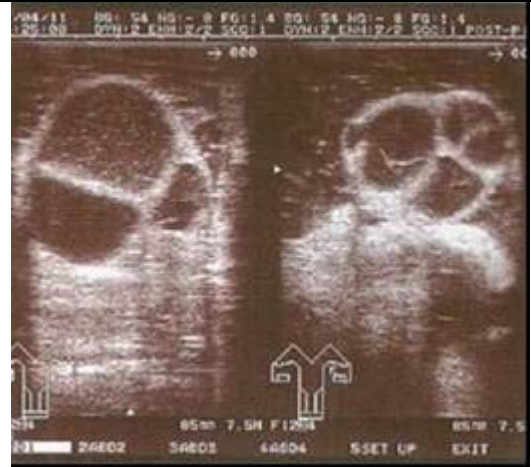
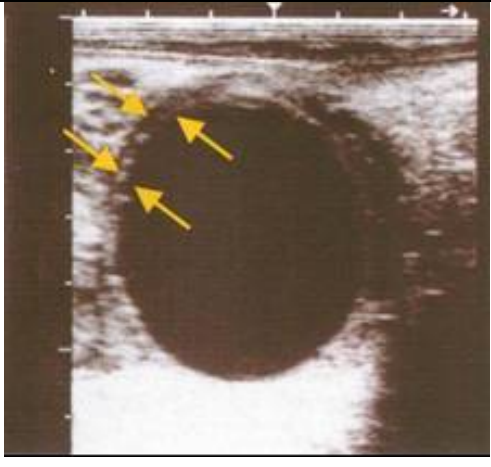
Photograph 3-13 Left and right of mucometra

[In the case of mucometra, the uterine lumen is mostly echo-free and minute echogenic particules are suspended in it. The uterine wall is thinned. In any case, care must be taken not to confuse it with pregnancy. The space between the arrows indicates the thickness of the uterine wall.]

3). Ovary

Follicular cysts are most easily identified by ultrasonography. Ovarian cysts are classified into follicular cyst and luteal cysts. Distinguishing a luteal cyst from a cystic corpus luteum is difficult but distinguishing a follicular cyst is possible with ultrasonography.

A follicular cyst appears as an echo-free circle within an echogenic theca folliculi with multiple follicular cysts, central part is deformed as seen in photograph 3-14. Follicles are separated by echogenic septa. In contrast, the surrounding part of a luteal cyst and cystic corpus luteum appears as a slightly echogenic layer because of the presence of a layer of luteal cells. The inside is echo-free because of the retention of fluid (photograph 3-15). A luteal cyst is circular like a follicle because of the lack of ovulation but a cystic corpus luteum is often elliptical or vase-shaped because of ovulation.

	
<p>Photograph 3-14 Follicular cyst (7.5 MHz)</p> <p>Multiple follicles are present in the right and left ovaries. The theca follicle and the septum between follicles is echogenic. As seen in the picture, follicles appear as a semiround or sectorial shape if the ovary consists of many structure.</p>	<p>Photograph 3-15 Luteal cyst (5 MHz)</p> <p>The cavity is large and echo-free, similar to a follicular cyst. It is surrounded by a slightly echogenic luteal zone, which distinguishes it from a follicular cyst.</p>

(3) Pregnancy Diagnosis by ultrasonic imaging

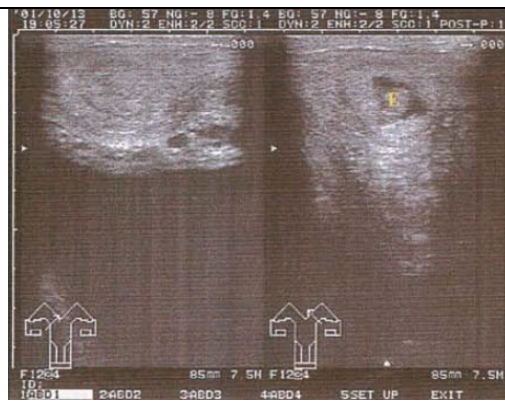
Many researchers reported that, in pregnant cows, vertical section of the uterine horn obtained by ultrasonography revealed echo-free thread-like images within the cavity of the pregnant horn from 15 days after insemination and these images increased to 2-3 mm by 20 days after insemination (photograph 3-16) and continued to grow until an embryo was seen. They also indicated however, that diagnosing pregnancy from these echo-free images in the uterine cavity 25 days after insemination or earlier is difficult because of the difficulty in distinguishing watery secretion at the time of estrus from the pathogenic fluid retained in the uterus. Because pregnancy diagnosis requires accuracy, as described in the section of rectal palpation, ultrasonography for pregnancy diagnosis should be performed 25 days after mating service or later.

Photographs 3-17 shows a cross section of the pregnant horn 28 days after insemination. The uterine cavity is about 2 cm in diameter and contains an embryo (E). At the time of examination, but not in the still picture, the beating of the heart can be observed on a real time basis. Improvements in diagnostic ultrasonographic techniques and equipment are expected to enable early and accurate diagnosis. However, confirming the continuance of pregnancy is necessary after early pregnancy diagnosis.



Photograph 3-16 The horn on the 20th day of pregnancy (7.5 MHz)

Echo-free image 2-3 mm in diameter are present in the lumen of the right horn that are related to the retention of fetal fluid. There are no changes in the lumen of the left horn. Diagnosing pregnancy from only these findings is difficult. The arrow indicates fetal fluid in the uterine cavity.



Photograph 3-17 The horn on the 28th day of pregnancy (7.5 MHz)

The uterine cavity, which is echo-free, is dilated due to the retention of fetal fluid. An embryo (E) is present. By the stage, minute changes in the image accompanying heartbeats are confirmable during the ultrasonographic process. Thus, confirming pregnancy is possible at this stage.



Chapter 4 Guidelines for the control of reproductive disorder

As long as there is a chance of insemination, female livestock generally repeat pregnancy/ delivery according to their species-specific reproductive characteristic unless there are abnormalities in the ovarian function and accessory reproductive organs. A condition in which reproduction is temporary or persistently prevented and suspended from any cause is generically referred to as a reproductive disorder.

Cause include feeding and management factors such as the environment of cow sheds and feed used, management factors such as herd size and milking volume, personal factors of individual farmers such as operation ability, management ability and observation ability, obstetric factor such sterility, abortion, premature and still birth and dystocia and insemination factors such as the identification of estrous sign, management of semen and artificial insemination method. Thus causes should be identified according to individual farmer to enable them to remove or improve the cause of reproductive disorder and achieve stable breeding performance.

This chapter provides field guidelines in managing reproductive disorder of dairy cattle for farmer, inseminators and veterinarians.

4.1 Technical guidance for farmers

To maintain high lactation and continuous calving and achieve high productivity and stable management, one delivery per year should be pursued. To achieve one delivery per year, insemination must be performed at 60-90 days after calving. To that end, identifying estrous after calving is significant in stock farming and improving conception rates. As dairy cattle have been improved, there has been a dramatic improvement in milk performance. These herds do not necessarily show clear estrous signs during the period from 60-90 days after calving because this period corresponds to the lactation peak. Thus, detecting estrus is difficult. Farmers must pay the utmost attention to identify estrus at this stage since it is the basic of stock farming. The following are major points in detecting estrus.

4.1.1 Detection of estrus

Sexual behavior of female livestock in the estrus stage is known in Table 4-1. There are differences among species. Here, a detailed description of sexual behavior in cattle is presented. A cow herd continuously fed in cow sheds tends to keep standing when normal cows are lying, approach adjacent cows in an unnatural manner, come close to a person in front of them, have decreased (of increased) milk yield and have decreased appetite and considerably shorter rumination periods. The vulva is swollen and the pudendal mucosa is congested. Sticky mucus is excreted from the vulva in the proestrus stage and mucus becomes fluid as estrus advances. It is watery at the estrus peak and sperm receptivity is the highest at this stage.



Table 4-1 Sexual behavior (estrous sign) in female livestock

Behavior	Cattle	Sheep	Goat	Horse
Smelling	Smelling the body and genital region of male animals.			
Urination	Frequent urination during teasing by male, pollakiuria is not an estrus sign in sheep but is characteristic of the condition accepting males in the horses.			
Crying	Normal but frequent cries			?
Exercise	Motility is generally increased. Smelling the genital region of males, females face the opposite direction to males and make a round movement			
	Mount Other female	Wag the tail. Do not mount	Mount other female	Do not mount
Posture	Stand still while males court			Open and close the pudendal lips to expose the clitoris (lightening). Open the hind legs, bend the hip lift the tail
	Turn the head backward and lift and bend the tail			
Response after mating	Bend the back and lift the tail high	None	None	None

Source Partially revised from Hafez, 1987

Estrus is a state in which a cow stands still and allows other cattle to mount it. The acts of pursuing and mounting other cattle usually last several days around estrus. Many cows in their late pregnancy period pursue and mount other estrous cows frequently. Thus, these act serve as signs for identifying estrus but are not decisive.

Table 4-2 Behavior in bovine estrous cycle

Division	Estrous cow	Non-estrous cow
Number of cows	7	7
No. of times of mounting/ hr	2-14 (9.6)	0-2 (0.4)
No. of times of being mounted/ hr	17-44 (29.6)	0-1 (0.2)
Number of steps/ hr	862-1821 (1279.4)	186-658 (313)

Source: Miyake 1996

Note: values in the parenthesis represent the means

The sexual behavior of an estrous cow is known to be more active in the morning than in the afternoon. A report shows that estrus mostly begins during the period from midnight to 6 AM and less frequently in the afternoon. The acts of standing still and allowing other cows to mount are important clues for detecting estrus when they are having exercise in the paddock or when they are raised in free stalls.

In tethered cows under drylot feeding, the presence of estrous mucus either attached to the tail or public hair or on the stall or feces in early morning often indicates. The results of a survey of the means used to detect estrus in 1,513 inseminated Holsteins in Chiba are shown in Table 4-3.

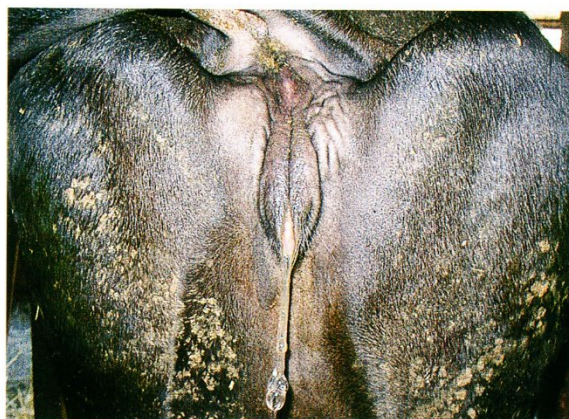
Table 4-3 Means of detecting estrus (Holsteins)

	Total	Conceived
Animal number heads	1,513	945
Total number of A.I.	4,227	1,635
Mucus	35.8%	34.5%
Vulva	21.9%	21.7%
Mounting	16.3%	17.2%
Behavior	13.9%	14.4%
Roar	9.0%	9.4%
Others	2.4%	3.1%

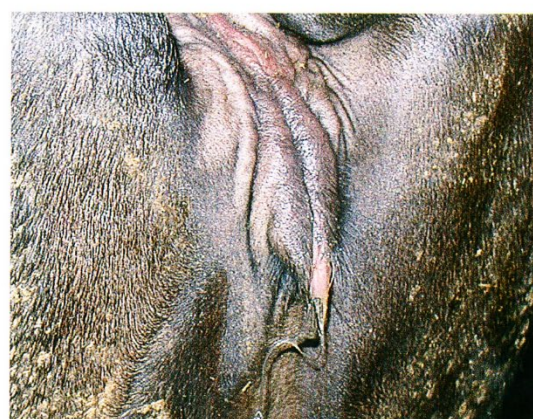
Source Chiba prefectural Mutual Insurance Federation of Agriculture Cooperatives (1977)

Estrus was detected by the presence of mucus in 35.8% of the cases, by swelling of the vulva in 21.9% of the cases and by mounting behavior in 16.3%.

Estrus estrous mucus is shown in photograph 4-1. A swollen vulva is shown in photograph 4-2.



Photograph 4-1 Estrous mucus



Photograph 4-2 Swelling of the vulva

Source: Chiba Prefectural federation of Agricultural Aid Associations in Japan

Postpartum recovery or reproductive function takes several dozen days. The ovary immediately after calving is in a stationary state and ovarian follicles start to grow within a week. The ovaries start to accelerate their growth 10 days after calving.

The first postpartum ovulation takes place about two weeks after calving at the earliest and mostly 20 days after calving in dairy cattle undergoing normal calving. This number of days depends on age, parity, season and nutritional condition and is strongly affected by milk yield; it increases especially in high-lactating cows. However, some reports show that first ovulation occurs about 15 days after calving in high-lactating cows if they are well fed. Thus, observation of the estrus should be started as early as possible after calving (about 20 days after calving).

The condition of a cow including weak estrus and metaestral bleeding must be observed carefully and recorded in preparation for the next estrus. As described above, failure in detecting estrus has a significant influence on dairy farming. Thus farmer should make sure to detect estrous sign, however weak estrous. Table 4-4 (p. 108) shows the rates of detecting estrus by method. There is no significant difference between twice-daily, observation at fixed time and other methods. Observation of estrus should be performed at least twice daily in the morning and evening to increase the rate of detecting



estrus and hence conception rates.

Cows should be subjected to once- to twice monthly regular reproductive examinations by a veterinarian and all cows should be examined on the 30th day after calving onwards for the presence of estrus and uterine involution to improve reproductive performance of the herd as a whole.

Table 4-4 Rate of detecting estrous in cow by different method

Methods	Presenter	Donaldson (1968)	Lauderdale (1974)	Foote (1975)	Others
3-time daily teasing		93.1%	-%	-%	-%
Mounting by other cows		81.0	-	-	-
24-hour-day monitoring		100	97-100	89	-
3-time daily, fixed-time monitoring		91	81-91	-	-
Twice daily, fixed-time monitoring		90	81-91	72	-
Observation during routine work		-	56	56	-
Chin-ball method		98	98-100	98-100	-
Heat mount detector method		-	-	-	96-98

Source Sugie, 1980

4.2 Technical guidance for veterinarians

4.2.1 Early Pregnancy diagnosis

Early identification of whether or not insemination resulted in conception helps to determine the course of action. In case of conception, for instance, preventing abortion and making calving plans. In the case of a failure, estimating the date of the next estrus and ensuring insemination. In the case of reproductive disorder, proper diagnosis and early treatment helps early recovery from these disorders.

Pregnancy diagnosis refers to a technique involving identifying the changes in the mother's body resulting from conception and the sign of pregnancy accompanying the generation of the fetus. A practical pregnancy diagnostic method must ensure early diagnosis and a rate of correct diagnosis of more than 85%. However, a rate of correct diagnosis of 100% is desirable as veterinarian are concerned. The method must also be simple, harmless to the mother and fetus and less costly.

(1) Rectal Palpation (fetal membrane slip)

This method has been widely used in the field and allows pregnancy diagnosis about 30 days after breeding onwards. However the field pregnancy diagnosis is usually made at 35-40 days after breeding. The method involves turning over the uterus, palpating the tips of the uterine horns and confirming clear fluctuation (fetal fluid) and dilation of the pregnant horn and the presence of the fetal membrane and vessels contained in the fetal membrane, as shown in figure 4-1.

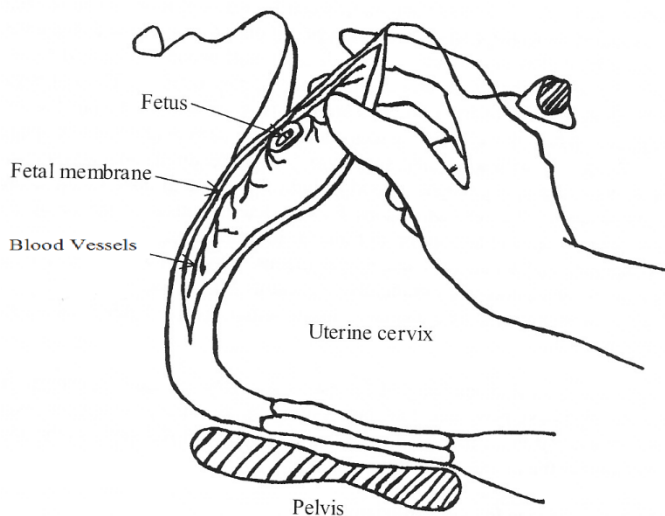


Figure 4-1 palpation region in pregnancy diagnosis

Source: Chiba Prefectural federation of Agricultural Aid Associations in Japan

Fetal membrane slipping reaction starts at the side of pregnant horn 35 days after breeding. At body of the uterus after 40 days and at both horn after 45 days, fetal membrane slipping can be diagnosed.

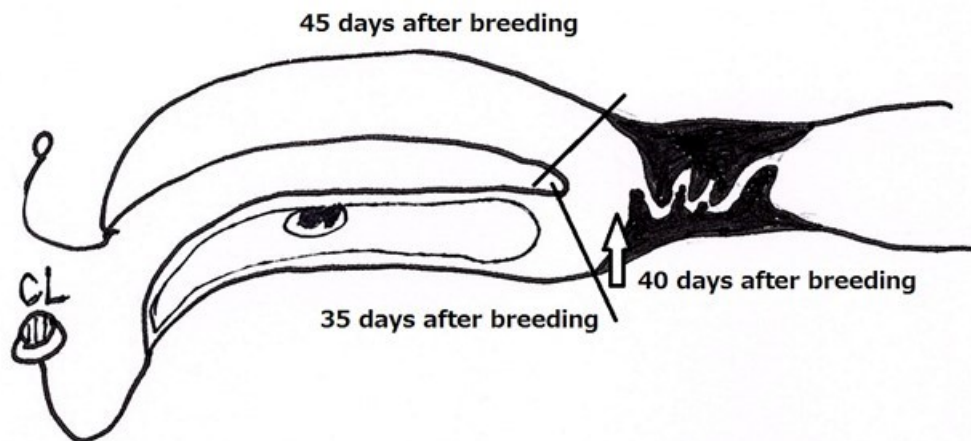


Figure 4-2 Points to be diagnosed of each days after breeding

Source: Tominaga 2018

The fetus in the fetal fluid on the 80th day of pregnancy onwards and the uterine artery and characteristic vibration in the pregnant horn on the 90th day of pregnancy onwards. However, finding of the uterine artery and vibration are not decisive indicators of pregnancy because they are occur in sterile cows with high parities. Pregnancy must be confirmed by the finding of the fetal membrane referring also to finding in the accessory reproductive organs.

Early pregnancy diagnosis allows early detection of abnormalities. It allows the detection of cows with embryonic



death and unstable pregnant condition such as the lack of development of the uterus and vessels matching the days after insemination. It allows the detection of cows that have growing ovarian follicles and contraction and thickness of the uterus so they are at risk of abortion and need treatment without hormones such as hCG.

The following summarize points to note when making pregnancy diagnosis by rectal palpation

1) Ovary

- 1) The number of pregnant corpus luteum, unilateral or bilateral?
- 2) The presence/ absence and quantity, if any, of fluid in the cavity of a pregnant corpus luteum.
- 3) The presence/ absence, number and size of coexistent ovarian follicles

2) Uterus

- 1) Whether thickening of the uterine wall is similar to that in estrus.
- 2) Whether contraction is similar to than in estrus.
- 3) Agreement between the size of the uterine horn and days of pregnancy

The size of the pregnant horn resulting from development of the fetus, fetal fluid and appendages of the fetus (based on the middle finger)

30 days of pregnancy: 2.0-2.5 finger widths

35 days of pregnancy: 2.5-3.0 finger widths

40 days of pregnancy: 3.5 finger widths

- 4) Confirmation of the presence or absence of expansion of the non-pregnant horn (after 35th day of pregnancy)

3) Appendage of the fetus

- 1) Whether it is monotocous or prolificacy. If it is prolificacy, is it bilateral of unilateral pregnancy?
- 2) Are the fetal fluid, fetal membrane and vessels in the fetal membrane readily palpable?
- 3) If the entrance of the appendages of the fetus into the non-pregnant horn confirmable (after the 35th day of pregnancy)?
- 4) Agreement between the vessels in the fetal membrane and days of pregnancy

30 days of pregnancy: silk thread like (size of vessels)

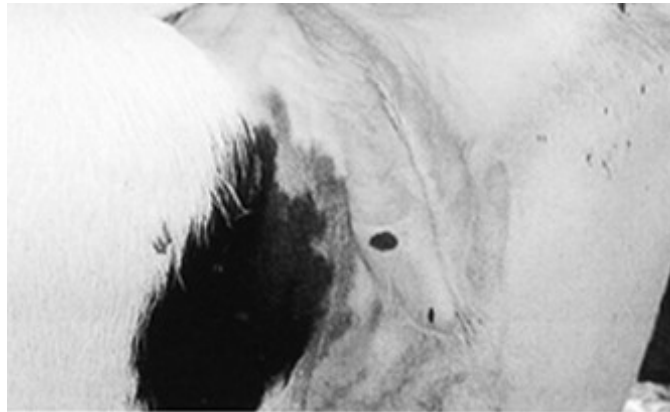
35 days of pregnancy: cotton thread like (size of vessels)

40 days of pregnancy: kite string like (size of vessels)

4) Others

- 1) The cervical canal is contracted.
- 2) The external pudendal lips are contracted.

The external pudendal lips of a pregnant cow Are shown in photograph 4-3



Photograph 4-3 The vulva of a pregnant cow

Source: Chiba Prefectural federation of Agricultural Aid Associations in Japan

5) Handling of a case of pregnancy with abnormal findings

1) Treatment

If the contraction of the pregnant horn is strong, treatment with hormones such as hCG is necessary to improve luteal function and attain a stable pregnant status.

2) Reexamination

If abnormal findings are present, a reexamination is performed on the 60th to 90th day of pregnancy when implantation is completed.

Pregnancy diagnosis by rectal palpation leads to misdiagnosis in the case of pyometra and mummified fetus but differential diagnosis is not very difficult if meticulous care is taken when checking the points mentioned above. Photograph 4-4 shows pyometra.



Photograph 4-4 Pyometra

Source: Chiba Prefectural federation of Agricultural Aid Associations in Japan

4.2.2 An example of a comprehensive diagnosis method and treatment for the reproductive organ mainly consisting of rectal palpation

Diagnosis of ovarian function based solely on ovarian finding in rectal palpation is often inaccurate and may lead to misdiagnosis.

The possibility of misdiagnosis can be remarkably reduced by examining ovarian function through an overall analysis of finding in palpation of the uterus and cervical canal and observation of the vagina, pudendal lips and mucus as well as ovarian findings.

A comprehensive diagnosis method will be described according to table 4-5. In either case, if the first examination fails to lead to a decision, a second examination should be performed after 7-10 days.

Table 4-5 Judgement of ovarian finding from finding in the uterus, cervical canal, vagina and vulva (overall diagnosis)

		Uterine findings					Others			Judgement	Diagnosis	
		Size	Shape	Contraction/elasticity	Thickness	Mucus	Cavity	Cervix	Membrane mucus			Pudendal lips
1		2.5	Flat	-	++	+++	+++	Hard, thick, open	Plenty	Loose	? is an ovarian follicle	Follicular cyst
2		2.0	Round	+	+	-	-	Thin	Absent	Contracted	? is the corpus luteum	Normal
3		2.0	Oval	+	++	+	+	Slightly thick	Opaque, plenty	Slightly loose	? is an abnormal ovarian follicle	Corpus luteum with decreased function Abnormal ovarian follicle
4	Ovarian findings	2.0	Round	+	+	-	-	Thin	Absent	Contracted	No effect of follicular hormones Normal luteal function	Normal
5		2.0	Round	++	++	-	-	Open	Present	Swollen	? is the regression of corpus luteum (left) ? is an estrous follicle (right)	Estrus



(1) Palpation of the ovary does not help determine whether there is an ovarian follicles of corpus luteum.

Is the large body in the right ovary in column 1 of table 4-5 really an ovarian follicle? The uterus is large, flat, not contracted and the uterine wall is initially thick with clear internal finding. The cervical canal is thick and its lumen is open. The vulva is significantly loose and leak a large quantity of opaque mucus. These finding are effect of E_2 . Thus, the large body in the right ovary is an ovarian follicle. Because the follicle is more than 25 cm in diameter and other corpus luteum is impalpable, a diagnosis of a follicular cyst is made. A diagnosis to differentiate from the cystic corpus luteum and a luteal cyst can be made by closely examining the finding above. To treat follicular cyst, hCG and GnRH preparation are administered in most cases. Special attention must be paid to whether continued estrus is present or not.

Is the body in the right ovary in column 2 of table 4-5 an ovarian follicle or corpus luteum? The uterus is soft without intense contraction, elasticity or thickness. The cervical canal is thin, its lumen is closed and the vagina is dry. The pudendal lips are contracted. These finding are the effect of P_4 . Thus, this body is the corpus luteum and judged normal because of a lack of internal feeling.

What are the bodies in the right and left ovaries in column 5 of table 4-5 Because the accessory reproductive organ show estrous findings, either one must be diagnosed as an estrous follicle. The left body with the size of an ovarian follicle lacks fluctuation by palpation and is hard so it is judged as the regressed corpus luteum.

(2) Examination luteal function and the effect of ovarian follicles

In column 3 of table 4-5, the corpus luteum and an ovarian follicle are detected in the left ovary. Are they functioning normally? The uterus is thick with internal feeling and the cervical canal is somewhat thick and open. The quantity of vaginal mucus is large for the luteal phase and the vulva is loose. These findings indicate the effect of E_2 . Thus, the ovarian follicle is abnormal and the corpus luteum is not functioning normally.

For treatment, to improve luteal function and induce ovulation an luteinization of the abnormal follicle coexistent with the corpus luteum, hCG preparations and luteal hormone are administrated as required.

Finding in the accessory reproductive organs shown in column 4 of table 4-5 indicate the absence of effect of the ovarian follicle in the left ovary and normal luteal function.



Chapter 5 Application of reproductive technology by the Project in Sindh Province

5.1 The situation of Reproduction in rural area and Guidance of appropriate technology

The Project on Sustainable Livestock Development for Rural Sindh is implementing its activity in Southern parts of Sindh Province, Pakistan.

The baseline survey on small and medium scale dairy farmers conducted in the beginning of the Project revealed that majority of dairy farmers availed veterinary services only at the time of serious illness or dystocia of their animals. Dairy farmers apply traditional methods when their animals suffer from slight illness. Dairy farmers did not use services of reproductive diagnosis and treatment for reproductive disorder of their animals. Reproductive disorder is not fatal disease and does not demand emergency treatment. Dairy farmers just wait without any diagnosis and treatment of unpregnant animals until they decide to cull at some point of time. This is normal practice which has been exercised in rural Sindh. Expertise on animal reproduction in the area was underdeveloped. The Project had to start technical guidance on animal reproduction from scratch.

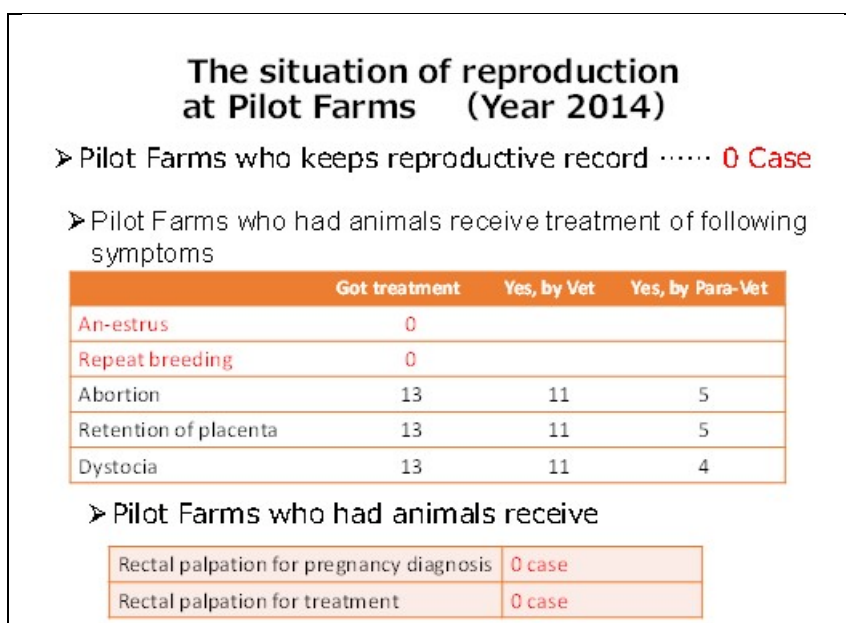


Figure 5-1 The situation of Reproduction at pilot farmer (year 2016)

To produce tangible results on improvement of conception rate of animals, both technical guidance to dairy farmers and to veterinary doctors are required in parallel. For dairy farmers, technical guidance on improvement of nutritious condition of animals, heat detection and reduction of stress are needed. For the veterinary doctors, training of skilled technicians who can carry out diagnosis and treatment of reproductive disorder are required. Diagnosis and treatment of reproductive disorder through rectal palpation requires profound techniques which can be developed through untiring efforts over considerable time period.

5.1.1 Reproductive situation at Pilot Farmer in rural area

The Project analyzed the data of parturition of buffalo at P/F obtained from 2014 to 2016. The month of parturition and heat were analyzed and graphed. Parturitions occur frequently in seven months, namely from May to November (See Figure 1 of line graph). Pregnancy period of buffalo is 310 days on average. Mating month is regarded as



10 months before parturition month. The month of heat, mating and conception, therefore, occurred in seven months, from July to January (See Figure 5-2 bar graph). Number of buffalo came in heat in December was small, which was due to low nutrient value of roughage provided during that month. Many farmers feed their animals with wheat straw or rice straw, which are less nutrient, from the end of November to the middle of December. From the end of November to early December farmers plant legumes berseem and alfalfa, which can harvest from the middle of December to March. Berseem and alfalfa can be harvested four to five times and mixed with wheat straw or rice straw. The number of animals come in heat, therefore, increased in January.

Calving interval and first parity age of months of P/F buffalo are as follows:

- Calving interval: 19 months \pm 3.2 months
(It took over 9 months after last delivery to become conceived again)
- Age of first parity: 42.8 months \pm 4.7 months

Table 5-1 Number of parturition and mating by month

	J	F	M	A	M	J	J	A	S	O	N	D
Breeding	15	9	5	5	5	7	15	16	14	16	15	9
Delivery	5	5	5	7	15	16	14	16	15	9	15	9

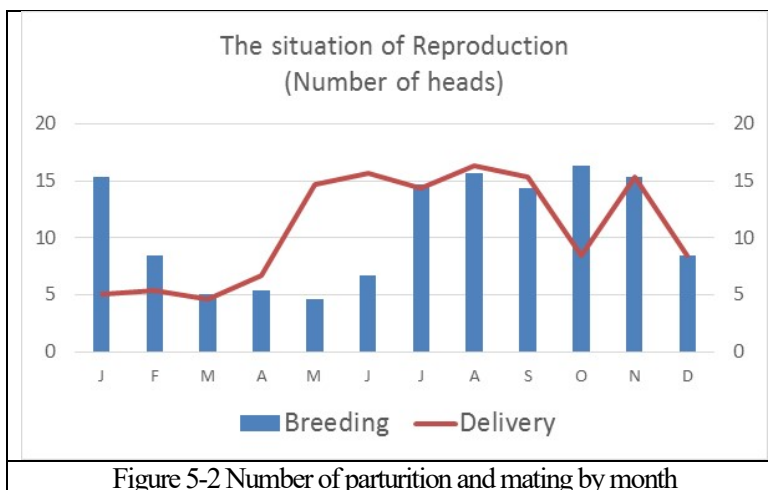


Figure 5-2 Number of parturition and mating by month

5.1.2 Improving reproduction

Reproduction can be improved in following 2 ways;

- 1) To achieve early age at first calving (for heifer); Improve feeding management so as to improve growth of heifers and to have first mating and conception in early age. When body weight of heifer reaches to 300kg (or 161 cm heart girth), is appropriate time for mating can be taken place.
- 2) To achieve early conception after parturition (for parous cow); Shorten calving interval.

(1) To achieve early age at first calving (for heifer)

Cattle/buffaloes can produce milk only after she conceives and delivers a calf. Cattle in Sindh Province conceives for first time at around 2.5 to 3 years old and have first calving at the age of 3.5 to 4 years. For a heifer to get conceived in its early age, it needs to grow well and reach at early maturity. Daily weight gain of calves and heifers in rural Sindh is 0.25 kg on average, which is low and main cause of late maturity and age at first mating. It is important to increase daily weight



gain up to 0.5kg by providing plenty of good quality hay (of those plenty of leaves) during suckling and after weaning up to 8 months of age, followed by provision of plenty of good quality of roughage (of those plenty of leaves) after 8 months of age. The heifer, can reach to optimum body weight 279 kg at the age of 1 and half years. This is appropriate body weight for first mating.

[Example of buffalo]

- The present buffalo growth in rural Sindh: 1064 days (about 3 years old) are needed to reach appropriate body weight for first mating
 Birth weight of 34kg + (1064 days x 0.25 kg) = 300kg
- In case of improved growth rate (0.5Kg/day) : The heifer at the age of 532 days (about 1.5 years old) shall reach appropriate body weight for first mating.
 Birth weight of 34 kg + (532 days x 0.5kg) = 300kg

Table 5-2 Quick chart for body weight and heart girth

Heart Girth	Estimated weight	Heart Girth	Estimated weight	Heart Girth	Estimated weight	Heart Girth	Estimated weight	Heart Girth	Estimated weight	Heart Girth	Estimated weight	Heart Girth	Estimated weight	Heart Girth	Estimated weight
65	40	91	62	117	120	143	214	169	344	195	510	221	712	247	950
66	40	92	63	118	123	144	218	170	350	196	517	222	720	248	960
67	40	93	65	119	126	145	223	171	355	197	524	223	729	249	969
68	40	94	67	120	129	146	227	172	361	198	531	224	737	250	979
69	41	95	68	121	132	147	232	173	367	199	539	225	746	251	989
70	41	96	70	122	135	148	236	174	373	200	546	226	755	252	1000
71	42	97	72	123	138	149	241	175	379	201	553	227	763	253	1010
72	42	98	74	124	142	150	245	176	385	202	561	228	772	254	1020
73	43	99	76	125	145	151	250	177	391	203	568	229	781	255	1030
74	43	100	78	126	148	152	255	178	397	204	576	230	790		
75	44	101	80	127	152	153	260	179	403	205	583	231	799		
76	45	102	82	128	155	154	264	180	410	206	591	232	808		
77	45	103	84	129	159	155	269	181	416	207	599	233	817		
78	46	104	86	130	162	156	274	182	422	208	606	234	826		
79	47	105	89	131	166	157	279	183	429	209	614	235	835		
80	48	106	91	132	170	158	284	184	435	210	622	236	845		
81	49	107	93	133	173	159	290	185	442	211	630	237	854		
82	50	108	96	134	177	160	295	186	448	212	638	238	863		
83	51	109	98	135	181	161	300	187	455	213	646	239	873		
84	52	110	101	136	185	162	305	188	462	214	654	240	882		
85	53	111	103	137	189	163	311	189	468	215	662	241	892		
86	55	112	106	138	193	164	316	190	475	216	670	242	901		
87	56	113	109	139	197	165	322	191	482	217	678	243	911		
88	57	114	111	140	201	166	327	192	489	218	687	244	920		
89	59	115	114	141	205	167	333	193	496	219	695	245	930		
90	60	116	117	142	210	168	338	194	503	220	703	246	940		

(2) To achieve early conception after parturition (for parous cattle/buffalo)

(Early reproductive diagnosis after parturition)

Cattle requires 30 to 45 days to recover their uterus after parturition. To mate your cattle earlier after parturition to get it conceived again, your proactive action will be needed. Call a veterinary doctor to have early reproductive diagnosis of cattle at 30 days after its parturition. Necessary treatment of problem cows by a veterinarian doctor at that point of time will



allow cattle to come in heat and get conceived again in early stage. Short delivery interval means more number of parturition in their life time. It also means that cow produce more milk in her life time and income of the farmer increased. .

(Shortening calving interval)

a. Cattle

It might be a little bit difficult target to get one calving per year. Earlier a cow get conceived, shorten the calving interval. As a result, total milk production of a cow in her lifetime will increase.

One year is comprised of 365 days. Pregnancy period of a cow is 285 days on average. Deducting 285 days from a year equals to 80 days. Supposing recovering period of uterus as 30 days on average, 50 days (80 days minus 30 days) will be left for next conception. If a cow comes in heat again during these 50 days of period and get conceived, ‘one delivery per year’ can be achieved. Heat cycle of a cow is 21 days on average. You will have 2 chances of your cow becomes in heat and get conceived during this period.

Example: Parturition interval : Case of Cattle

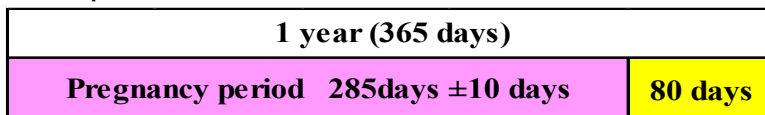


Figure 5-3 Pregnancy period of a cow

b. Buffalo

Pregnancy period of buffalo is longer than cattle, which make it more difficult to get one calving per year as compared with cattle. Earlier a buffalo get conceived, shorter calving interval becomes. As a result, total milk production of a buffalo in her lifetime will increase.

One year is comprised of 365 days. Pregnancy period of a buffalo is 310 days on average, which is 25 days longer than cattle. Deducting 310 days from a year equals to 55 days. Supposing recovering period of uterus as 30 days, 25 days (55 days minus 30 days) will be left for next conception. If a buffalo comes in heat again during this 25 days of period and get conceived, ‘one delivery per year’ can be achieved, which seems difficult for a case of buffalo. Heat cycle of a buffalo is 21 days on average. If mother buffalo comes in heat and get conceived during this period, you can achieve the target. It is, however, difficult for a case of buffalo so the ideal calving interval would be a little bit longer than those of a cow.

Example: Parturition interval : Case of Buffalo

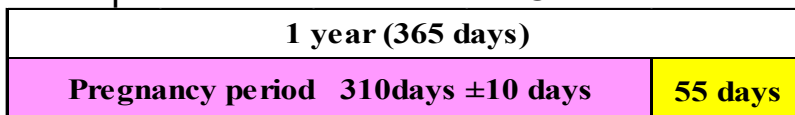


Figure 5-4 Pregnancy period of a buffalo



5.2 Detecting heat and reproductive record of Kundhi buffalo

5.2.1. Detecting heat of Kundhi buffalo

Currently there is no detailed data of heat phenomenon of Kundhi buffalo available. Data of Nili Ravi buffalo breed, therefore, is used for explanation below. Comparing with cattle, it seems quite difficult to detect heat sign of buffalo.

Buffalo comes in heat mostly in the night, i.e. 85% heat is appeared in the night time. It is, therefore, difficult for farmers to detect their heat sign.

Table 5-3 Heat sign of Nili Ravi buffalo breed detected by time

	Time	%	
The night	18:00 - 22:00	19	85
	22:00 - 02:00	40	
	02:00 - 06:00	26	
The day	06:00 - 12:00	4	15
	12:00 - 18:00	11	

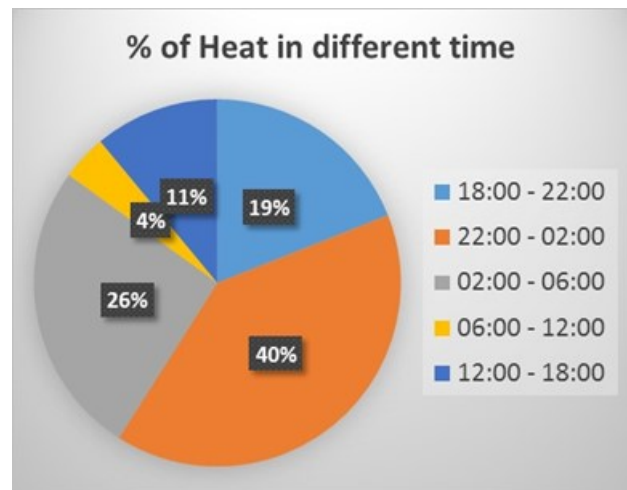


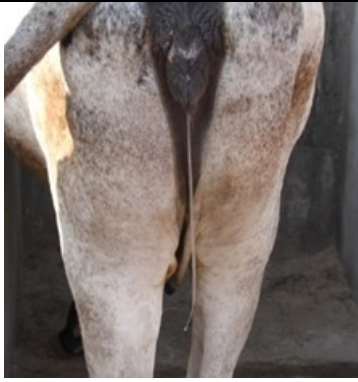
Figure 5-5 Heat sign of Nili Ravi buffalo breed detected by time

Source: National Agricultural Research Center

Besides, characteristics of buffaloes' heat sign are different from cattle, which are explained below;

- 1) Mounting with both female animal, i.e. courtship display, are rarely seen. (buffalo mounted by fellow buffalo is in heat).
- 2) Mucus from external genitalia is not strongly correlated with heat sign.
- 3) Only around 30% of buffalo bellowing at the time of heat.
- 4) Heat period is short.
- 5) Silent heat (heat without apparent sign) frequently occurs.

Heat can also be detected from phenomenon such as decrease of milk production, becoming fidget, buffalo does not care even their hind legs are touched.

		
<p>Photograph 5-1 Swelling of external genitalia</p>	<p>Photograph 5-2 Mucus from external genitalia</p>	<p>Photograph 5-3 Natural mating</p>

5.2.2 Frequency of heat detection observation for buffalo

Normally frequency of observation for heat detection can be set as 3 times in a day, namely, morning, midday and evening. At least 10 minutes per time observation are recommended. Observation of your herd in the paddock or grazing field allows to check mounting behavior of buffalo so that detection rates can be increased. As mentioned above, for the case of buffaloes, their heat occurs mostly in the night, i.e. 19% during 18:00 to 22:00 and 40% during 22:00 to 2:00. It is, therefore, recommended to observe one more time before you go to sleep in the night.

5.2.3 Reproductive record

Let's improve reproduction of your cattle together with veterinary doctors.
 To improve reproduction of your cattle, record on reproductive activities of your cattle is essential step.
 Let's look at the calendar below, learn how to record and do it!

Currently farmers in Sindh province do not take any measures against their cattle which have been non pregnant for a long time. Proper reproductive diagnosis and treatment is almost non-existent in rural areas. There are few numbers of skilled veterinary doctors specialized in reproductive health as well.

To improve reproduction of your cattle, records of reproductive activities of your cattle is necessary. This record will help for proper diagnosis and treatment by veterinary doctors. Let's start recording.

As a first step, you enter the name of female cattle/buffalo. Any calendar is used for recording. Following information should be noted down on day each activity is taken place.

- 1) Record of Parturition: Name of mother
- 2) Record of Heat: Name of female cattle/buffalo comes in heat
- 3) Record of Mating: Name of female cattle/buffalo mating, type of mating, i.e. either natural mating (NM) or artificial insemination (AI), Name of bull
- 4) Other information: Abortion, Sold out, Dead and so on.

Sun.	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.
Note: NM: Natural mating AI : Artificial Insemination				1	2	3
4	5 Basir, Heat	6 Basir, NM	7	8	9	10 No.211, Died
11	12	13	14	15 Badin, Heat	16	17
18	19 Tand, Abortion	20	21	22 Memon, Delivery	23	24
25	26 Hyde, AI	27	28	29 Tand, Sold	30	31

Figure 5-6 The calendar of reproductive record

5.3 Basic treatment technics taught in Sindh province by the Project

5.3.1 Hormone injection

Hormone injection should be given as per necessity and limited as little as possible. Hormone can cause accident if it is leaked and adhered to fingers. PGF_{2a} adhered to fingers of pregnant women may cause abortion.

Disinfection of body area for hormone injection should be encouraged. PGF_{2a} multiplies bacteria. Hormone injection on unhygienic body area might cause gangrene of that area.

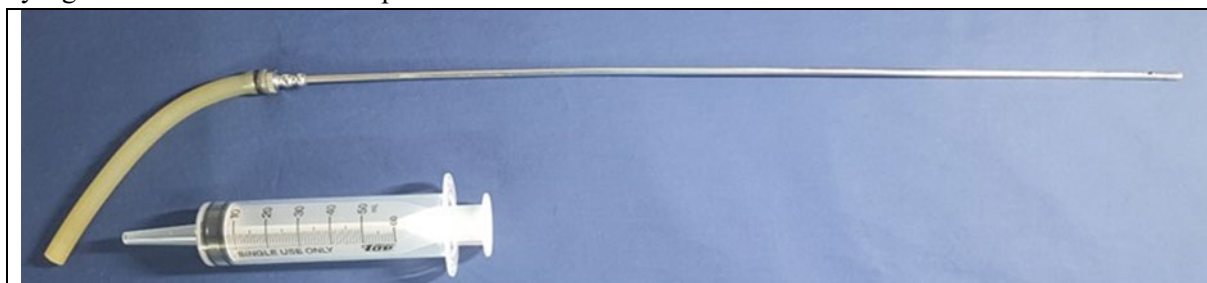
5.3.2 How to inject medicine into uterus through cervical canal by recto-vaginal method

To inject medicine into uterus for treatment and cleansing, a tube needs to be inserted into uterus via cervical canal. Use of metal tube made for this purpose is preferable. In case metal tubes are not available, insemination gun or plastic tube can be used. Tubes are used along with 50 mL capacity disposable syringe. Set a syringe into a tube.

(1) Types of tubes for injection

1) Japanese made metal tube

Syringe with thick inlet is used for Japanese metal tube.



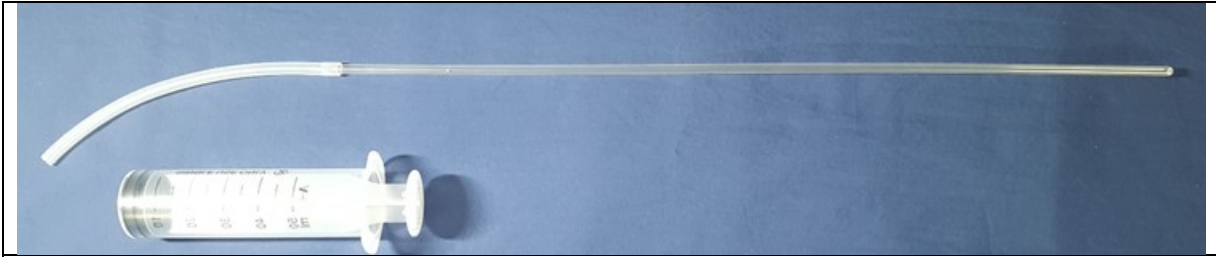
Photograph 5-4 Japanese made metal tube



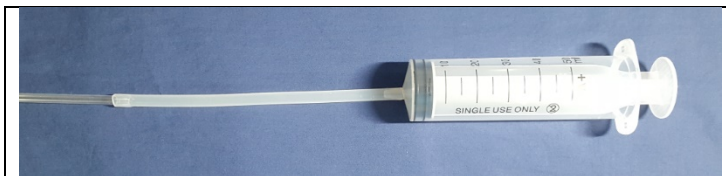
Photograph 5-5 Thick inlet syringe

2) Plastic tube

Plastic tube is available in local markets in Pakistan. Plastic is soft and easy to bend. Handling of tubes for injection is, therefore, a bit difficult. Use thin inlet no. 21G x 1 1/2.



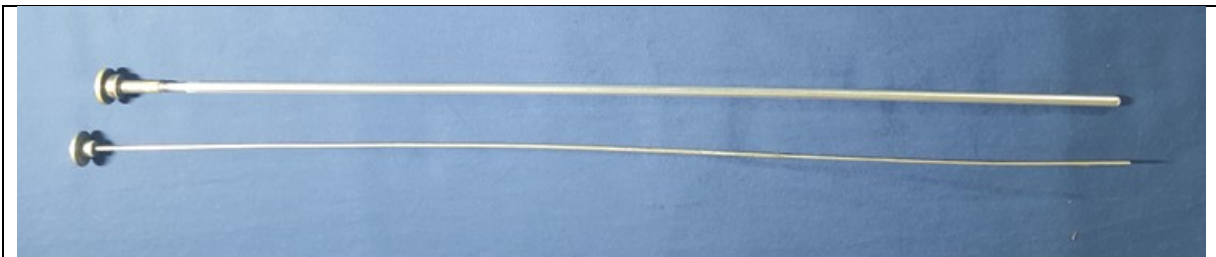
Photograph 5-6 Plastic tube for injecting medicine



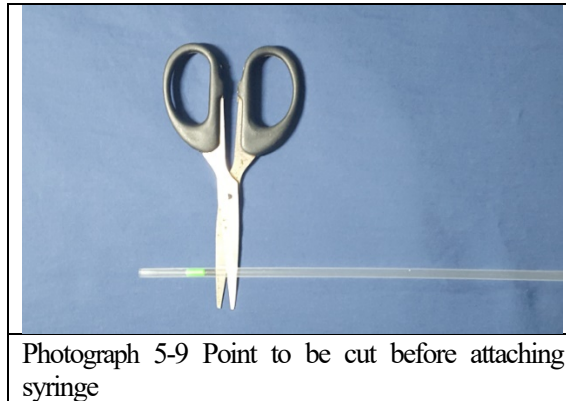
Photograph 5-7 Thin inlet syringe

3) Insemination gun

Cut a sheath pipe at a stopper point. Attach syringe with insemination gun.



Photograph 5-8 Insemination gun



Photograph 5-9 Point to be cut before attaching syringe

When sheath pipe for AI is used for irrigation uterus, some inventive measures are required such as making a hole at a side of a pipe,

(2) Preparation

Insert a hand into rectum as per procedure of inserting insemination gun for AI. Cut nails of a hand short and smoothen surface of cut end of nail into with nail file beforehand not to damage rectal mucous membrane. Disinfect tubes with alcohol cotton to keep tubes hygienic.

(3) Inserting a tube

Put a glove for rectal palpation on one hand to be inserted into rectum. It is preferable to insert non-dominant hand since dominant hand can be free for recording and other activities. Wet surface of a glove with soapy water. Wash bovine vulva with antiseptic solution water and disinfect it with alcohol cotton. Wipe vulva with alcohol cotton from center to outer side until vulva become clean. When alcohol cotton get dirty, replace it with new one. Keep wipe it until no stain on surface of alcohol cotton is found. Open bovine vulva with a thumb and a forefinger of the hand without a glove and insert a tube into vagina.

When a tube is came off for any reasons, repeat same procedure as mentioned above.

Insert a tube gradually for about 10 cm with slightly upward slope. Once a tip of a tube pass through a vestibule of vagina, level a tube and insert it further deep. Hold a tube while pushing it slightly when a tip of a tube reaches near external os.

Insert a hand wearing a glove gradually into rectum. Do not insert a hand forcibly when rectal contraction motion of a cattle or a buffalo is strong. Adjust force with strength of rectal contraction motion and insert a hand gradually. Discharge air in rectum if any before handling a tube. Air in rectum expands rectum, which make handling a tube difficult.

Insert a hand further deep. Grasp and hold cervical canal from rectal wall. Hold external opening of cervical canal of the side of a hand gently as wrapped it with a palm. Place a little e finger and a third finger side and bottom of cervical canal. Bring a tip of a tube near external opening of uterus into external opening of cervical canal. Drawing below shows good example and wrong example of holding cervical canal

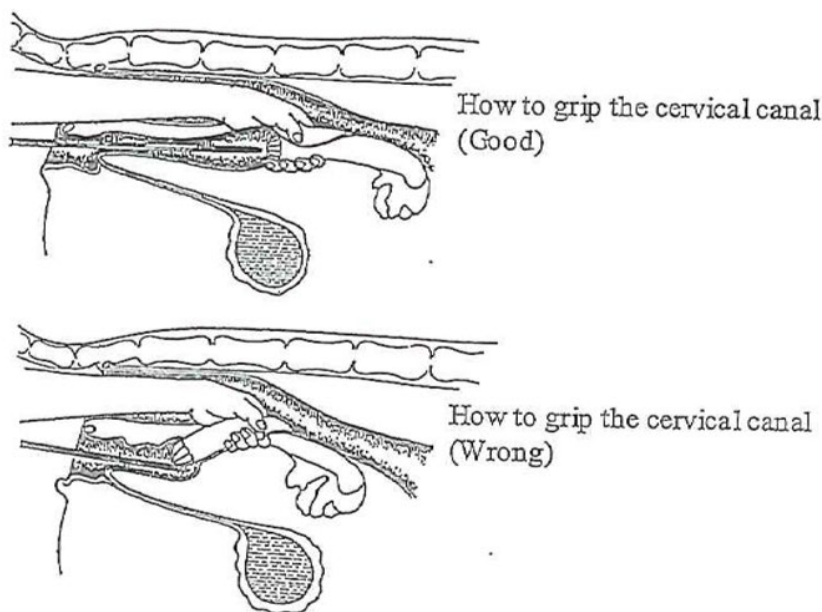
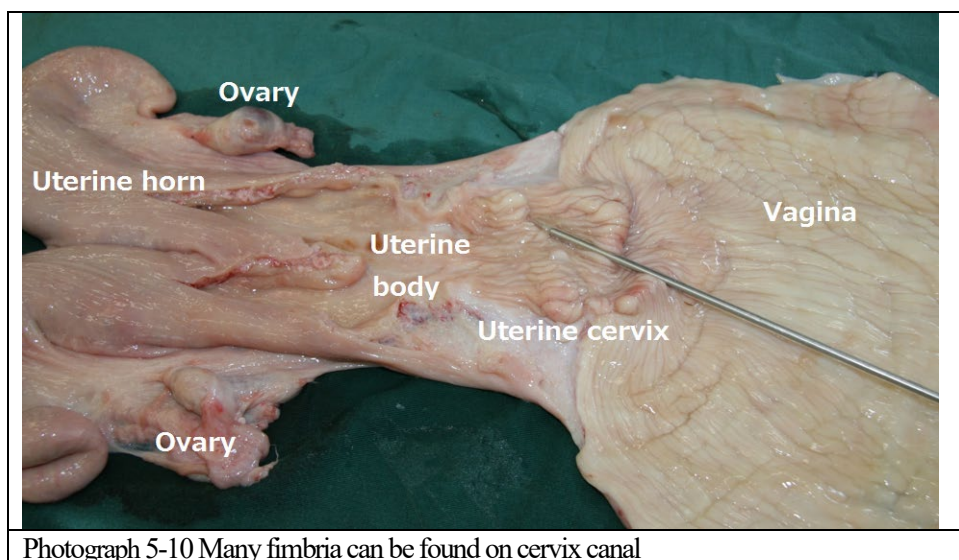


Figure 5-7 Good and wrong method for cervical canal grip

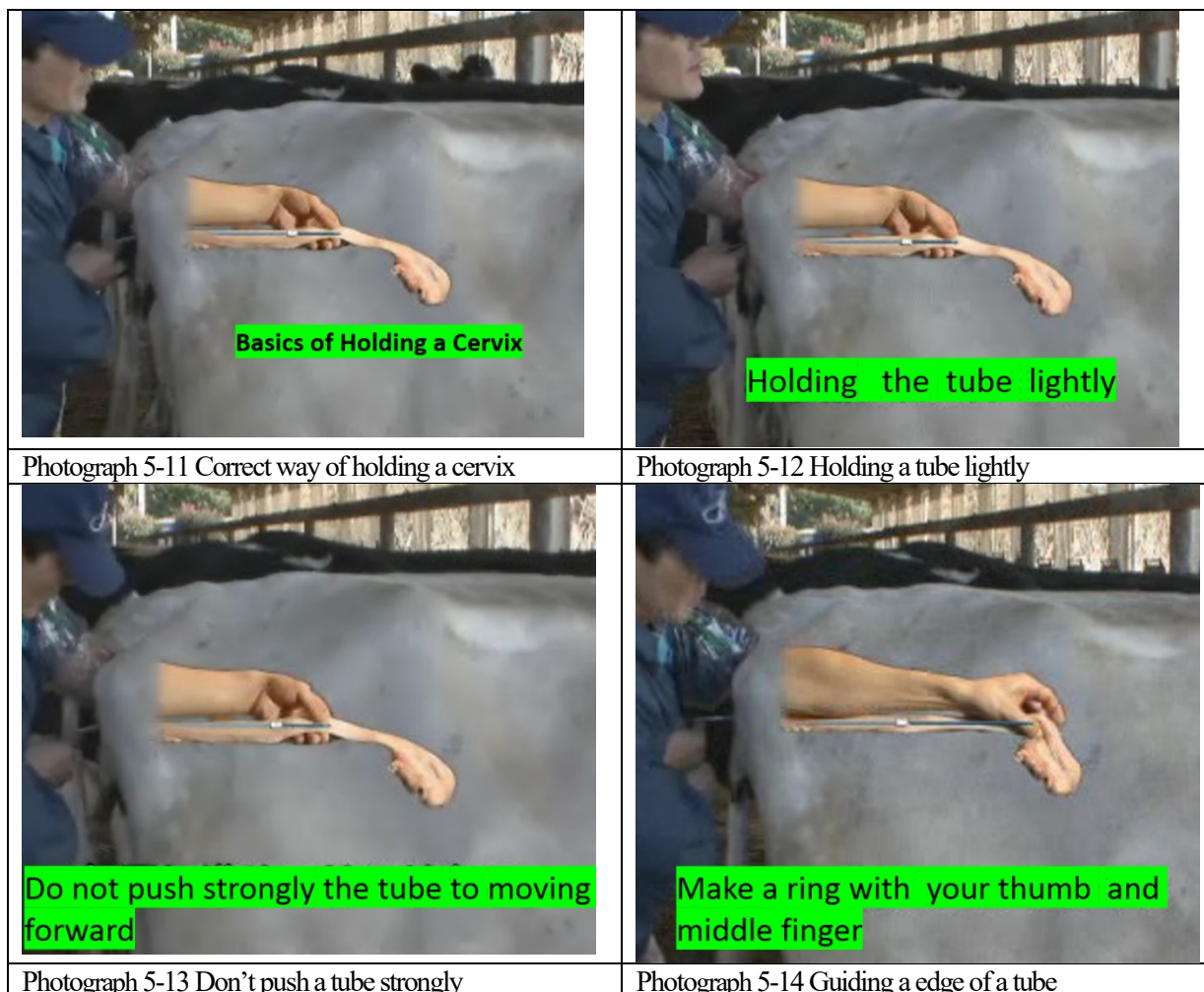
Once a tube is inserted into cervical canal, place a hand further forward along with a tip of a tube and insert a tube deep further. There are irregular spiral fimbria and stricture inside cervical canal, which make inserting a tube difficult.



Photograph 5-10 Many fimbria can be found on cervix canal

Source: Chiba Prefectural federation of Agricultural Aid Associations in Japan

Never insert and push a tube by force, otherwise it injures mucous membrane and cause bleeding. If a tip of a tube is stuck, pull a tube back to the side of a hand and move a tip in another direction, then push it forward again. It is easier to handle a tube by moving cervical canal with a hand holding cervical canal than moving a tube in such a case.



5.3.3 Injection of medicine and cleansing uterus

Injection of medicine and cleansing uterus is comparatively easy during estrus since cervical canal is open. However, in general, treatment is performed during luteal when cervical canal is closed. The injection and cleansing is, therefore, difficult to perform. In such a difficult case, inject estrogen 3 days before treatment. With effect of estrogen, cervical canal is open, which makes injection and cleansing easy.

5.3.4 Medicine for uterus injection

(1) Iodine solution for animals (Povidone iodine)

For Uterine injection and external injury This is the solution of povidone iodine (PVP-I), it is mixed polyvinyl pyrrolidone and iodine. This drug has a strong bactericidal power of iodine. Moreover, it reduces irritancy of iodine.

[Ingredients and quantity]

It contains 20 mg povidone iodine (effective iodine 2 mg) in 1 mL solution. It stimulates uterus and renew endometrium.

Perform reproductive diagnosis 30 to 40 days after parturition. Inject iodine solution to those cattle and buffaloes whose uterus are delay in recovery and ovary is inactive. Iodine solution is effective for multiparous cattle and buffaloes



with normal uterus and inactive ovary a few months after parturition as well. Iodine solution inject does not affect quality of milk. Farmers, therefore, do not need to stop milk supply to markets like anti-biotic injection.

In the case of application of iodine solution to buffalo in Sindh, iodine solution caused irritation and sorrow. 50% diluted iodine solution with disinfected physiological saline solution, therefore, is applied to buffalo in Sindh. 50mL iodine solution is used for Holstein cattle whose uterus is big whereas 30mL iodine solution is enough for Pakistani buffalo whose uterus is small.

(2) Anti-biotics

Inject anti-biotics when bacteria cause inflammation of uterus. There are various kinds of anti-biotics but apply penicillin first.

5.3.5 Improvement of conception ratio

Detection of estrus is getting more and more difficult according to the extension of the numbers of cows reared, the improvement of milking cows with a high milk production and the changes of the circumstances of feeding and management of cow. Thus the dependence on the techniques for estrus and ovulation synchronization in the reproductive management is very high. To reply this requirement the techniques for estrus and ovulation synchronization have been vigorously developed and widely applied especially in USA and Europe. The advantage of this technology is that it can succeed in conception to some extent without rectal palpation skills but with use of hormone injection or CIDR. The disadvantage is that technicians have to visit farms several times and high cost of hormone.

Japanese technique for reproductive disorder treatment apply diagnosis of external examination and rectal palpation of individual animal and treatment on the basis of diagnosis result. Only skillful technicians can perform diagnosis, which can be disadvantage, but this method can save costs of hormone. Japanese method is much fit for the situation in Pakistan.

5.3.6 Case study of reproductive treatment in the Project

Ovsynch and CIDR are the reproductive techniques easily applied by technicians who cannot perform rectal palpation. The Project treated 10 heads of buffalo with Ovsynch. Eight among 10 heads (80%) showed estrus sign. Five out of 10 heads conceived, which was 50% of Ovsynch treated buffaloes and 62.5% of buffaloes that showed estrus sign. The Project treated 11 heads of buffaloes with CIDR. Seven among 11 heads showed estrus sign. Five out of 11 heads conceived, which was 45.5% of CIDR treated buffaloes and 71.4% of buffaloes that showed estrus sign. The both estrus and conception rate were comparatively high in both Ovsynch and CIDR methods.

HCG and Estrogen hormone treatment are performed based on results of reproductive diagnosis through rectal palpation. The conception depends on accuracy of diagnosis and rely on skills of technicians. The conception rate, therefore, was lower than Ovsynch and CIDR methods as expected. With HCG treatment, conception rate was 44.4% and 37.5% with Estrogen hormone treatment.

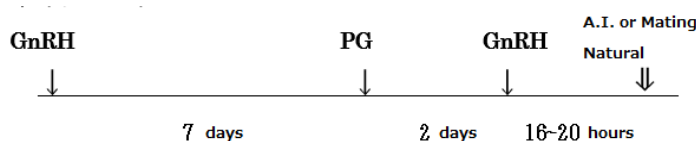
Four among 11 buffaloes treated with CIDR were heifers. All 4 heads (100%) showed estrus sign. According to literatures, heifers tend to show higher response against CIDR treatment than parous buffaloes. Same tendency was confirmed in the Project data. In case of Murrah buffalo in Italy, CIDR treatment achieved high conception rates. The cost of CIDR is however, as high as Rs. 2,300, which might not be easy to apply by economically disadvantaged small scale farmers.



Table 5-4 Results of reproductive treatment by the Project

Treatment		Animal Shows Heat Signs		Pregnancy		
Name	Heads	Yes	%	Heads	% of Treat.	% of Heat
Ovsynch	10	8	80	5	50.0	62.5
HCG	13	9	69	4	30.8	44.4
CIDR	11	7	67	5	45.5	71.4
Estrogen	12	8	67	3	25.0	37.5

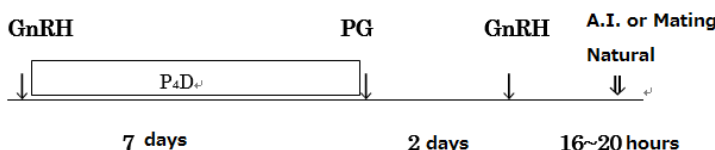
a) Ovsynch method



Method of applying regular insemination regardless of estrus sign

This method does not need accurate reproductive diagnosis and often applied in large scale farms in North and South America. It may cause deterioration of ability of reproductive diagnosis and treatment of veterinary doctors and overuse of medicines. In some regions of Japan, this phenomenon have been happening.

a) CIDR method (Ovsynch with combination use of P₄D)



Ovsynch with combined use of progesterone device placed in the vagina

When ovsynch is used regardless of estrus cycle, timing of estrus become varied in each animal. Some animals ovulate without any estrus sign. Placing progesterone device (P₄D) easy breed in the vagina before treatment for 7 days allow delay estrus and ovulation leading in less variation of estrus sign among herd.

c) Cattle and buffaloes to be treated by Ovsynch and CIDR methods

Chiba prefecture cooperative in Japan apply Ovcynch and CIDR for the following cases;

- a. Not showing estrus sign for unknown reason more than 5 months after parturition
- b. Not conceiving for a long period though animal shows estrus sign
- c. In summer when estrus sign is weak
- d. Cow with follicular cyst

In all above cases, treatment is performed when uterus of animals is normal condition. In any case, good results of treatment depend on correct diagnosis prior to treatment. In the Project area, there are few cases of abnormal uterus conditions. Treatment by Ovsynch and CIDR, therefore, is expected to achieve good results.



5.3.7 Other advice on treatment

(1) Treatment of insistent cyst

Inject liver tonic every other day for 5 times.

(2) Luteinization failure

Inject thyradin (thyroid hormone) 10cc ampoule every other day for 3 times.

(3) When endometritis is suspected after AI

Inject penicillin 30 minutes after AI.

5.4 Training on reproductive disorder by the Project

Training on reproductive disorder is comprised of 10 days basic training and 5 days refresher training. In a basic training, basic diagnosis of reproductive disorder through external examination, vaginal examination and rectal palpation is taught to trainees. Trainees are expected to understand basis of proper diagnosis and proper recording on a record sheet for rectal palpation thoroughly. The Project award a certificate of training to those trainees who achieve remarkable results during a training.

After a training, trainees are expected to practice diagnosis and record a result of diagnosis onto a record sheet continuously in their localities to accumulate their practical experiences. The Project assesses understanding and gained techniques of each trainee 4 to 6 months after 10 days basic training.

The Project selects trainees who make remarkable progress of gaining technique for 5 days refresher training. Early pregnancy diagnosis and treatment of reproductive orders are taught in 5 days refresher training.

A few months after a refresher training, the Project visits fields where trainees of 5 days refresher training are practicing diagnosis and treatment to evaluate their performance. Those who pass the Project's evaluation criteria will get permission for performing treatment from that time on.

5.4.1. Ten days basic training

(1) Selection of trainees

The Project requests Deputy Directors of District Livestock Office to nominate candidate for 10 days beginners training. Upon receipt of name of nominees, in charge of the Project prepares list of candidate for selection. Trainees are selected based on the criteria below:

- 1) S/he is a veterinary doctor.
- 2) S/he has willingness to perform rectal palpation, though never perform before.
- 3) S/he is engaged with field activities in more than 60% of her/his working hours. (Her/his office work should be less than 40% of her/his working hours.)
- 4) His/her condition allows him/her to practice rectal palpation continuously after trainings.
- 5) S/he is 35 years old or below. (Special provision of exemption of age limit can be given according to situations)
- 6) S/he can attend all 10 days training.



NB: 3 days' delay for attending training is counted as 1 day absence. Anyone who is absent for 3 days or more during 10 days training is not entitled to receive completion certification of a training.

(2) Agreed terms to be shared with trainees on last day of 10 days basic training

1) Accumulation of practical experience after a training

Trainees learn basic knowledge of proper reproductive disorder diagnosis in short period. Trainees, therefore, need to accumulate practical experience by themselves after training.

2) Selecting farm for practice

Generally speaking, a farmer does not like a beginner technician to diagnose his/her animals. Trainees have to find a farmer who can trust them to diagnose his/her animals. It is ideal if trainees can find a farmer of his/her relatives, friends, acquaintances. It is better to select a farmer rearing more heads of animals. Trainees should not start practicing diagnosis at a small scale farm. In case trainees practice diagnosis in pilot farms and pilot villages of the Project, s/he has to be accompanied by experienced technicians and practice under guidance of them.

3) Ideal initial practice by trainees by themselves

Once a farm for practice is found and a farmer is agreed, a trainee select a few female buffalo to be diagnosed on a regular basis. A trainee diagnoses animals on a day of heat (0 day), a next day of heat, i.e. ovulation day (1st day), 7th day, 14th day and before next heat, respectively and make record on a record sheet for rectal palpation properly. This exercise is very effective for beginner technicians.

4) Recording on record sheet for rectal palpation

Proper recording is important. Trainees must not write unclear or unsure things. If trainees pretend to understand and write unclear or unsure things, s/he never improve his/her skills. It is often found a case which is difficult to diagnose even by 5 to 10 years experienced technicians. For that difficult cases, technicians revisit a farm for diagnosis a few days later.

5) Utilizing textbook

The Project distributes 'text for diagnosis and treatment of reproductive disorder in dairy cattle and buffalo' to trainees. Trainees should visit a farm along with this text book and fully utilize it. Trainees are advised to read 'Introduction' of the textbook first. Background of developing the textbook and how to use it are explained in the 'Introduction' The textbook is a guideline for trainees to improve their skills.

5.4.2 Five days refresher training

(1) Selection of trainees

The Project visits a farm where trainees practice diagnosis and evaluates skills of trainees of 10 days basic training. Selection criteria for 5 days refresher training is as follows;

- 1) S/he continues practicing diagnosis after 10 days basic training and can perform proper diagnosis.
- 2) S/he does not participate in 10 days basic training but can perform proper diagnosis through rectal palpation.



- 3) S/he is engaged with field activities in more than 60% of her/his working hours. (Her/his office work should be less than 40% of her/his working hours.)
- 4) His/her condition allows him/her to continue diagnosis of reproductive disorder and treatment after trainings.
- 5) S/he is 38 years old or below. (Special provision of exemption of age limit can be given according to situations)
- 6) S/he can attend all 5 days training.

NB: 3 days' delay for attending training is counted as 1 day absence. Anyone who is absent for 2 days or more during 5 days training is not entitled to receive completion certification of training.

(2) Agreed terms to be shared with trainees on last day of 5 days refresher training

Importance of record of rectal palpation

Proper record of diagnosis through external examination, vaginal examination and rectal palpation is important. Normally a technician visit a farm biweekly for diagnosis. Result of each diagnosis is recorded. Biweekly diagnosis and recording should be continued even after an animal become pregnant. This diagnosis prevents an animal from abortion due to abnormal CL or small CL. Even an animal abort, immediate treatment can be performed. Regular diagnosis can be exempted after 5 months of pregnancy. Ovarian cyst can be inherited from mother to calves. In case mother has ovarian cyst and she gives birth to a female calf, there is high possibility for a female calf inherit ovarian cyst. Such a calf is better to be eliminated. Record of diagnosis is useful for judging the case.



Reference

Japan International Cooperation Agency (January 2016), Project Progress Report (Second Year) of the Project on Sustainable Livestock Development for Rural Sindh “PSLD”, Tokyo, JICA, pp 51

Japan International Cooperation Agency (February 2017), Chapter 3 Output 1 in *Project Progress Report (Third Year) of the Project on Sustainable Livestock Development for Rural Sindh “PSLD”*, Tokyo, JICA, pp 38-43

Japan International Cooperation Agency (February 2018), Chapter 3 in *Project Progress Report (Forth Year) of the Project on Sustainable Livestock Development for Rural Sindh “PSLD”*, Tokyo, JICA, pp 39-45

Japan Livestock Technology Association (March 2004), Artificial Insemination Manual for Cattle, Tokyo, Japan Livestock Technology Association

Japan Livestock Technology Association (March 2002), Manual for Diagnosis and Treatment of Reproductive Disorder in Dairy Cattle, Tokyo, Japan Livestock Technology Association



**The Project on Sustainable Livestock Development
for Rural SINDH “PSLD”
(JICA Technical Cooperation)**

Handbook for Pedigree Registration of Kundhi Buffalo



July 2017

Preface

Establishing blood relation information system is fundamental for improving animal genetics. As for cattle and buffaloes, they need to be identified with an ear tag attached on individual animals. Their basic information including on their date of birth, sire and dam needs to be collected as an essential step to establish information system.

In addition to those basic information, milk test data and phenotypical information closely related with lifetime milk productivity of each animals needs to be collected as well.

Under the guidance of Japanese expert, Mr. Yoshio Chiba, 2 counter parts of the Project, namely, Dr. Muhammad Mubarak Jatoi and Dr. Ali Akthar Shahani developed and started operation of the registration system of Kundhi Buffalo for establishing blood relation information system.

Software program for pedigree registration was developed by The Holstein Cattle Association of Japan with financial assistance of Japan International Cooperation Agency, JICA.

This pedigree registration model is under verification among 8 progressive breeders and 5 milk inspectors under the initiative of Mr. Ali Hyder Shah, General Secretary of Matiari Breeders Association.

This model is still in a small scale. However, we hope that with our 3 years experiences, this model will result in establishment of long lasting pedigree registration system in future.

We would like to express our gratitude to all those who concerned with this activity.

Hideo Tominaga
Expert on Livestock Technology Development
10 July 2017

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I To make highly productive Kundhi Buffalo herd

1. Importance of genetic improvement

Main source of income of dairy farmers come from milk selling. Dairy farmers need to sell as much quantity of milk as possible to increase their income. To increase milk production, you may think of means such as 1) increasing number of milking animals and 2) feeding more concentrates or formula feed to animals. However, you should not forget to minimize production costs to increase profitability.

It is important to have productive buffalo in your herd which can efficiently use energy from intake feed for milk production and to feed them with good quality of roughage and concentrate in a proper manner.

Having productive herd can be realized by eliminating less productive buffaloes. By recording milk quantity and quality of each animal, it is possible to judge the superiority and inferiority of each individual buffalo, which can be base for selecting productive buffalo and less productive buffalo to be eliminated.

Apart from milk quantity and quality, udder and teat shape which affect the efficiency of milking work as well as legs and hoof which affect life expectancy of buffalo are more or less inherited from dam and sire to calves. To select productive buffaloes and increase offspring of those productive buffaloes ultimately result in increase of profitability and livelihood of dairy farmers in Sindh province.

2. Registration of animals is first step for genetic improvement

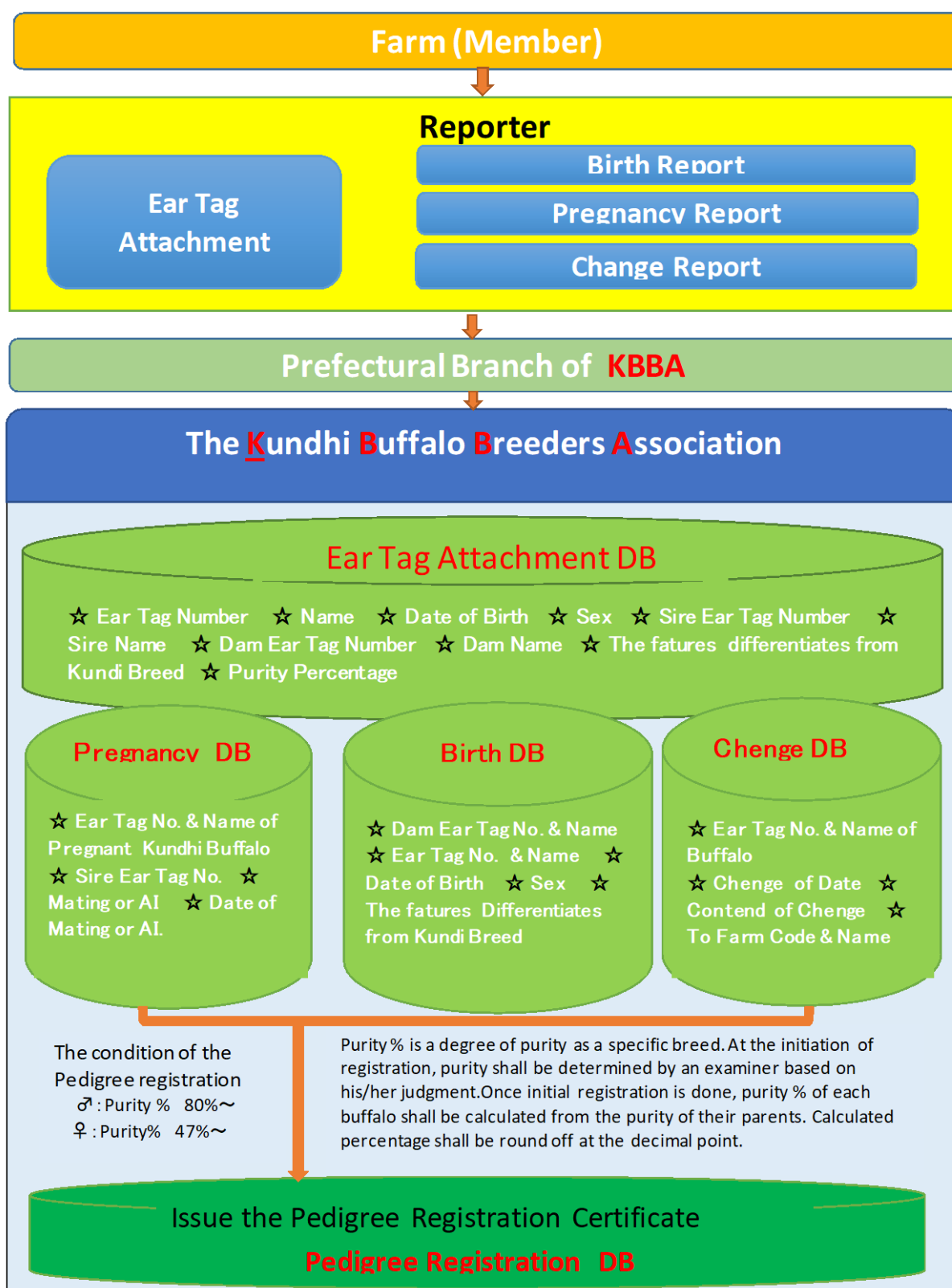
Genetic improvement will start with accurate record taking. If records are not accurate, there will be no tangible effect on genetic improvement even you did selection and culling of buffalo as well as mating with excellent bull. Pedigree registration is basis of record of individual animals. Pedigree record tell a farmer when, where and from which dam and sire an individual buffalo is born. Only after having pedigree record, inbreeding can be prevented. Inbreeding might cause defective characteristics in some of buffaloes.

Pedigree characteristics appear remarkably in milk production capacity and phenotypical characteristics of buffaloes. Genetic improvement of buffaloes can be effectively and properly done when pedigree record is correlated with milk test and phenotypical feature of buffaloes.

3. The advantages of pedigree registration.


- a) A buffalo can be identified and its pedigree can be verified.
- b) Preservation of genetically superior buffaloes is ensured.
- c) Purity degree (47 – 100% for female, 80-100% for male) can be clearly identified.
- d) Inbreeding can be avoided.
- e) Additional information including milk production, type conformation and others gives advantage in the marketing.

II. The System of Pedigree Registration



Note: The meaning of “DB” is database.

III. Certificate of Pedigree Registration

Pedigree Registration Certificate		
100100 966	KUNDHI	Female
Purity 53 %		Date of birth 10/12/2015
Name Talpur Dairy Farm 966		
Sire Talpur Dairy Farm 800 100100800		95 %
Paternal grand sire		%
Paternal grand dam Talpur Dairy Farm 799 100100799		95 %
Dam Talpur Dairy Farm 792 100100792		70 %
Maternal grand sire Talpur Dairy Farm 800 100100800		95 %
Maternal grand dam Talpur Dairy Farm 795 100100795		95 %
Farm CD 1020001		
Farm Name Talpur Dairy Farm Near Bakir Nizamani, Tal TMK, TMK		
Transfer record		
The feature which must be eliminated White Tail		
	Date of registry	01/04/2018
Livestock Breeder Association District Matiari Under supported by the PSLD The project on Sustainable Livestock Development for Rural Sindh (Technical cooperation from Japan "GCA")		

IV. Filling and submission of report proforma

1. Birth Report

Birth Report

Ear Tag Number ^①

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Name ^②

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Date of Birth ^③

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Sex ^④

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 1: Female 2: Male

Sire's Ear Tag Number ^⑤

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Dam's Ear Tag Number ^⑥

--	--	--	--	--	--	--	--	--	--	--

Sire's Name ^⑤

--	--	--	--	--	--	--	--	--	--	--	--	--

Dam's Name ^⑥

--	--	--	--	--	--	--	--	--	--	--	--	--

Dam's Farm Name ^⑥

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Farm code ^⑦

	-			-				
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The features differentiates from Kundi breed ^⑧

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Date of Report ^⑨

		/			/					
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Reporter's Code ^⑩

	-			-				
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Signature

When a calf is born to ear-tagged buffalo of KBBA (Kundhi Buffalo Breeders Association) member farms, birth report will be filled and submitted to the secretariat.

There is no need to submit attachment report of a calf reported by the birth report.

The report needs to be submitted to the secretariat of KBBA, i.e. the office of the Project on Sustainable Livestock Development for Rural Sindh (PSLD).

(1) Ear tagging (see①)

Apply ear tag on the one side of the ear of a newly born calf.

(2) Checking submission of pregnancy report of dam

Check if pregnancy report of dam of that calf was submitted or not. If no pregnancy report is submitted and inputted onto the database, the software will find it error. No pedigree certificate will be issued in that case.

In case no pregnancy report is submitted, fill a pregnancy report along with birth report and submit to the secretariat.

Check the date of mating or AI written in the pregnancy report and normal gestation period with the reference table of gestation period. Check if the birth date and mating or AI date is within the range of normal gestation period (310 ± 15 days). In case it is out of range, there is the possibility of other mating or AI conducted. Check if there is any.

(3) How to fill the birth report

1) Ear Tag Number (See ①)

Fill the ear tag number attached to a calf. (9 digits. In future it will be 10 digits.)

2) Name of Animal (See ②)

Write name of a calf if a member wish to name it.

If no name is given to a calf, write registered name of a farm followed by last 3 to 4 digit numbers printed with big letters on the bottom side of the ear tag.

Example: Hyder Farm 205

3) Date of Birth (See③)

Write the date of birth in the DD/MM/YYYY order.

4) Sex (See④)

Check the sex of a calf and fill the code either 1 for female or 2 for male.

5) Sire's Ear Tag Number & Sire's Name (See ⑤)

Write the Sire's ear tag number and sire's name referring from Sire's ear tag and pedigree certificate of sire.

Do not fail to write both ear tag number and name. They will be used to check the miswriting or mistyping of ear tag number. Same is applied to following items as well.

6) Dam's Ear Tag Number & Dam's Name & Dam's name (See⑥)

Write the Dam's ear tag number and Dam's name referring from Dam's ear tag and pedigree certificate of dam.

7) Farm code (See⑦)

Write a farm code of a calf referring farm code of its' dam in dam's pedigree certificate.

8) The features differentiate from Kundhi breed (See⑧)

Write if any features differentiate from Kundhi breed is found with a calf. Those features should be eliminated genetically including white spot on foreheads, white tail, white spot on a body, white spot on the coronary should be noted. Brown hair and different horn shape (NB: it might be difficult to judge in case of a newly born calf), if any, should be noted as well.

9) Date of Report (See ⑨)

Write the date of submission of the birth report to the secretariat according to DD/MM/YYYY order.

10) Reporter's Code & Signature (See⑩)

Write reporter's code given to a reporter who fills a proforma. Make signature on the report by a reporter.

11) Checking contents of birth report

Once filled a birth report proforma, check again if there is no blank column and error.

(4) Submission of a birth report

Once a birth report is filled, submit it immediately to the secretariat.

2. Pregnancy Report

Pregnancy Report

①	①
Ear Tag Number of Pregnant Buffalo	Name of Pregnant Buffalo
<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/>
②	②
Farm Code	Farm Name
<input type="text"/> - <input type="text"/> <input type="text"/> - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/>
③	③
Sire's Ear Tag Number	Sire's Name
<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/>
④	
Mating <input type="checkbox"/>	or AI <input type="checkbox"/>
⑤	
Date of Mating or AI	
<input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	
⑥	⑥
Sire's Owner's Farm Code	Name of Sire's Owner's Farm
<input type="text"/> - <input type="text"/> <input type="text"/> - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	<input type="text"/>
⑦	
Date of Report	
<input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	
⑧	
Reporter's Code	Signature
<input type="text"/> - <input type="text"/> <input type="text"/> - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	_____

When an ear-tagged buffalo of KBBA members farm become certainly pregnant, pregnancy report will be filled and submitted to the secretariat.

Make sure to fill a pregnancy report and submit it before its parturition.

When there are no phenomena of estrus found over 60 days after mating or AI, it is regarded as certain pregnancy.

(1) How to fill the pregnancy report

1) Ear Tag Number and Name (See ①)

Write an ear tag number of pregnant buffalo. Check its ear tag number physical and fill the form.
Name of pregnant buffalo is filled referring to pedigree registration certificate.

2) Farm code & Farm Name (See ②)

Write a farm code number of pregnant buffalo referring to a pedigree certificate of that buffalo.

3) Sire's Ear Tag Number & Sire's Name (See③)

Write sire's ear tag number and name. Check its ear tag number physically referring to its pedigree registration certificate.

4) Mating or AI (See④)

Tick mating if a buffalo conceived by mating.

Tick AI if a buffalo conceived by AI.

5) Date of Mating or AI (See⑤)

Write date of mating or AI in DD/MM/YYYY order.

6) Sire's Owner's Farm Code & Name of Sire's Owner's Farm (See⑥)

Write sire's owner's farm code and name of sire' owner's farm code referring to sire's pedigree registration certificate.

7) Date of Report (See⑦)

Write date of submission of pregnancy report to the secretariat in DD/MM/YYY order.

8) Reporter's Code & Signature (See⑧)

Write reporter's code given to a reporter who fills a proforma. Make signature on the report by a reporter.

9) Checking contents of pregnancy report

Once filled a pregnancy report proforma, check again if there is no blank column and error.

(2) Submission of pregnancy report

Once a pregnancy report is filled, submit it immediately to the secretariat.

3. Change Report

Change Report

Ear Tag Number of Buffalo

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①

Date of Change

②

		/			/						
--	--	---	--	--	---	--	--	--	--	--	--

Content of Change ^③

(1 : Sold 2 : Purchased
3 : Dead 4 : Sold for Meat)

Farm Code

④

	-			-					
--	---	--	--	---	--	--	--	--	--

Farm Name

④

--

Date of Report

		/			/						
--	--	---	--	--	---	--	--	--	--	--	--

⑤

Reporter's Code

	-			-				
--	---	--	--	---	--	--	--	--

⑥

Reporter's Signature

⑥

When any changes in a buffalo reared in member farms, a reporter has to submit a change report to a secretariat.

(1) How to fill a change report

1) Ear Tag Number of Buffalo (See①)

Write an ear tag number of buffalo having any change.

2) Change of Date (See②)

Write a date of change in DD/MM/YYYY order.

3) Content of Change (See③)

Tick 1:sold, when an ear tagged buffalo is sold.

Tick 2:purchased, when an ear tagged buffalo is purchased.

Tick 3:dead, when an ear tagged buffalo is dead.

Tick 4:sold for meat, when an ear tagged buffalo is sold for meat.

Note: In case purchased buffalo is ear-tagged and has pedigree certificate, use a change report. Tick 2: purchased. Farm code of that buffalo needs to be changed to a new farm. In case purchased buffalo has no ear tag, use attachment report.

4) Farm Code & Farm Name (See④)

Write a farm code number and farm name of a buffalo having change referring to a pedigree certificate of that buffalo.

5) Date of Report (See⑤)

Write a date of submission of change report to the secretariat in DD/MM/YYYY order.

6) Reporter's Code & Signature (See⑥)

Write reporter's code given to a reporter who fills a proforma. Make signature on the report by a reporter.

7) Change Report の確認 Checking contents of change report

Once filled a change report proforma, check again if there is no blank column and error.

(2) Submission of change report

Once a change report is filled, submit it immediately to the secretariat.

4. Ear Tag Attachment Report

Ear Tag Attachment Report

<p>①</p> <p>Ear Tag Number</p> <table border="1" style="width: 100%; height: 20px; border-collapse: collapse;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>											<p>②</p> <p>Name</p> <table border="1" style="width: 100%; height: 40px; border-collapse: collapse;"> <tr> <td style="width: 100%; height: 40px;"></td> </tr> </table>										
<p>③</p> <p>Date of Birth</p> <table border="1" style="width: 100%; height: 20px; border-collapse: collapse;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px; text-align: center;">/</td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px; text-align: center;">/</td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>			/			/					<p>④</p> <p>Sex</p> <table border="1" style="width: 40px; height: 20px; border-collapse: collapse;"> <tr> <td style="width: 40px; height: 20px;"></td> </tr> </table> <p>1: Female 2: Male</p>										
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<p>⑤</p> <p>Sire's Ear Tag Number</p> <table border="1" style="width: 100%; height: 20px; border-collapse: collapse;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>											<p>⑥</p> <p>Dam's Ear Tag Number</p> <table border="1" style="width: 100%; height: 20px; border-collapse: collapse;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>										
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<p>⑦</p> <p>Dam's farm name</p> <table border="1" style="width: 100%; height: 40px; border-collapse: collapse;"> <tr> <td style="width: 100%; height: 40px;"></td> </tr> </table>		<p>⑧</p> <p>Farm code</p> <table border="1" style="width: 100%; height: 20px; border-collapse: collapse;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px; text-align: center;">-</td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px; text-align: center;">-</td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>			-						-										
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<p>⑨</p> <p>The features differentiates from Kundi breed</p> <table border="1" style="width: 100%; height: 40px; border-collapse: collapse;"> <tr> <td style="width: 100%; height: 40px;"></td> </tr> </table>																					
<p>⑩</p> <p>Purity Percentage</p> <p>_____ %</p>	<p>⑪</p> <p>Judge's Code</p> <table border="1" style="width: 100%; height: 20px; border-collapse: collapse;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px; text-align: center;">-</td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>			-						<p>Signature</p> <p>_____</p>											
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<p>⑫</p> <p>Date of Report</p> <table border="1" style="width: 100%; height: 20px; border-collapse: collapse;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px; text-align: center;">/</td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px; text-align: center;">/</td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>			/			/					<p>⑬</p> <p>Reporter's Code</p> <table border="1" style="width: 100%; height: 20px; border-collapse: collapse;"> <tr> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px; text-align: center;">-</td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> <td style="width: 20px; height: 20px;"></td> </tr> </table>			-						<p>Signature</p> <p>_____</p>	
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		-																			

When a farm become a new member of KBBA, their buffalo herds will be ear-tagged. Or when a member introduces new buffalo without ear tag, that buffalo will be ear-tagged. For those cases, a reporter will fill Ear Tag Attachment Report and submit to the secretariat.

Judge assigned by the secretariat will make judgement of purity percentage of Kundhi Breed.

The both signatures of a reporter and a judge are required on an Ear Tag Attachment Report.

The recommended order of ear tagging of the herd is as follow;

- a) Male buffalo currently used for mating in descending age order (elder to young) female buffalo which has blood relation with other buffalo in descending age order (elder to young)

This order is convenient for filling Ear Tag Attachment Report.

(1) How to fill Ear Tag Attachment Report

1) Ear Tag Number & Name (See①)

Write an ear tag number of ear-tagged buffalo.

2) Name (See②)

Write name of an ear-tagged buffalo if a member named it.

If no name is given to a buffalo, write registered name of a farm followed by last 3 to 4 digit numbers printed with big letters on the bottom side of the ear tag.

3) Date of Birth (See③)

Write date of birth of an ear-tagged buffalo in DD/MM/YYYY order.

In case a farmer knows only birth year, give 1st July as a date and month of the birth.

In case a farmer knows only birth year and month, give 15th as a date of the birth.

Example: 01/07/2000 15/01/2000

4) Sex (See④)

Check the sex of a buffalo and fill the code either 1 for female or 2 for male.

5) Sire's Ear Tag Number & Name (See⑤)

Write Sire's ear tag number and name

In case sire is not exist and cannot be ear tagged, keep the Sire's ear tag number column blank. Write a name of it referring to the record of a farm or memory of care-taker or farm owner.

6) Dam's Ear Tag Number & Name (See⑥)

Write Dam's ear tag number and name

In case Dam is not exist and cannot be ear tagged, keep the Dam's ear tag number column blank.

Write a name of it referring to the record of a farm or memory of care-taker or farm owner.

7) Dam's Farm Name (See⑦)

Write Dam's farm name referring to Dam's tag number and pedigree certificate.

8) Fame Code (See⑧)

Write a farm code number of a farm rearing an ear-tagged buffalo.

9) The features differentiate from Kundhi breed (See⑨)

Write if any features differentiate from Kundhi breed is found with a calf. Those features should be eliminated genetically including white spot on foreheads, white tail, white spot on a body, white spot on the foot should be noted. Brown hair and different horn shape (NB: it might be difficult to judge in case of a newly born calf), if any, should be noted as well.

10) Purity % (See⑩)

Write purity percentage of an ear-tagged buffalo according to judgement by a judge assigned by the secretariat.

Purity % is a degree of purity as a specific breed. At the initiation of registration, purity shall be determined by an examiner based on his/her judgment. Once initial registration is done, purity % of each buffalo shall be calculated from the purity of their parents. Calculated percentage shall be round off at the decimal point.

11) Judge's Code & Signature (See⑪)

Write judge's code given to a judge who make judgement of purity percentage. Make signature on the report by a judge.

12) Date of report (See⑫)

Write a date of report in DD/MM/YYYY order.

13) Reporter's Code & Signature (See⑬)

Write reporter's code given to a reporter who fills a proforma. Make signature on the report by a reporter.

14) Checking contents of Ear Tag Attachment Report

Once filled an ear tag attachment report proforma, check again if there is no blank column and error.

(2) Submission of Ear Tag Attachment Report

Once an ear tag attachment report is filled, submit it immediately to the secretariat.

5.Membership Application Form

Membership Application Form

* Name of Farm

* Name of Representative of a Farm

* Telephone number

* Address

I agree with the objective of the association and will become a member of the association.

Date

/ /

Farm Code

 - -

Reporter's Code

 - -

Signature

Those farms wish to make pedigree registration of their buffaloes must be a member of KAAB. Those who wish to become a member shall fill the form below and submit to the secretariat.

Farm code will be given by the secretariat once they accept a farm's membership. The farm code column should be kept as blank when a farm fills an application form.



**The Project on Sustainable Livestock Development
for Rural Sindh “PSLD”
(JICA Technical Cooperation)**

**Textbook for Genetic Improvement of
Kundhi Buffalo**
(Developing Foundation for Genetic Improvement of Kundhi
Buffalo)



December 2018

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This textbook has been developed for the use of livestock professionals. The Livestock and Fisheries Department, Government of Sindh welcomes your comments and suggestion to improve this material.

Developed by The Project on Sustainable Livestock Development for Rural Sindh

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Preface

Livestock is the largest sub-sector in agriculture of Pakistan, contributing 11.4 percent to overall GDP of the country. Livestock plays vital role in rural economy and livelihood of rural poor, so as in rural Sindh. It is a source of cash income, nutrition and sometimes only asset for the rural and marginalized people.

The Project on Sustainable Livestock Development for Rural Sindh (The Project) is the 5 years technical cooperation project implemented in collaboration with the Livestock and Fisheries Department, Government of Sindh and Japan International Cooperation Agency (JICA), Government of Japan, aiming for creating foundations of sustainable livestock sector development in Sindh province, which benefit small scale dairy farmers who comprises more than 80 percent of the sector. The Project was initiated in February 2014 and implemented in 5 pilot districts, namely Matiari, Hyderabad, Tando Muhammad Khan, TandoAllahyar and Badin. The Project focused on development of appropriate technologies for dairy farming. Throughout five years of implementation, appropriate technologies were developed, piloted and verified for the use of small scale formers in Sindh province. Along with the appropriate technologies, useful basic technologies for livestock professional technicians were developed. The technologies range over 7 areas, namely, farm management, marketing, feeding management, fodder, animal health, animal reproduction and livestock genetic improvement. The Project worked on effective utilization of livestock resources, i.e. calves and dry buffaloes in the commercial cattle colony as well. Method for salvation of calves and dry buffaloes were verified.

Technologies developed by the Project are compiled as textbooks, guidelines and booklets for wider application and dissemination to professional technicians, and ultimately to farmers. The Livestock and Fishery Department hope that these series of publications will widely be used by livestock professional technicians both public and private and dairy farmers in Sindh province for uplifting their livelihood.

Director General / Project Coordinator
The Livestock and Fisheries Department
Government of Sindh

Foreword

The Project on Sustainable Livestock Development for Rural Sindh is implemented in Southern parts of Sindh Province, Pakistan in collaboration with Livestock and Fisheries Department, Government of Sindh and Japan International Cooperation Agency (JICA). The Project was supported by the team of Japanese experts led by Mr. Hiroshi Okabe.

There are several good dairy breeds reared in Sindh, Pakistan, for example dairy Red Sindh breed in zebu cattle, Kundhi breed in dairy river buffalo, and other goats and sheep. These domestic animals have been reared under the severe hot and dry weather for centuries, date back to B.C. 2,500 in Mohenjo-Daro. Those dairy animals have been offering milk to residents in the area, which made selection of individual animals at farmer's level.

These Pakistani indigenous dairy breeds produce less milk than dairy animals reared in the developed country. They are, however, highly resistant against severe weather condition, rough feeding management and endemic diseases.

In consideration of the limited project period of 5 years, the Project put focus on Kundhi breed which account for 70% of milk source of Sindh. Kundhi breed is regarded as a pride of Sindh as well. The improvement of capacity of Kundhi breed meeting the demand of the present age was the target of the Project. To do that, the Project attempted to develop technology of genetic improvement and lay a foundation of genetic improvement activities and program. The Project had to start these activities from scratch. The Project experienced difficulties to carry out these activities. Nevertheless, the concerted efforts of forward-looking support from Mr. Ali Hyder Shah, the president of Matiari breeders' association, technical guidance from Mr. Yoshio Chiba, the experienced ex-officer of The Holstein Cattle Association of Japan, earnest Pakistani technicians, Dr. Muhammad Mubarak Jatoi, Dr. Ali Akhtar Shahani and efforts of Ms. Zahida Soomro made the Project attempt successful. Various technologies of genetic improvement were developed and experiences were accumulated.

Genetic improvement activities require time. Pedigree registration and milk tests of the Kundhi breed piloted by the Project should be continued as long as possible. For the continuity of these activities, genetic improvement activities are better to be carried out by breeders themselves. The materialization of this concept is, nevertheless, still under process. The technical guidance and follow up of the activities for the breeders association from the Livestock and Fisheries department are indispensable till the time when all activities will be run by the breeders association alone. The Project requests the Livestock Department to provide such support to the breeders association.

Last but not least, the Project would like to express gratitude to The Holstein Cattle Association of Japan, who kindly introduced Mr. Yoshio Chiba to the Project and developed the pedigree registration software, Breeder farmers rearing Kundhi buffaloes and concerned technicians worked together with the Project.

December 2018

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Chapter 1 Background

1.1 The current situation of genetic improvement in Pakistan

In developed countries, genetic improvement of large dairy domestic animals is based on the results of genetic evaluation with the latest analysis method. Analysis is made with the pedigree data of several generations of both sire and dam, milking capacity of individual animal and body size information in relation with lifetime productivity.

Based on this information, low capacity female animals are eliminated. Remaining female animals are used for milking and the herd for further selection of genetically superior next generation. The selections of genetically superior animals are done according to this process.

Bulls used for reproducing genetically better generation are selected based on the results of a progeny test which evaluate genetic capacity of bull with the data of milking capacity of their daughters and their physical ./ appearance.

This selection process has long been continuing till now without interruption.

The area from t centre to the South of Pakistan is hot and dry. Zebu pure, cross breed of zebu cattle and European cattle, and buffalo Nili-Ravi breed and Kundhi breed have adaptation to the climate in the region and have been reared for centuries. These breeds have not been scientifically improved enough and reared as it is so far.

Progeny tests and genetic improvement of animals through introducing artificial insemination are partially introduced by the federal government or a provincial government. Nevertheless, they have yet to widely applied all over the country. Especially, in the case of buffaloes, still natural mating is popularly applied.

In the light of this background, the Project started the activity of genetic improvement with collecting information related to genetic improvement in the field, sorting them out and developing information system.

1.2 Principles of technical guidance regarding genetic improvement by the Project

In the beginning, the Project planned to develop and verify a model of genetic improvement by targeting two indigenous breeds, i.e. Kundhi buffalo and Red Sindhi zebu cattle. However, the Project had to start the activities from scratch and develop a model within the limited time period. After observing the actual situation, the Project decided to focus only on Kundhi buffalo to establish a model. Through a process of developing a model, technical guidance is provided to technicians and breeder farmers. This practical strategy was applied by the Project. The reasons for selecting Kundhi buffalo as a target breed are as follows;

- a) Number of heads and farmers rearing Kundhi buffalo is more than those of red Sindhi¹. Average number of heads reared per household of those buffalo is larger than red Sindhi as well.
- b) Economic benefit of buffalo is higher since buffalo is heavier than Red Sindhi, which is more profitable in case animals are sold for meat if not used for dairy purpose.

Besides, Kundhi buffalo reared by breeder farmers seems maintaining more purity than those of other buffalo breed and are expected to be more productive. With these presumptions, it was planned to identify potential elite breeding bull with milk test data and liner classification data while clarifying blood relationship of concerned buffaloes. These bulls are supposed to be provided to villages as community bulls. The Project planned to establish such a model. The cooperation from breeder farmers and their active participation are the keys to succeeding in genetic improvement activities. The pride in the indigenous breed of farmers and concerned people are motives for promoting genetic improvement of breeds.

1.3 Characteristics and current situation of Kundhi buffalo in Sindh

Buffaloes reared in Sindh are Kundhi pure breed and Kundhi cross breed. Judging from the horn shape, it seemed that this breed was originated from river buffalo Murrah. The features of Kundhi breed are appeared in faces, body shape and horn shape. Kundhi cross breed often showed the influence of the Nili- Ravi breed, namely, white spots on tail, forehead and legs. Kundhi in District Matiari showed influence of Murrah breed such as heavy body, crude looking rectangular face, specific way of sprouting horns and specific shape of sectional view of horns. Kundhi buffalo carrying these characteristics are locally called as 'Goshi'.

Kundhi breed has jet black and compact body. These typical characters are often found in Kundhi reared in District Badin. Some of Kundhi breed reared in Badin, however, showed influence of Jaffrabadi breed, i.e. hanging down horn along with a face. Kundhi buffaloes reared in district Badin, therefore, cannot be said as 100% pure Kundhi breed as well.

According to the milk test data obtained from the Project activities, milk production of big body Kundhi buffalo reared in District Matiari was higher than compact body Kundhi in District Badin.

1.4 Current situation of Breeding and Genetic Improvement of Kundhi buffalo

Natural mating is common among Kundhi buffalo reared in Sindh. Breeding bulls are reared either landowners or farmers. The selection of those breeding bull were not clearly defined by anyone. Farmers might give an answer that the bull is the calf of buffalo produced xx kg of milk per day. They might tell us that they occasionally buy breeding bull from outside to avoid inbreeding. Ten numbers of breeder farms selected by the Project for the project pilot activities were mainly owned by land owners. They have been

¹ (7.34 million heads of Kundhi buffalo and 6.93 million heads of Red Sindhi; the statistics of Sindh in 2006)

rearing Kundhi buffaloes for long time. The proper record of pedigree, mating, milk production were not available. The only record is the memory of care takers of buffaloes working at farms.

Some breeder farms have inherited buffalo herds from their forefathers. They take good care of their herds for maintaining honor of their family. Milk produced from their animals is sometimes distributed to their tenant farmers by tradition. Some farmers milking their animals two times per day up to 3 months after parturition then shift to one time milking from 4th month for the reason of maintaining good health of milking buffaloes. Their priority is not making profit out of milk production. Lack of motivation to improve the productivity and profitability of their herds among breeder farmers was the hindering factor for the activities of genetic improvement.

Chapter 2 Plan and outcome of pedigree registration of Kundhi buffalo

2.1 Background of pedigree registration mechanism

The Project visited pilot farms and breeder farms rearing pure Kundhi buffaloes to collect information on Kundhi buffaloes. Variety of characteristics and body shape were found among so-called pure Kundhi buffaloes. Pure Kundhi buffaloes are said to be jet black color. Considerable ratio of Kundhi buffaloes, however, have white tail and white spot on their foreheads. With consideration of these conditions, the Project examined the framework of pedigree registration system to be piloted in the Project activities.

2.2 Framework of pedigree registration

Framework of pedigree registration designed by the Project was as follows;

2.2.1 Principles of Pedigree Registration

Pedigree registration shall be carried out by the Sindh livestock breeder association (Provisional name. Hereinafter called 'the association'). The purpose of pedigree registration is to maintain pure Kundhi breed buffaloes and to disseminate the improved group of good genotype in the region. The association will be formed and operated by a group of breeders who work under the same objectives. The association will be operated as per the rules and regulations made by the association. Pedigree will be registered as per the procedures stipulated in the registration regulation of the association. Farms who participate in the pedigree registration shall become members of the association.

Strategies for pedigree registration of the association are as follows;

- 1) The association will induce more farms into pedigree registration practice.
- 2) The association will encourage farmers to register more number of Kundhi buffaloes.

2.2.2 Personnel setup for Pedigree Registration

(1)Registrar:

The association shall commission technicians of concerned district offices registrars. Registrars shall put ear tags, fill the ear tag attachment form, identify each buffalo of the member farm and report to the association.

(2)Examiner:

Examiner is full-time staff of the association who judge purity percentage of Kundhi. The association may commission technicians outside the organization to work as examiners upon necessities.

2.2.3 Ear tagging and reporting

(1)The association puts ear tags on all buffalo farms participating in the pedigree registration practice. Ear tags issued by the association (or the project) are used.

(2)A registrar records 1) ear tag number, 2) sex, 3) date of birth, 4) name and ear tag number of the father, 5) name and ear tag number of the mother, 6) name and address of the owner of the ear tagged buffalo onto the format and report to the association.

(3)When a registrar identifies features (such as white spots on tail and forehead etc.) which differentiate those buffaloes under examination from pure Kundhi breed and features which should be eliminated, s/he reports those features of buffaloes to the association.

2.2.4 Pedigree registration

Information of each buffalo sent to the association shall be recorded into the database. Pedigree registration certificates shall be issued for those buffaloes which come under the following criteria.

(1) Criteria

1) Criteria for initial registration of buffaloes of a herd

A buffalo has to show certain purity percentage to be registered. For male buffalo, purity should be 80% or more. For female buffalo, 47% or more purity shall be registered even they have features which differentiate it from Kundhi breed and that should be eliminated. A purity percentage of a buffalo shall be written in a certificate.

2) Criteria for registration of calves born after initial registration of a herd

a) A male buffalo

Purity percentage of calves calculated from purity percentage of sire and dam is registered. Total purity percentages of sire and dam divided by two is regarded as a purity percentage of a calf. In case male calf has features such as white spots on tail and forehead etc. which differentiate it from Kundhi breed and that should be eliminated, those male calves need not be registered.

b) A female buffalo

Purity percentage of calves calculated from purity percentage of sire and dam is registered. Total purity percentages of sire and dam divided by two is regarded as a purity percentage of a calf. In case female calf has features such as white spots on tail and forehead, which differentiate it from Kundhi breed and that should be eliminated, purity percentage is set to be 25 point less than purity percentage calculated from sire and dam purity percentage. Although purity percentage of a female calf calculated as less than 47%, a female calf is remained registered as 47% purity buffalo.

$$\text{e.g.1: } (\text{♂}100\% \times \text{♀}75\%) \div 2 = 88\% \quad \Rightarrow \quad 88 - 25 = 63\%$$

$$\text{e.g.2: } (\text{♂}80\% \times \text{♀}47\%) \div 2 = 64\% \quad \Rightarrow \quad 63 - 25 = 39\% \text{ (This buffalo is to be registered as 47\%)}$$

In case features which differentiate from Kundhi breed (such as changes of horn shapes) appear while a buffalo is growing up, an examiner might change its purity percentage based on his/her judgment. Registration will be cancelled for a male buffalo whose purity percentage is lower than 80%. In other words, in case any features which differentiate from Kundhi breed is found, those male buffaloes are cancelled

from registration since reduction of 25 points means 75% purity even it is recognized as 100% purity initially.

In case of female buffalo, purity percentage is set to be 25 point less than original purity percentage. Although purity percentage of a female buffalo calculated as less than 47%, a female buffalo is remained registered as 47% purity buffalo.

- c) A father should be registered Kundhi.
- d) A mother should be registered Kundhi. Nevertheless, mother can be unregistered if it shows its capability for improving as registered breed.

(2) Purity %

Purity % is a degree of purity as a specific breed. At the initiation of registration, purity shall be determined by an examiner based on his/her judgment. Judgment shall be done by checking 1) color of hair, 2) shape of horn, 3) shape of face, 4) balance between forelegs and fore-quarter and so on.

Once initial registration is done, purity % of each buffalo shall be calculated from the purity of their parents. Calculated percentage shall be round off at the decimal point.

e.g.) ♂ 97% × ♀ 88% ⇒ (97 + 88) ÷ 2 = 92.5 ⇒ 93%

Purity of a mixed female buffalo is regarded as 0%. Improvement of purity of these female buffaloes shall be done by mating with a pure male Kundhi (93% or more). A 50% purity female buffalo can become 100% pure Kundhi after 7 generation provided every time female buffaloes shall be mated with 100% pure male Kundhi.

Generation and Purity %						
					♂(100%)	♀(100%)
				♂(100%)	♀(100%)	
			♂(100%)	♀(97%)	♀(99%)	
		♂(100%)	♀(94%)			
	♂(100%)	♀(88%)				
♂(100%)	♀(75%)					
♀(50%)						
(1st Generation)	(2nd Generation)	(3rd Generation)	(4th Generation)	(5th Generation)	(6th Generation)	(7th Generation)

2.2.5 Pedigree registration certificate

1) Male

Pedigree registration certificate shall be issued for those buffaloes whose purity is 80% or more.

2) Female

Pedigree registration certificate shall be issued for those buffaloes whose purity is 47% or more.

2.2.6 Management of reproduction information

When an ear tagged female buffalo is conceived, a farmer and an examiner shall submit a pregnancy report to the association. The association records data in the pregnancy report into the database.

2.2.7 Report on changes

When an ear tagged buffalo of a member farm either dies, sold or received, a member shall inform to the association. The association records those changes into the database.

2.3 Registration of members

As of July 2018, the Sindh livestock breeder association (provisional name) has not been created. The existing organization, the Livestock Breeder Association District Matiari, temporarily is working with the Project to carry out activities. Prior to pedigree registration and attachment of ear tag of buffaloes, the Project registered farms that the Pakistani Counterparts specialized in genetic improvement activities recommended and those who wish to participate in pedigree registration activities. Some breeder farms are located in the other districts than Mariari. They are, however, practically members of Livestock Breeder Association District Matiari. Generally, farmers who wish to get registration their animals agree with the objectives of the organization that provides registration services (such as register association or breeders' association) and become members of the organization. An association registers their animals according to rules and regulation of the association and issue pedigree registration certificate to member farms.

When breeders establish breeders association for pedigree registration, membership rules can be developed as follows;

(Member)

The members of this association are those farms or organizations who support the purpose of his association and own or rear Kundhi buffaloes for breeding purpose.

(Becoming a member)

Those farms or organizations who wish to become member of this association have to submit the application form of the association and get approval from the board of directors of the association. (Membership fee)

The members have to pay an annual membership fee decided at the general assembly of the association.

2.4 Procedure of starting pedigree registration

The Project developed the criteria of selecting member farms, number of farms and registration procedure

to pilot pedigree registration of Kundhi buffalo in Sindh for the first time. The pilot activities were carried out according to the following procedures.

2.4.1 Selection of Farms

(1) Criteria

- 1) The farm has will to improve Kundhi breed buffalo.
- 2) About 2/3 of animals owned by the farm are recognized as Kundhi pure breed.
- 3) The farm keeps records of blood relationships of each buffalo.
- 4) The farm keeps records of reproduction.
- 5) The farm agrees to become a member of the association.
- 6) The farm agrees to put ear tags on all Kundhi and like Kundhi buffalo in their farms.
- 7) The farm agrees to make pedigree registration all their Kundhi buffalo which can be registered as Kundhi (47-100% for female, 80-100% for male).
- 8) The farm agrees to carry out milk test of all pedigree registered Kundhi buffalo (Principle idea, but will be decided according to situations).
- 9) The farm agrees to report the association every month about changes on their Kundhi buffaloes including birth, death, purchase and sell as well as about buffaloes' pregnancy through registrar.

(2) Number of farms to be selected

Number of farms to be selected in the first year, i.e. year 2014 shall be limited to 10.

2.4.2 Preliminary activities for starting pedigree registration

(1) Explaining necessities and advantages of pedigree registration to farms

The association shall explain to those farms who wish to participate in the pedigree registration about the necessity of genetic improvement and the following advantages of pedigree registration.

- 1) A buffalo can be identified and its pedigree can be verified.
- 2) Preservation of genetically superior buffaloes is ensured.
- 3) Purity degree (47–100% for female, 80-100% for male) can be clearly identified.
- 4) Inbreeding can be avoided.
- 5) Additional information including milk production, type conformation and others which give advantage in the marketing.

(2) Consent from farms

The association shall receive consent from farms on the item no. 4) to 9) in 2-4-1).

(3) The association shall record the following information of farms into the databases.

- 1) Farm name
- 2) The name of owner of a farm
- 3) The address of the farm

- 4) Telephone number
- 5) Others

2.4.3 Attachment of ear tags

- (1) Put ear tags on all Kundhi buffalo to be registered in the farm. It is preferable to allot sequence ear tag number in descending order of their age.
- (2) The information on each ear tagged buffalo shall be recorded onto the form attached (Form No.1)
 - 1) The year of birth must be recorded onto the above form (Form No.1). In case month and date of birth are not known, the column for month and date of birth shall be left blank.
 - 2) In case parents does not exist, the column of parents' ear tag number shall be left blank and their name shall be recorded in the column of parents' name, which enable to identify each individual.
 - 3) In case paternal and maternal grandparents are identifiable, their names shall be recorded onto the form (Form No.1). The column for the ear tags shall be left blank.
- (3) Identification of pregnant buffaloes
When pregnancy of an ear tagged buffalo is confirmed, necessary data shall be recorded on the form (Pregnancy form).

2.4.4 Judgment of Purity percentage

- (1) A buffalo which has features of Kundhi breed can be registered even its' ancestors cannot be identified due to lack of records.
- (2) Purity percentage shall also be given to a buffalo which cannot be recognized as pure Kundhi. Purity percentage (47 – 100% for female; 80%-100% for male) shall be given according to their features.
- (3) Examiners (or the project for the initial period) commissioned by the association shall judge the purity percentage of an individual buffalo and record data onto forms (Form No.1).

Table2-1 Characteristics of Kundhi Buffalo

Trait	Score	Description
Skin and hair color	15	Jet black skin and hair is the most common and most popular color. The skin is thin, soft, smooth and Jet black with scanty hair
Horn type	25	Short thick at the base, inclined backward and upward, and end in a moderately tight curl.
Head	20	Comparatively small, sharply and clean cut in females but coarse and heavy in bull. The fore head is broad and slightly prominent in bull.
		Face : Fine hollow without white markings
		Nostrils : Wide apart
		Eyes : Prominent, active and bright in females
		Ear : Small, thin and pendulous
Fore Legs and Feet	10	Short and straight. Hooves are black and inter digital space is small
Tail	20	Long, thin and flexible and usually extends up to the middle of fetlock ending in black tuft.
Body weight	10	Smaller than the Nili-Ravi buffaloes, with a live weight of 320-450 kg.
	100	

In case the features differentiates from Kundhi breed is identified, 25 points will be deducted from purity % of those animals calculated according to the above table. In case of female, 47% purity is given even if it becomes less than 47% of purity.

Traits to be judged;

1) Color of coat, 2) Shape of horn, 3) Shape of a face (a frame and eyes) , 4) balance between forelegs and fore-quarter and so on. (will be decided later).

2.4.5 Database and registration

Data of all ear tagged buffaloes are recorded into the database managed by the association (the project). The buffaloes that fulfil the criteria for Kundhi breed shall be registered.

2.5 Reporting format

Various format used for pedigree registration are shown below.

(1) Membership Application Form

Membership Application Form

* Name of Farm

* Name of Representative of a Farm

* Telephone number

* Address

I agree with the objective of the association and will become a member of the association.

Date / / Farm Code - -

Reporter's Code - - Signature _____

Fig. 2-1 Membership Application Form

(2) Ear Tag Attachment Report

Ear Tag Attachment Report

Ear Tag Number Name

Date of Birth / / Sex 1: Female 2: Male

Sire's Ear Tag Number Dam's Ear Tag Number

Sire's Name Dam's Name

Dam's farm name Farm code - -

The fatures differentiates from Kundi breed

Purity Percentage _____ % Judge's Code - - Signature _____

Date of Report / / Reporter's Code - - Signature _____

Fig. 2-2 Ear Tag Attachment Report

(3) Pregnancy Report

Pregnancy Report

Ear Tag Number of Pregnant Buffalo Name of Pregnant Buffalo

Farm Code - - Farm Name

Sire's Ear Tag Number Sire's Name

Mating or AI

Date of Mating or AI / /

Sire's Owner's Farm Code - - Name of Sire's Owner's Farm

Date of Report / /

Reporter's Code - - Signature _____

Fig. 2-3 Pregnancy Report

(4) Birth Report

Birth Report

Ear Tag Number Name

Date of Birth / / Sex 1: Female 2: Male

Sire's Ear Tag Number Dam's Ear Tag Number

Sire's Name Dam's Name

Dam's Farm Name

Farm code - -

The fatures differentiates from Kundi breed

Date of Report / /

Reporter's Code - - Signature _____

Fig. 2-4 Birth Report

(5) Change Report

Change Report	
Ear Tag Number of Buffalo <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	Date of Change <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/>
Content of Change <input type="checkbox"/>	(1 : Sold 2 : Purchased 3 : Dead 4 : Sold for Meat)
Farm Code <input type="text"/> - <input type="text"/> <input type="text"/> - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	Farm Name <input type="text"/>
Date of Report <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/> / <input type="text"/> <input type="text"/>	
Reporter's Code <input type="text"/> - <input type="text"/> <input type="text"/> - <input type="text"/> <input type="text"/> <input type="text"/>	Reporter's Signature _____

Fig. 2-5 Change Report

Chapter 3 Pedigree registration software for Kundhi buffaloes

3.1 Development of pedigree registration software

Based on the pedigree registration activity plan and frame work explained in the chapter 2, the Project developed the pedigree registration software. The software is 1) to input data filled in the reports, 2) to prepare database of various information, 3) to judge eligibility for registration of individual animals, 4) to issue pedigree certificates and 5) to search and print out necessary information. Development of the software was commissioned to the Holstein Cattle Association of Japan. The Holstein Cattle Association of Japan carries out pedigree registration of dairy animals in Japan. It was established in 1948 and took over pedigree registration data of Holstein cattle in Japan started since 1890. The pedigree registration data obtained are computerized and kept in the computer system. The Holstein Cattle Association issues pedigree certificates to farms. Besides, it disseminates various information necessary for dairy farmers through various media. It has good experiences and knowledges of pedigree registration system and developing software so that it is most suitable organization to develop software for Kundhi pedigree registration software for the Project. The Project, therefore, selected the Holstein Cattle Association of Japan for assigning development of software.

The software was delivered to the Project in March 2015. The operability was reviewed and revised through pilot activities. The software currently in use was completed in 2017.

3.2 Characteristics of the pedigree registration system of buffalo & cattle

- 1) This system is to build up kin information mainly of KUNDHI buffalo bull and to prepare a pedigree certificate.
- 2) This system is built on Microsoft Access 2013.
- 3) For entering information, only a keyboard is required.
- 4) This system doesn't have a function to print a screen (hardcopy).

[Outline of the pedigree registration system]

Outline of the pedigree registration software is explained as follows;

Main Menu

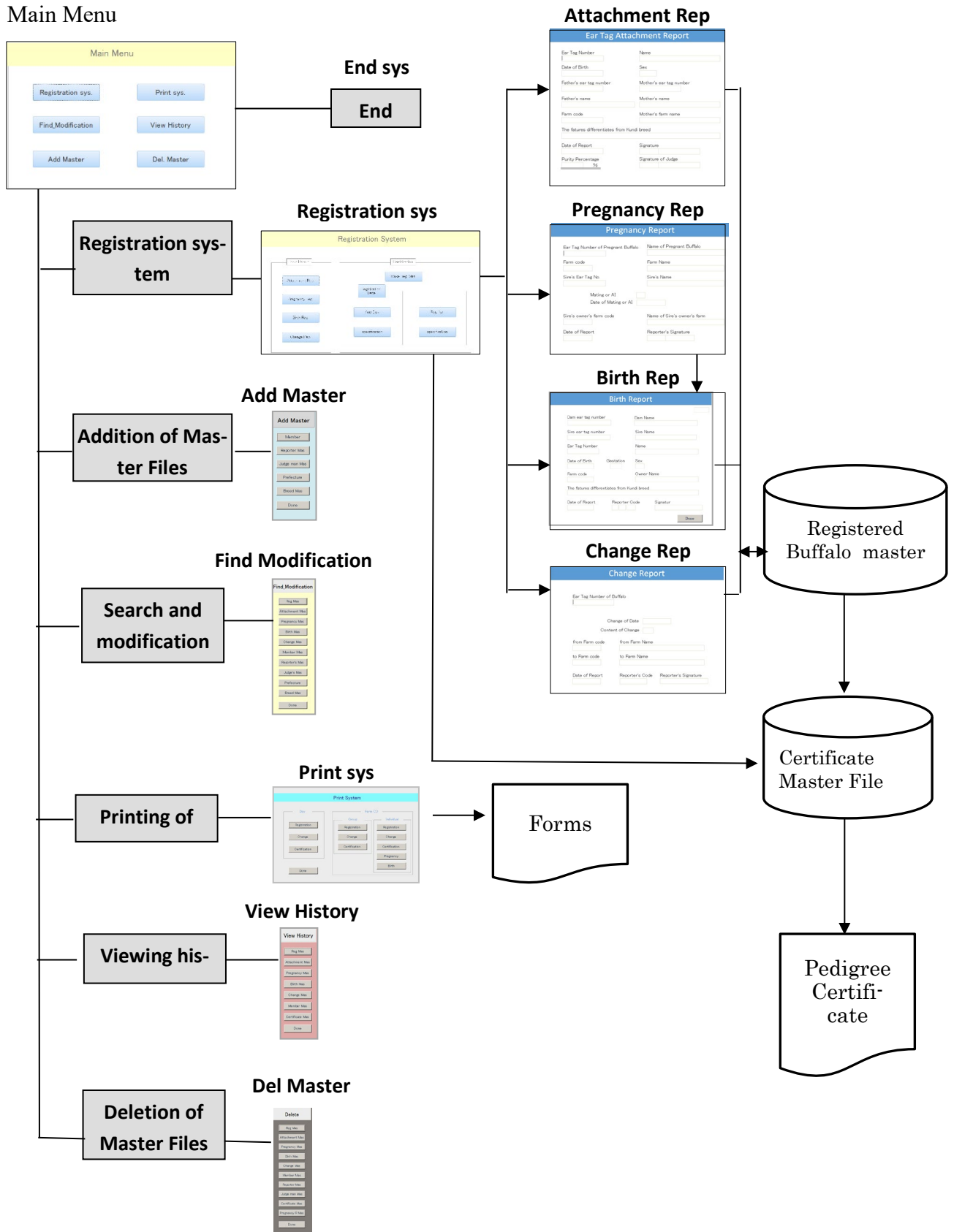


Fig 3-1: Outline of the pedigree registration system of buffalo & cattle

3.3 Overview

1) Main Menu

Main menu appears right after starting the software. Six buttons are shown on the screen. To close the software, click 'End sys' button.

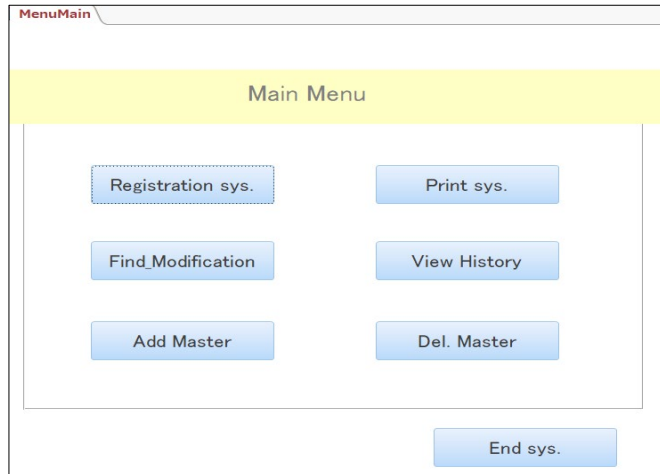


Fig.3-2 The screen of Main Menu

(1) Registration sys.

To enter various reports (Ear Tag Attachment, Pregnancy, Birth and Change) and to issue pedigree certificates.

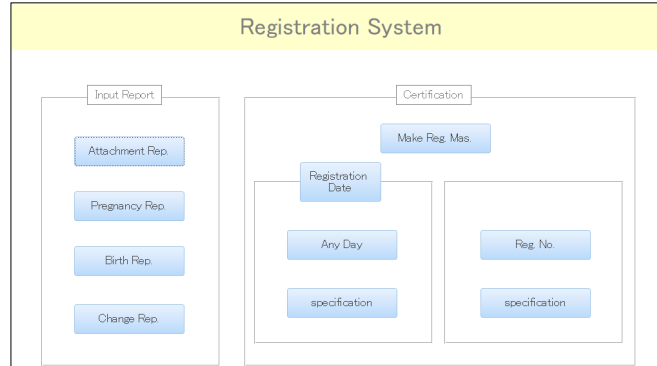


Fig.3-3 The screen of Registration System

(2) Find Modification

To search and modify various Master Files.

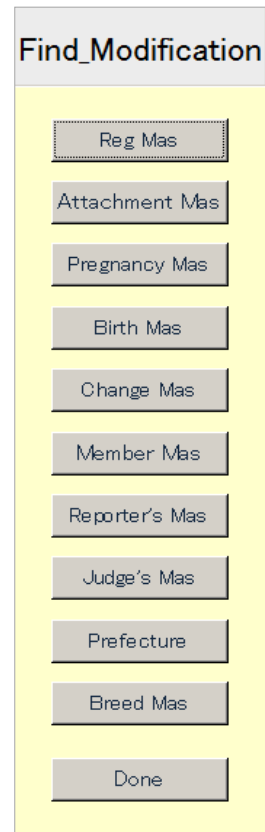


Fig. 3-4 The screen of Find Modification

(3) Add Master

To enter basic information: membership, Reporter, Judge Man, district and breed.

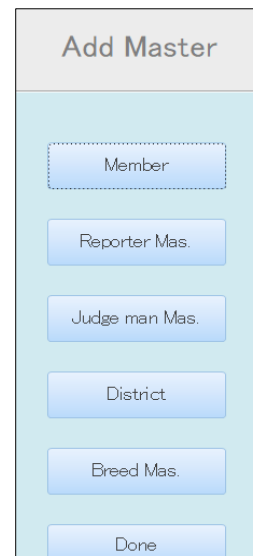


Fig.3-5 The screen of Add Master

(4) Print sys.

To print various forms.

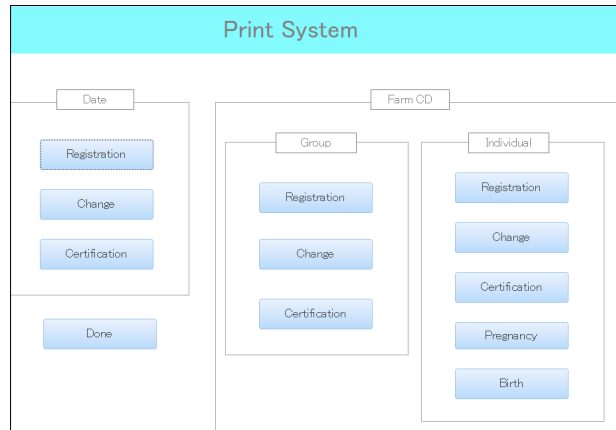


Fig.3-6 The screen of Print System

(5) View History

To see update history of various Master Files(Reg Mas. Attachment Mas. Pregnancy Mas. Birth Mas. Change Mas. Member Mas. Certificate Mas.

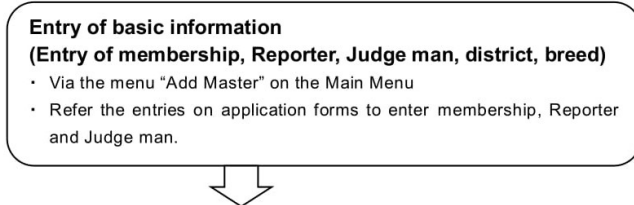
(6) Del. Master

To delete various Master Files (Ear Tag Attachment, Pregnancy, Birth, Change, Membership, Reporter and Judge man).

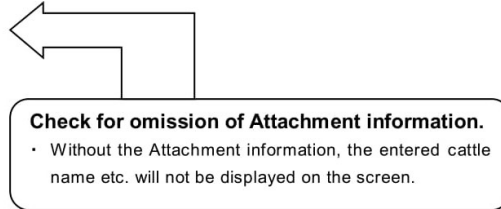
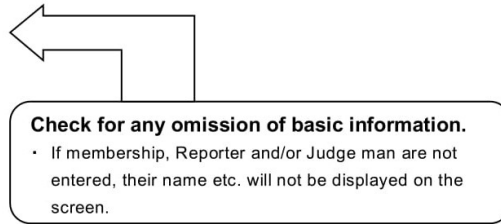
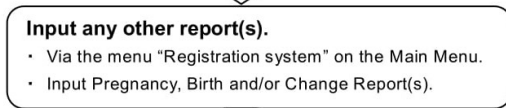
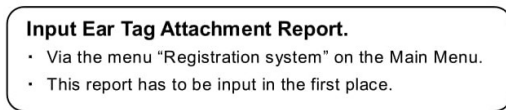
3.4 Procedure overview of the pedigree registration system

Overall procedure from data inputs to printing out pedigree certificates are shown in the figure below.

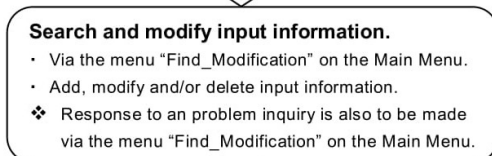
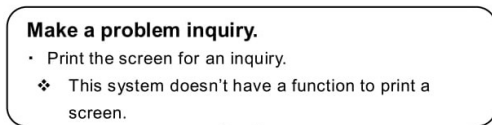
1. Creation of basic information



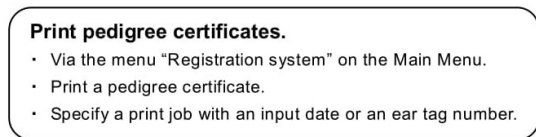
2. Input of Reports



3. Problem inquiries and search and modification of input information



4. Printing of pedigree certificates



- **Note**
- Lists of registered cattle, pregnant cows and born cattle can be respectively printed per farm in a form format.
 - The number of certificates issued for pedigree and/or Change can be printed per farm in a form format.

Fig.3-7 Procedure overview of the pedigree registration system

3.5 Procedure

Operational procedures are explained below. For the details, please refer to the attached operational manual.

(1) Creation of basic information

Click 'Add Master' on the Main Menu screen. The figure xx 'Add Master' window is appeared. Click one of 'Member', 'Reporter Mas', 'Judge man Mas', 'District', and 'Breed Mas' to input data of each information.



Fig.3-8 The screen of Add master

1) Reporter mas.

First of all, a reporter name who collect and inspect data at farms need to be inputted. Click 'Reporter mas' to show 'new reporter code' screen. Input name of a reporter. This data allows to give clear responsibility of data to each reporter who collects information. Once any issues are found, that reporter has to rectify those issues.

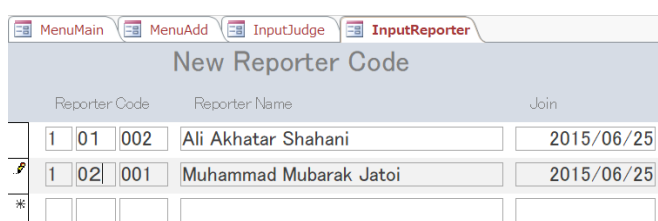


Fig.3-9 The entry screen of Reporter mas.

Six codes number are given to each reporter. One digit for a province, two digits for districts and 3 digits for individual reporters. In the Project, code 1 was given to first digit, which represents Sindh province. District code 01 represents Matiari, 02 represents Tando Muhammad Khan, 03 Badin, 04 Tando Allahyar and 05 Hyderabad. This information was reflected in the master data.

2) Judge man Mas.

Input data of a judge who make judgement of purity percentage of Kundhi buffalo. Some reporters works as a judge at the same time. Click 'Judge Man mas' button to show 'new judge man code' screen. Input 6 digits code. In case liner classification will be carried out in future, input data of a judge for liner classification onto the same screen.

Judge man Code	Judge man Name	Join
1 01 001	Muhammad Mubarak Jatoi	2015/06/25
1 02 002	Ali Akhtar Shahani	2015/06/25

Fig. 3-10 The entry screen of Judge man mas.

3) District

Give code to each province and district. Click 'District' button and input codes. One digit for a province and two digits for a district. In total three digits are given (Refer to above 1)).

4) Breed Mas.

Breed Mas. Is used for registering code of breed when plural breeds are registered into same software. One digit is given to each breed. The Project targeted only one breed, i.e. Kundhi. The code 0, therefore, was given.

5) Member

Click 'Member' button to show the membership screen. Input the data of members filled in the application form. Member's information was reflected into the master file. Farm code identifies farm owner and printed onto certificates. Number of inputted data will be shown on the column on the right top of the screen. To shift from one screen to another to input another member's data, click 'enter' or 'tab' key. Once data input of members is completed, click 'Done' button.

* Owner Name of a Farm
* Farm Name
* Telephone number
* Address
Farm code
Date
Reporter CD
Signature
UPDT
Done

Fig.3-11 The entry screen of Membership Application Form

(2) Registration System.

Click 'Registration Sys' button to input data of various report and to issue pedigree registration certificates. The screen shown in fig. 3-12 appears. Buttons are categorized into two, i.e. 'input report' and 'certification'. 'Input report' is for inputting data filled onto various reports. 'Certification' is for printing pedigree registration certificates and other related documents. To input various data, click a button of each data.

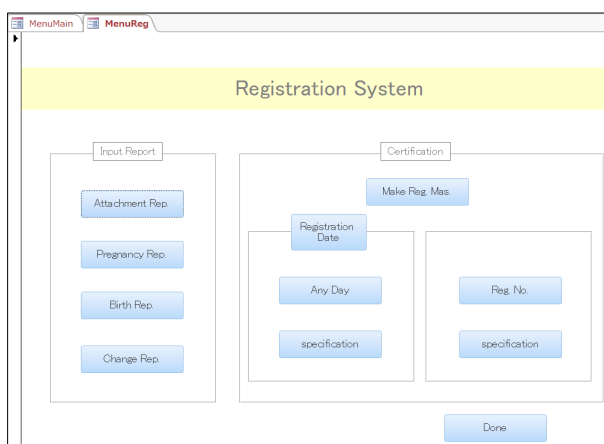


Fig.3-12 The screen of Registration System

(3) Input Report

1) Attachment Rep.

Click 'Attachment Rep' on 'Input Report' screen to input data filled in the ear tag attachment report. In case any notes are written in the column 'The features differentiates from Kundhi breed', accurately input them. When Ear tag number of sire and dam are inputted, name of sire and dam are automatically displayed. When farm code, reporter code and judge man code are inputted, name of farm, reporter, judge man are displayed automatically. In case names are not displayed automatically, mistype of registration numbers and codes or incomplete registration of sire and dam can be possible reasons.

Fig.3-13 The Entry screen of Ear Attachment Report

(ID Display: Display the number of today's input reports in the Attachment Report.)

- Ear Tag Number Entry: Enter a 9-digit ear tag number.
- Name Entry: Enter a cattle name.
- Date of Birth Entry: This item is required to enter.
- Sex Entry: Enter the sex of cattle. Female... 1, Male..... 2
- Sire ear tag number Entry: Enter a 9-digit ear tag number.

(Sire name Display: A sire name on the Registered Cattle Master File is automatically displayed.)

- Dam ear tag number Entry: Enter a 9-digit ear tag number.

- (Dam name Display: A dam name in the Registered Cattle Master File is automatically displayed.)
- g) Farm code Entry: Enter a 7-digit Farm code.
 (Dam Farm Name Display: A dam farm name in the Membership Master File is automatically displayed.)
- h) The features differentiate from Kundhi breed Entry : Enter if it is described in the application form.
- i) Date of Report Entry: Enter the date. (YYYY/MM/DD)
- j) Reporter Code Entry: Enter a Reporter code.
 (Signature Display: A Reporter name in the Reporter Master File is automatically displayed.)
- k) Judge man code Entry: Enter the Judge man code.
 (Signature of Judge Display: A Judge man name on the Judge man Master File is automatically displayed.)
- l) Purity Percentage Entry (Display): Enter a Purity Percentage of the animal as evaluated by the Judge man.
 (If the parents are already registered, a calculated purity percentage is automatically displayed on the right side.)
- m) Done Process button: For exiting the entry screen. Always exit with this button to make sure that other Master Files are updated upon the exit.

2) Pregnancy Rep.

Click 'Pregnancy Rep' on the 'Input Report' screen to input data filled into the pregnancy report. Pregnancy Report screen shown in fig 3-14 appears.

Data of pregnancy registered Kundhi are inputted and reflected in birth report of a calf and pedigree registration. Various code numbers automatically display names. The data are written on a master data file.

(ID Display :Display the number of the today's input reports in the Pregnancy Report.)

Fig.3-14 The entry screen of Pregnancy Report

- a) Ear Tag Number of Pregnant Buffalo Entry: Enter a 9-digit ear tag number.
 (Name of Pregnant Buffalo Display: A pregnant dam name in the Registered Cattle Master File is automatically displayed.)
 (Farm code Display: Display a 7-digit Farm code.)
 (Farm Name Display: A farm name in the Membership Master File is automatically displayed.)
- b) Sire Ear Tag No .Entry: Enter a 9-digit ear tag number.
 (Sire Name Display: A sire name in the Registered Cattle Master File is automatically displayed.)
- c) Mating or AI Entry :Enter the method of insemination.

- d) Input value method of insemination, i.e. Mating..... 0 or AI..... 1
- e) Date of Mating or AI Entry: This item is required to enter. Enter the date. (YYYY/MM/DD)
(Sire owner farm code Display: Display a 7-digit Farm code. Name of Sire owner farm Display: A farm name in the Membership Master File is automatically displayed.)
- f) Date of Report Entry: Enter the date.(YYYY/MM/DD)
- g) Reporter Code Entry: Enter a Reporter code.
(Signature Display: A Reporter name in the Reporter Master File is automatically displayed.)
- h) Done Process button: For exiting the entry screen. Always exit with this button to make sure that other Master Files are updated upon the exit.

3) Birth Reg.

Click 'Birth Rep' button on Input Report screen to display Birth Report screen as shown in Fig 3-15. Input data filled onto the birth report. Farmers are obliged to submit a birth report when registered Kundhi gives birth to a calf irrespective of their sex. Based on date of mating or AI filled in the pregnancy report and birth date of a calf, gestation period of a calf is calculated. Sire data are cross-checked. In case any discrepancy in names of sire in the pregnancy report and birth report, reconfirmation of data is require. In case no pregnancy report is submitted and inputted prior to inputting birth report, warning message of 'no pregnancy record' appears. In case dam is already eliminated, warning message of 'dam was already eliminated' is appeared when inputting code number. By inputting code numbers, names are automatically displayed on the screen.

Fig.3-15 The entry screen of Birth Report

(ID Display: Display the number of the today's input reports in the Birth Report.)

- a) Ear Tag Number Entry: Enter a 9-digit ear tag number.
- b) Name Entry: Enter a cattle name in one-byte uppercase character.
- c) Date of Birth Entry: This item is required to enter. (YYYY/MM/DD)
- d) Gestation Display: When a date of birth is entered, a gestational age is displayed.
- e) Sex Entry: Enter the sex of cattle, i.e. Female..... 1or Male..... 2
- f) Dam ear tag number Entry: Enter a 9-digit ear tag number.
(Dam Name Display: A dam name in the Registered Cattle Master File is automatically displayed.)
(Sire ear tag number Display: A sire ear tag number in the Pregnancy Report is automatically displayed .Sire Name Display :A sire name in the Registered Cattle Master File is automatically displayed.)
(Farm code Display: Display a 7-digit Farm code.
(Owner Name Display: Farm name in the Membership Master File is automatically displayed.)

- g) The features differentiates from Kundhi breed Entry: Enter if it is described in the application form.
- h) Date of Report Entry: Enter the Date.(YYYY/MM/DD)
- i) Reporter Code Entry: Enter a Reporter code.
(Signature Display: A Reporter name in the Reporter Master File is automatically displayed.)
- j) Done Process button: For exiting the entry screen.
(Always exit with this button to make sure that other Master Files are updated upon the exit.)

4) Change Reg.

Click 'Change Rep' button on the Input report screen to show change report screen as shown Fig 3-16. Input data filled onto change report. Farms are obliged to submit change report when any sales, purchase, decease, sales for meat of registered animals occur.

(ID Display: Display the number of the today's input reports in the Change Report.)

Fig.3-16 The entry screen of Change Report

- a) Ear Tag Number Entry: Enter a 10-digit ear tag number.
- b) Name Display: A name in the Registered Cattle Master File is automatically displayed.
- c) Change of Date Entry: This item is required to enter. (YYYY/MM/DD)
- d) Content of Change Entry: Enter the reason of change, i.e. Sold ..1or Purchased ..2or Dead ..3 or Sold for Meat....4
(Farm code Display: A Farm code of a current feeding farm is automatically displayed.)
(Owner Name Display: A farm name of a current feeding farm is automatically displayed.)
- e) Farm code Entry: Enter a 7-digit Farm code.
(Owner Name Display: A farm name in the Membership Master File is automatically displayed.)
- f) Date of Report Entry: Enter the date. (YYYY/MM/DD)
- g) Reporter Code Entry: Enter a Reporter code.
(Reporter Signature Display: A Reporter name in the Reporter Master File is automatically displayed.)
- h) Done Process button: For exiting the entry screen. Always exit with this button to make sure that other Master Files are updated upon the exit.

(4) Search and Modification of Master Files

Search and modification of report contents can be done with following procedures.

Click 'Find Modification' on Main Menu.

Find modification window appears.

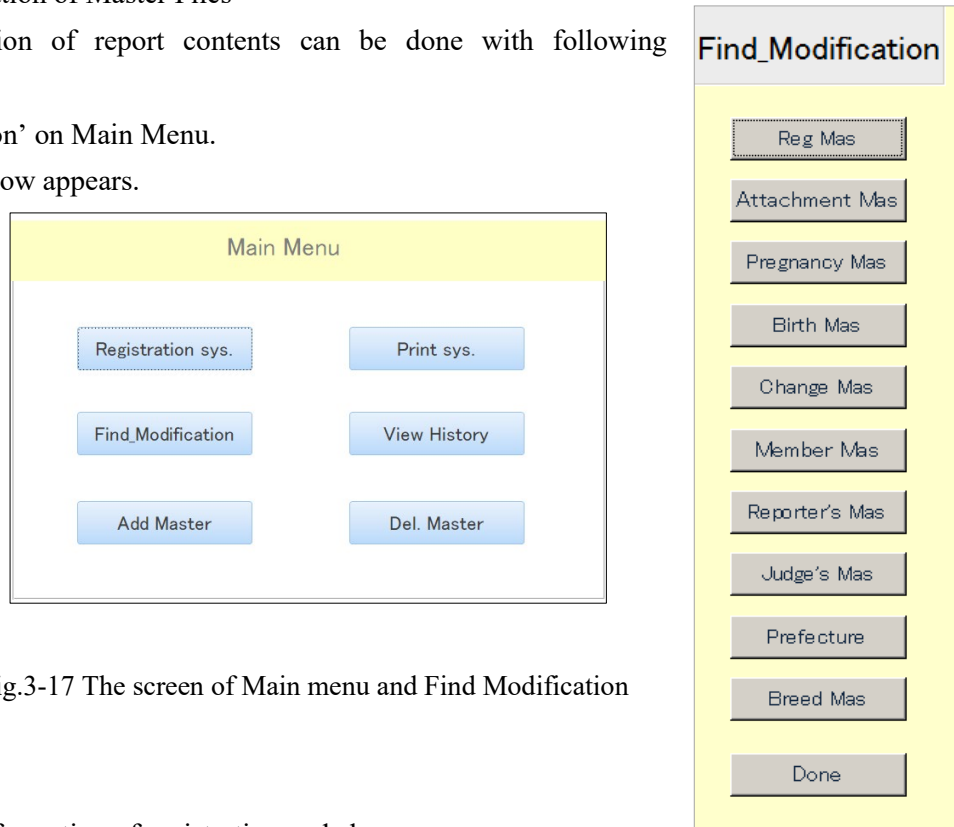


Fig.3-17 The screen of Main menu and Find Modification

1) Reg. Mas.

To view and modify information of registration and change.

In the Reg. mas., date of Attachment report and birth report are stored. The data of animals which are not eligible for registration are included. Female buffalo whose purity percentage is more than 47 and Male buffalo whose purity percentage is more than 80 are eligible for registration.

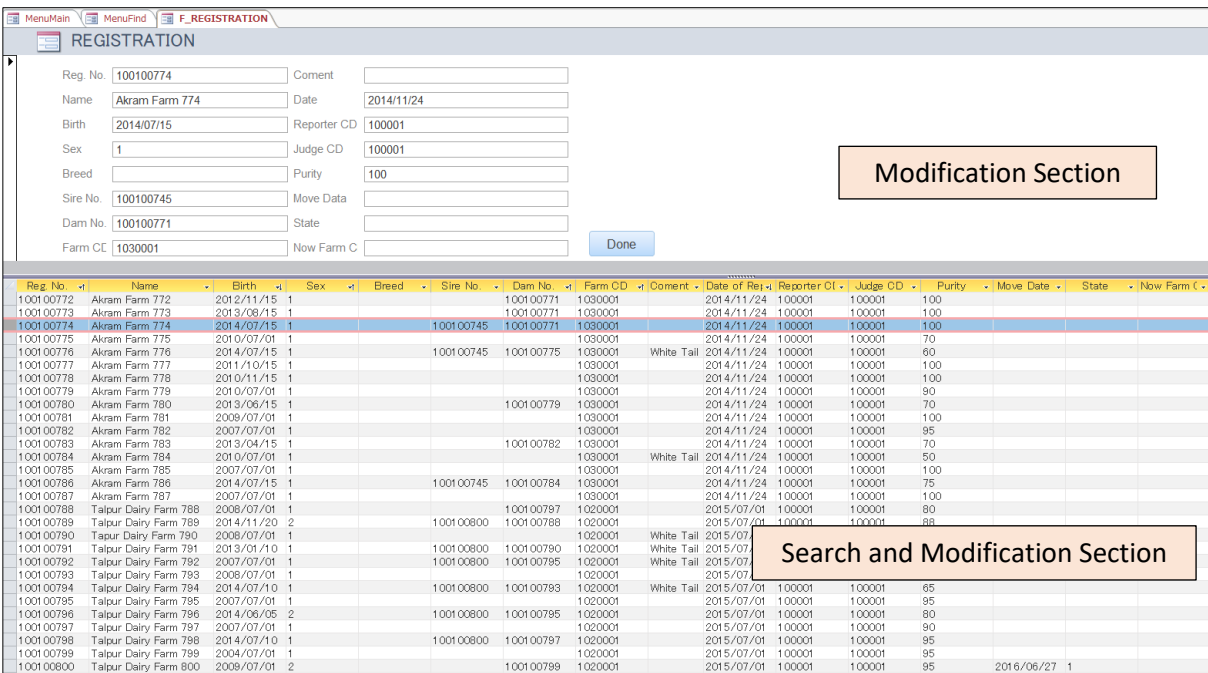


Fig.3-18 The screen of Search and Modification Mas.

Search and Modification Section (as explained in the above)

All the items are displayed that are entered in the Master File. (from Attachment Report ,Birth Report ,Change Report)

Item contents can be modified. After the modification the Master File is automatically updated.

To sort by the item or to refine the search, click the “▼” (down-pointing arrow) button at the right end of the item title cell.

Reg. No.	Name	Birth	Sex	Breed	Sire No.
100100001	Moomal	2007/07/01	1		
100100002	Meena	2008/07/01	1		
100100003	Ludan	2010/07/01	1		

Modification Section (as explained in the above)

Information on the cattle selected in the Search and Modification section is displayed.

Item contents can be modified. After the modification the Master File is automatically updated.

The layout is according to the entry screen. Only some of the items are displayed.

To exit the screen, click the “Done” button.

Data inputted on the screen of Ear Tag Attachment Report, Pregnancy Report, Birth Report and Change Report are automatically reflected in Reg. Mas. Of ‘Find Modification’. Data discrepancy especially in purity percentage due to mistype should be carefully checked.

In case any notes are written in the column of ‘The Features Differentiates from Kundhi Breed, purity percentage of that animal has to be manually corrected. 25 points has to be deducted from purity percentage automatically calculated with purity percentage of sire and dam.

There are cases that calving interval of dam does not make sense. These data errors should be re-checked at farms and corrected in the software. Only after that, pedigree registration certificate can be printed out.

2) Attachment Mas.

To verify and modify input information in an Attachment Report.

Modifications on this Master File will not be reflected in other Master Files.

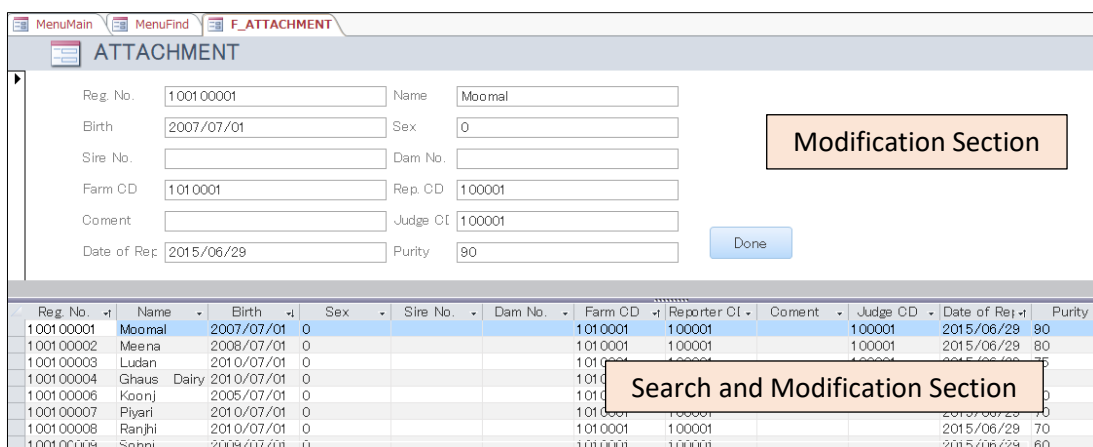


Fig.3-19 The screen of Search and Modification of Attachment Mas.

This function operates the same as the one with the Reg. Mas.

3) Pregnancy Mas.

To verify and modify an input value in a Pregnancy Report.

The screenshot shows the 'PREGNANCY' form with the following fields:

- Dam No.: 100100001
- Dam Name: Moomal
- Farm CD: 1010001
- Farm Name: Ghaus Dairy Farm
- Sire No.: 100100110
- Sire Name: Ghaus Dairy Farm 110
- CD: 0
- Date: 2014/09/22
- Date of Rep: 2014/11/18
- Reporter CI: 100001

A 'Modification Section' box highlights the Sire Name and Date fields. A 'Done' button is located at the bottom right of the form.

Dam No.	Dam Name	Farm CD	Farm Name	Sire No.	SNAME	JUSEI_CD	JUSEI_YMD	SKYMD	REPCD
1001 00001	Moomal	101 0001	Ghaus Dairy Farm	1001 00110	Ghaus Dairy Farm 0		2014/09/22	2014/11/18	100001
1001 00002	Meena	101 0001	Ghaus Dairy Farm	1001 00110	Ghaus Dairy Farm 0		2014/12/07	2014/12/18	100001
1001 00002	Meena	101 0001	Ghaus Dairy Farm	1001 00120	Ghaus Dairy Farm 0		2016/09/20	2016/10/26	100001
1001 00003	Ludan	101 0001	Ghaus Dairy Farm	1001 00110	Ghaus Dairy Farm 0		2014/10/17	2014/11/18	100001
1001 00003	Ludan	101 0001	Ghaus Dairy Farm	1001 00115	Sodhal 115				
1001 00003	Ludan	101 0001	Ghaus Dairy Farm	999900001	Mehari				
1001 00004	Sanhari 004	101 0001	Ghaus Dairy Farm	1001 00110	Ghaus Dairy Farm 0		2014/10/03	2014/11/18	100001

A 'Search and Modification Section' box highlights the table header and the first few rows.

Fig.3-20 The screen of Search and Modification of Pregnancy

When it is before the birth (the input of Birth Report), the modified values will be reflected in each Master File.

This function operates the same as the one with the Reg. Mas.

4) Birth Mas.

To verify and modify an input value in a Birth Report.

Modifications in this Master File will not be reflected in other Master Files.

The screenshot shows the 'BIRTH' form with the following fields:

- Dam No.: 100100003
- Dam Name: Ludan
- Sire No.: 999900001
- Sire Name: Mehari
- Reg. No.: 100100126
- Name: Ghaus Dairy Farm 126
- Birth: 2017/02/15
- Sex: 2
- Farm CD: 1010001
- Farm Name: Ghaus Dairy Farm
- Comment: (empty)
- Date of Rep: 2017/02/16
- Reporter CI: 100001

A 'Modification Section' box highlights the Name and Sex fields. A 'Done' button is located at the bottom right of the form.

Dam No.	Dam Name	Sire No.	Sire Name	Reg No.	Name	Birth	Sex	Farm CD	Farm Name	Comment	Date of Rep	Reporter CI
1001 00003	Ludan	999900001	Mehari	1001 00126	Ghaus Dairy Farm	2017/02/15	2	101 0001	Ghaus Dairy F		2017/02/16	100001
1001 00008	Sohni	999900001	Mehari	1001 00127	Ghaus Dairy Farm	2017/08/18	2	101 0001	Ghaus Dairy F		2017/08/20	100001
1001 00033	Abida	1001 00155	Rahu Dairy Farm	1001 00125	Rahu Dairy Farm 1	2016/11/11	1					
1001 00033	Abida	1001 00155	Rahu Dairy Farm	1001 00117	Ghaus dairy Farm 1	2015/09/24	1					
1001 00037	Gudi	1001 00115	Sodhal 115	1001 00122	Ghaus Dairy Farm	2015/12/20	1					
1001 00039	Lakhpai-2	999900001	Mehari	1001 00124	Ghaus Dairy Farm	2016/09/06	2	101 0001	Ghaus Dairy F		2016/09/06	100001

A 'Search and Modification Section' box highlights the table header and the first few rows.

Fig.3-21 The screen of Search and Modification of Birth Mas.

This function operates the same as the one with the Reg. Mas.

5) Change Mas.

To verify and modify an input value in a Change Report.

Modifications in this Master File will not be reflected in other Master Files.

This function operates the same as the one with the Reg. Mas.

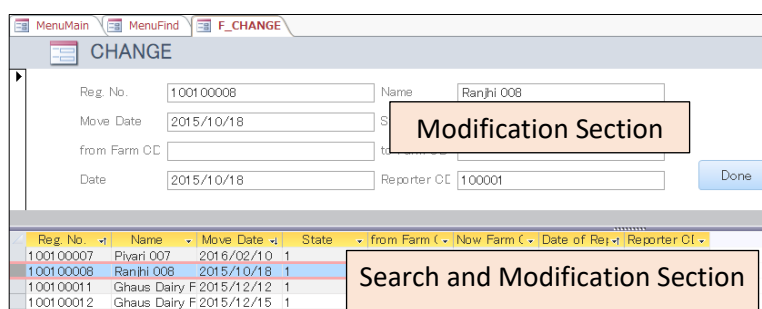


Fig. 3-22 The screen of Search and Modification of Change Mas.

6) Member Mas.

To verify and modify an input value in a Membership Report.

A modified value will be reflected in each Master File.

The screen of Search and Modification and the operation is same as the one with the Reg. Mas.

7) Reporter Mas.

To verify and modify an input value about a Reporter.

A modified value will be reflected on each Master File.

The screen of Search and Modification and the operation is same as the one with the Reg Mas.

8) Judge man Mas.

To verify and modify an input value about a Judge man.

A modified value will be reflected in the Attachment Master File.

The screen of Search and Modification and the operation is same as the one with the Reg. Mas.

9) District Mas.

To verify and modify an input value in a District Report.

A modified value will be reflected in each Master File.

The screen of Search and Modification and the operation is same as the one with the Reg. Mas.

10) Breed Mas.

To verify and modify an input value in breed information.

A modified value will be reflected in the Attachment Master File and the Certificate Master File.

The screen of Search and Modification and the operation is same as the one with the Reg. Mas.

11) Done

To exit the menu screen of 'Find Modification'.

(5) Certification

Click ‘Registration Sys’ on Main Menu screen to display Registration Sys. Screen. Use function of ‘Certification’ to print out pedigree registration certificates and documents.

Pedigree registration certificates can be printed out only for those female buffalo with more than 47% purity and male buffalo with more than 80% purity.

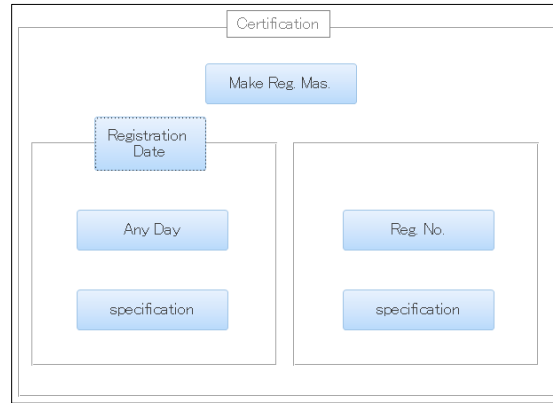


Fig.3-23 The entry screen of Certification

1) Make Reg Mas

To make the Registration Master File for preparing a pedigree certificate.

(A completion message is not displayed when the Master File is made.) After making the Master File, prepare a certificate via “Any Day” or “Reg. No.”

2) Registration Date

The window shown in fig.3-24 appears when clicking ‘Registration Date’ button. Check registration date of Kundhi buffalo to be printed and input registration date (date when the data was inputted) of the column of ‘Registration Date input’.

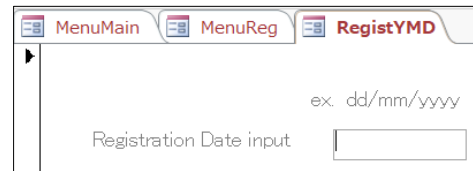


Fig.3-24 The entry screen of RegistYMD

3) Any Day

To print an intended certificate by specifying an input (registration) date. The registration date is an input date of an Attachment-, Birth- and Change Report. Date of certification is to be entered separately. After the input, the screen shows a print preview. Print the certificate if it is considered appropriate.

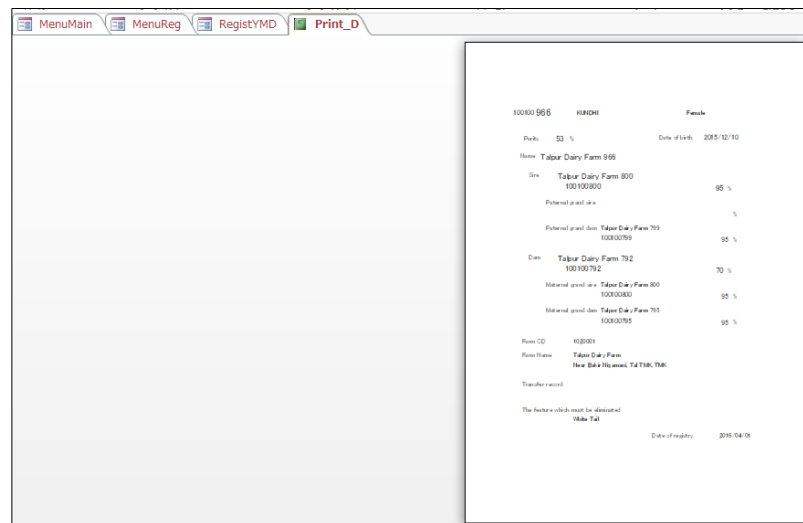


Fig.3-25 The screen of Pedigree Registration Certificate

The pedigree registration certificate shown below is printed when printing out certificates onto the certificate format paper.

4) Reg No.

To print a certificate by specifying a specific ear tag number.

It is possible to reprint a pedigree certificate that was registered in the past.

Date of certification is to be entered separately.

After the input, the screen shows a print preview. Print the certificate as it is considered appropriate.

5) Specification

The cover letter can be prepared.

Pedigree Registration Certificate

100100 **966** KUNDHI Female

Purity 58 % Date of birth 2015/12/10

Name Talpur Dairy Farm 966

Sire Talpur Dairy Farm 800
 100100800 95 %

Paternal grand sire %

Paternal grand dam Talpur Dairy Farm 799
 100100799 95 %

Dam Talpur Dairy Farm 792
 100100792 70 %

Maternal grand sire Talpur Dairy Farm 800
 100100800 95 %

Maternal grand dam Talpur Dairy Farm 795
 100100795 95 %

Farm CD 1020001

Farm Name Talpur Dairy Farm
 Near Bakir Nizamani, Tal TMK, TMK

Transfer record

The feature which must be eliminated
 White Tail

Date of registry 2016/04/01

Livestock Breeder Association District Matiari
Under supported by the PSLD The project on Sustainable Livestock
Development for Rural Sindh (Technical cooperation from Japan "JICA")




Fig.3-26 Pedigree Registration Certificate

Register List

2016/04/01

FARM CD	FARM NAME		SEX	REGIST DAY
	REGNO	NAME		
1020001	Talpur Dairy Farm			
	100100790	Tapur Dairy Farm 790	Female	2016/04/01
	100100791	Talpur Dairy Farm 791	Female	2016/04/01
	100100792	Talpur Dairy Farm 792	Female	2016/04/01
	100100794	TalpurDairy Farm 794	Female	2016/04/01
	100100965	Talpur DairV Farm 965	Female	2016/04/01
	100100966	Talpur Dairy Farm 966	Female	2016/04/01
	100100964	Talpur Dairy Farm 964	Male	2016/04/01

(6)Printing of Register Lists

Select **Print system** from **Main Menu**.

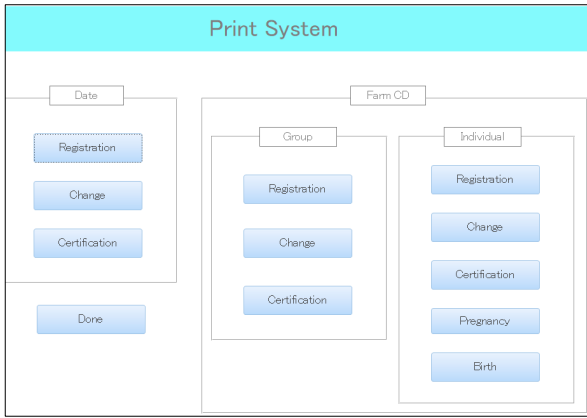


Fig. 3-27 The screen of Print System

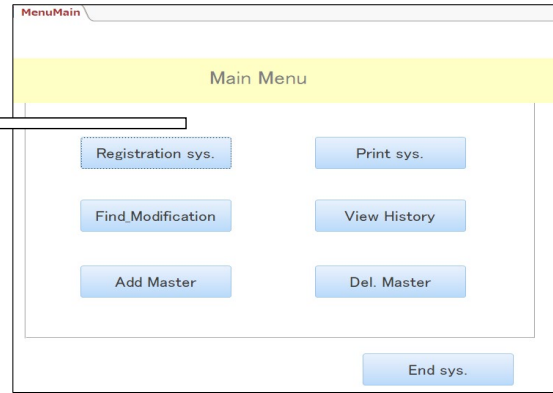


Fig.3-28 The screen of Main Menu

a) Date : to prepare a list in the order of the registration date + the Farm code.

b) Farm CD : to prepare a list in the order of the Farm code + the registration date.

- Group : per herd
- Individual : per farm
 - Registration : registered cattle (cattle added to the Master File)
 - Change : cattle with a Change certificate
 - Certification : cattle with a pedigree certificate
 - Pregnancy : cows with a Pregnancy Report
 - Birth : cattle with a Birth Report

To exit the menu screen of “Print system”.

Register List				2018年5月4日	
SEX	FARM CD	FARM NAME	REGNO	NAME	
REGISTER by Month					
1	1010001	Ghaus Dairy Farm	100100002	Mena	
0	1010003	Rahu Dairy Farm	100100616	Mohi	
2015/07/01					
1	1020001	Talour Dairy Farm	100100788	Talour Dairy Farm 788	
2015/07/02					
1	1010003	Rahu Dairy Farm	100100602	Solvi 602	
2015/07/06					
1	1010003	Rahu Dairy Farm	100100608	Koore 608	
1	1010003	Rahu Dairy Farm	100100613	Charvi	
1	1010003	Rahu Dairy Farm	100100614	Rahu Dairy Farm 614	
1	1010003	Rahu Dairy Farm	100100623	Bhambhore	
1	1010003	Rahu Dairy Farm	100100625	Toi	
2	1010003	Rahu Dairy Farm	100100626	Rahu Dairy Farm 626	
1	1020002	Bhital Dairy Farm	100100823	Madhuri 823	
2	1020002	Bhital Dairy Farm	100100814	Bhital Dairy Farm 814	
2	1020002	Bhital Dairy Farm	100100848	Bhital Dairy Farm 848	
2	1020002	Bhital Dairy Farm	100100900	Bhital Dairy Farm 900	
1	1030002	Qajjar Farm	100100719	Qajjar Farm 719	
2	1030002	Qajjar Farm	100100723	Qajjar Farm 723	
2	1030002	Qajjar Farm	100100741	Qajjar Farm 741	
2015/07/14					
1	1010003	Rahu Dairy Farm	100100630	Rahu Dairy Farm 630	
2015/08/04					
1	1020003	Mukhtar Dairy Farm	100100764	Mukhtar Dairy Farm 764	
1	1020003	Mukhtar Dairy Farm	100100930	Mukhtar Dairy Farm 930	
1	1020003	Mukhtar Dairy Farm	100100931	Mukhtar Dairy Farm 931	
1	1020003	Mukhtar Dairy Farm	100100941	Mukhtar Dairy Farm 941	
2015/08/06					
1	1020002	Bhital Dairy Farm	100100871	Achar Wali	
2015/08/28					
1	1030002	Qajjar Farm	100100980	Qajjar Farm 980	
1	1030002	Qajjar Farm	100100981	Qajjar Farm 981	

Fig.3-29 Register List (Date)

FARM CD	FARM NAME	REGNO	NAME	SEX	REGIST DAY
100101386	Gul Dairy Farm 1386	1		2018/02/14	
100101375	Gul Dairy Farm 1375	2		2018/02/14	
100101387	Gul Dairy Farm 1387	2		2018/02/14	
1010008 Ghulam Haider Farm					
100100287	Ghulam Haider Farm 287	1		2018/03/22	
100100288	Ghulam Haider Farm 288	1		2018/03/22	
100100289	Ghulam Haider Farm 289	1		2018/03/22	
100100275	Ghulam Haider Farm 275	1		2018/03/22	
1010009 Naeemuddin Farm					
100100242	Naeemuddin Farm 242	1		2018/03/22	
100100246	Naeemuddin Farm 246	1		2018/03/22	
100100252	Naeemuddin Farm 252	1		2018/03/22	
100100481	Naeemuddin Farm 481	1		2018/03/22	
100100484	Naeemuddin Farm 484	1		2018/03/22	
100100480	Naeemuddin Farm 480	2		2018/03/22	
1010010 Aul Jaf Farm					
100100276	Aul Jaf Farm 276	1		2018/03/22	
100100279	Aul Jaf Farm 279	1		2018/03/22	
100100502	Aul Jaf Farm 502	1		2018/03/22	
100100505	Aul Jaf Farm 505	1		2018/03/22	
999900014	Haider 14	2		2018/03/29	
1010011 Hussain Bus Farm					
100101026	Hussain Bus Farm 1026	1		2018/03/22	
100101028	Hussain Bus Farm 1028	1		2018/03/22	
100101901	Hussain Bus Farm 1901	1		2018/03/22	
1010012 Unmed AB Farm					
100101016	Unmed AB Farm 1016	1		2018/03/22	
1020001 Talour Dairy Farm					
100100788	Talour Dairy Farm 788	1		2015/07/01	
100100793	Talour Dairy Farm 793	1		2018/03/14	
100100795	Talour Dairy Farm 795	1		2018/03/14	
100100797	Talour Dairy Farm 797	1		2018/03/14	
100100798	Talour Dairy Farm 798	1		2018/03/14	
100100799	Talour Dairy Farm 799	1		2018/03/14	
100100770	Talour Dairy Farm 770	2		2018/03/14	
100100796	Talour Dairy Farm 796	2		2018/03/14	

Fig.3-30 Register List (Farm CD Group)

Register List				
FARM CD	FARM NAME	REGNO	NAME	SEX, REGIST DAY
1010000	Rahu Dairy Farm			
10010016	Mbu			0 2015-08-29
100100151	Rahu Dairy Farm 151			1 2017-08-06
100100152	Rahu Dairy Farm 152			1 2017-04-07
100100154	Rahu Dairy Farm 154			1 2017-04-07
100100155	Rahu Dairy Farm 155			1 2017-11-14
100100156	Rahu Dairy Farm 156			1 2017-04-07
100100157	Rahu Dairy Farm 157			1 2017-08-21
100100166	Rahu Dairy Farm 166			1 2017-11-07
100100169	Rahu Dairy Farm 169			1 2018-02-14
100100601	Sabri 601			1 2016-03-28
100100602	Sabri 602			1 2015-07-02
100100603	Sabri 603			1 2016-03-28
100100604	Sabri 604			1 2016-03-06
100100605	Mawal 605			1 2016-08-06
100100607	Koore 607			1 2015-09-09
100100608	Koore 608			1 2015-07-06
100100609	Gikem 609			1 2017-11-07
100100611	Sabri			1 2016-03-28
100100612	Rahu Dairy Farm 612			1 2016-03-28
100100613	Chani			1 2015-07-06
100100614	Rahu Dairy Farm 614			1 2015-07-06
100100615	Pupu			1 2016-03-28
100100617	Mawal Hindi			1 2015-08-09
100100618	Koore Hindi			1 2015-10-22
100100620	Mitvi			1 2016-03-28
100100621	Pupu			1 2015-08-09
100100622	Piveri 622			1 2016-08-05
100100623	Bhambhore			1 2015-07-06
100100625	Tadi			1 2015-03-06
100100627	Rahu Dairy Farm 627			1 2016-03-14
100100628	Rahu Dairy Farm 628			1 2016-03-14
100100629	Rahu Dairy Farm 629			1 2016-03-14
100100630	Rahu Dairy Farm 630			1 2015-07-14
100100631	Rahu Dairy Farm 631			1 2016-11-04

Fig.3-31 Register List (Date)

Only register list was shown. Change, Certification, Pregnancy and Birth list are not shown here.

(7) Viewing History of Master Files

History of data change can be viewed with ear tag numbers.

Select **View History** from **Main Menu**.



① Reg. Mas.

To view history of the Registration Master File.

② Attachment Mas.

To view history of the Attachment Master File.

③ Pregnancy Mas.

To view history of the Pregnancy Master File.

④ Birth Mas.

To view history of the Birth Master File.

⑤ Change Mas.

To view history of the Change Master File.

⑥ Member Mas.

To view history of the Membership Master File.

⑦ Certificate Mas.

To view history of the certification of pedigree.

Done

To exit the menu screen of “View History”.

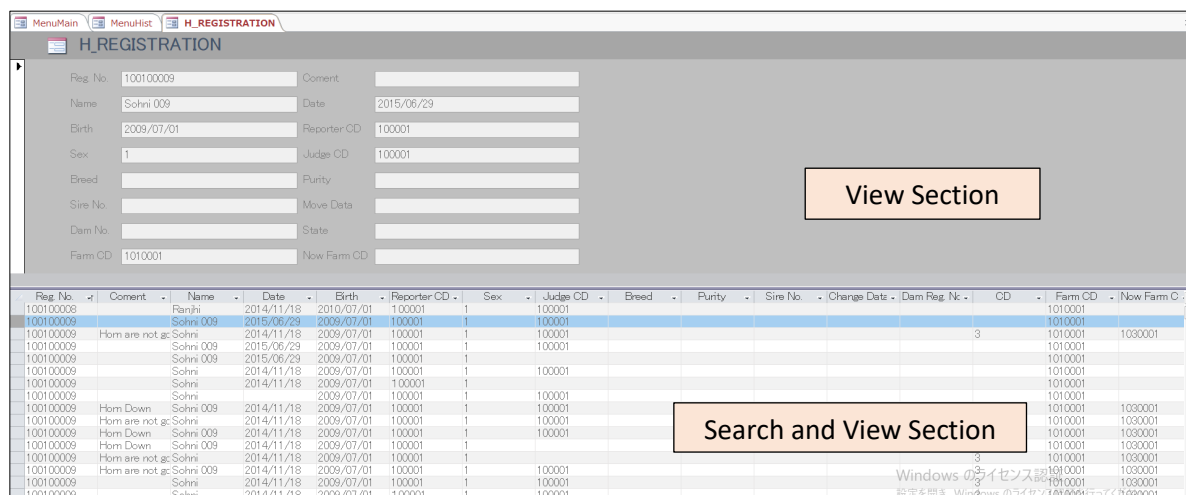


Fig.3-32 The screen of H.REGISTRATION

a) View section

Information on the cattle selected in the Search and View section is displayed.

b) Search and Modification section

All the items are displayed that are entered in the Master File.

History of data modification of 100100009 are listed.

The screen of Attachment Mas., Pregnancy Mas., Birth Mas., Change Mas., Member Mas., and Certificate Mas are not shown here.

(8) Deletion of Master Files

Select **Delete** from **Main Menu**.

1) Reg. Mas.

To delete information of cattle with a specified ear tag number from the Registered Cattle Master File.

2) Attachment Mas.

To delete information of cattle with a specified ear tag number from the Attachment Master File.

3) Pregnancy Mas.

To delete information of cattle with a specified ear tag number (pregnant cows) from the Pregnancy Master File.

As the information is also recorded in the Pregnancy Record Masterfile, delete it at the same time as needed.

4) Birth Mas.

To delete information of cattle with a specified ear tag number from the Birth Master File.

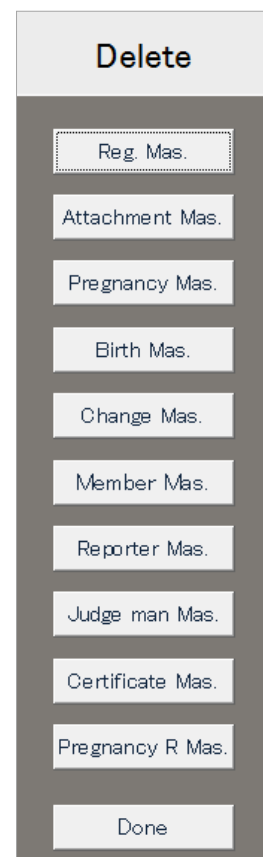


Fig.3-33 The screen of Delete

5) Change Mas.

To delete information of a specified ear tag number and a date of change from the Change Master File.

6) Member Mas.

To delete information of a specified membership code from the Membership Master File.

7) Reporter Mas.

To delete information of a specified Reporter code from the Reporter Master File.

8) Judge man Mas.

To delete information of a specified Judge man code from the Judge man Master File.

9) Certificate Mas.

To delete information of cattle with a specified ear tag number from the Certificate Master File.

10) Pregnancy R. Mas.

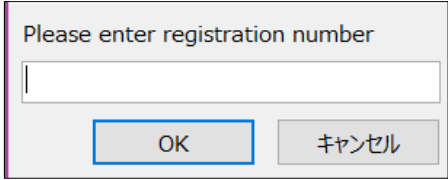
To delete information of cattle with a specified ear tag number (pregnant cattle) from the Pregnancy Record Master File.

As the information is also recorded in the Pregnancy Master File, delete it at the same time as needed.

Done

To exit the menu screen of “Delete”.

The window shown in Fig. 3-34 appears when clicking each button. Input ear tag number or code number to process data.



The image shows a standard Windows-style dialog box. At the top, it says "Please enter registration number". Below this text is a single-line text input field. At the bottom of the dialog, there are two buttons: "OK" on the left and "キャンセル" (Cancel) on the right. The "OK" button has a blue border, while the "キャンセル" button has a grey border.

Fig.3-34 The entry screen of Parameter

Chapter 4 Outcome of the Project activities

The Project started pilot activities in November 2014. Ear tags were attached and information was filled in the Ear Tag Attachment Report. The outcome of the activities from November 2014 to 31 March 2018 for about 3 and half years were as follows;

4.1 Members

In the beginning of the activities, breeder farms became members for the pilot activities. Five farms in District Matiari, three farms in District Tando Muhammad Khan, two farms in District Badin were selected as initial members. In total, eight farms became members. In 2016, two more farmers in District Matiari joined the activities. In the latter half of 2017, 10 pilot farms, 5 from district Matiari and 5 from district Tando Muhammad Khan joined the activities as members. Three farms out of 8 initial member farms suspended their activities of pedigree registration in the middle.

Table 4-1 Member List

Farm Name	Owner Name	District	Farm CD	The subscription year
Ghaus Dairy Farm	Ali Haider Shah	Matiari	1010001	2014
Ameer Dairy Farm	Ameer Haider Shah	Matiari	1010002	2014
Rahu Dairy Farm	Qameruddin Rahu	Matiari	1010003	2014
Haji Fateh Muhammad Rahu	Muhammad Siddique Rahu	Matiari	1010004	2014
Sher Muhammad Rahu	Sher Muhammad Rahu	Matiari	1010005	2014
Talpur Dairy Farm	Dr. Lutaf Ali Talpur	TMK	1020001	2014
Bhitai Dairy Farm	Haji Bashir Ahmed Almani	TMK	1020002	2014
Mukhtiar Dairy Farm	MukhMukhtair Ali	TMK	1020003	2014
Akram Farm	Haji Akram Gujjar	Badin	1030001	2014
Gujjar Farm	Sohail Gujjar	Badin	1030002	2014
Abbas Dairy Farm	Ghulam Abbas Koree	Matiari	1010006	2016
Gul Dairy Farm	Haji Ishfaq Shaikh	Matiari	1010007	2016
Ghulam Haider Farm	Ghulam Haider Rahu	Matiari	1010008	2017
Asif Jat Farm	Asif Jat	Matiari	1010010	2017
Hussain Bux Farm	Hussain Bux Sahoowal	Matiari	1010011	2017
Muhammad Ramzan Farm	Muhammad Ramzan Dal	TMK	1020006	2017
Najamuddin Farm	Najamuddin Ghambeer	Matiari	1010009	2018
Umeced Ali Farm	Umeced Ali Detho	Matiari	1010012	2018
Zaman Farm	Zaman Sathio	TMK	1020004	2018
Faqero Farm	Faqero	TMK	1020005	2018
Panhwer Farm	Niaz Ali Panhwer	TMK	1020007	2018
Khamoon Farm	Khamoon Palejo	TMK	1020008	2018

4.2 Numbers of various reports inputted

Number of various reports inputted into the pedigree registration software is shown in the table 4-2. Numbers varies in farm size. The most of animals of each farm were thought to be covered in the reports. Number of pregnancy reports is much higher than that of birth reports. The possible reason is that farms submitted pregnancy report when mating take place but without pregnancy diagnosis. Latest mating information is reflected in the Reg. Mas. along with birth report. The pregnancy report, therefore, is reviewed at the time of submission of birth report. It is, therefore, better to submit it without pregnancy diagnosis than forget to submit it. Since Pakistani counterpart specialized in genetic improvement in the Project visit every farm once in a month to collect milk sample for fat analysis and collect information and reports at the same

Table 4-2 The number of the various report entries
(~ March 31st, 2018)

Farm Cord	Attachment Report	Pregnancy Report	Birth Report	Change Report
1010001	47	27	10	20
1010002	12	7		4
1010003	71	34	16	26
1010004	16	23	11	8
1010005	2			2
1010006	18	26	13	3
1010007	28	34	9	7
1010008	4			
1010009	6	3		
1010010	4	2		
1010011	3			
1010012	1			
1020001	19	17	11	1
1020002	96	156	53	51
1020003	50	11	5	9
1020004	2			42
1020005	2			
1020006	2			
1020007	8			
1020008	3			
1030001	20	10	1	
1030002	65	59	34	
Total	479	409	163	173

time, most of reports are properly submitted. To continue pedigree registration activities after the completion of the project activities, securing local reporter and their technical training are necessary.

4.3 Hair colour of Kundhi buffalo whose data was stored in Reg. Mas.

Number of Kundhi buffalo whose data was stored in Reg. Mas. from the data of Attachment report and birth report is 472 heads for female buffalo, 138 heads for male buffalo. In total 610 heads data was stored as of 31 March 2018. Number of heads having normal hair colour is 493 heads out of 610 heads, which is 80.8% of total buffaloes Those who have abnormal hair colour including white tail, white spot on head, hanging horn is 19.2%, i.e. 117 heads.

Male buffaloes have more tendencies of abnormal hair colour and others.

Table 4-4 shows ratio of normal hair colour and abnormal hair colour & others by farms.

Purity percentage of Kundhi buffaloes stored into Reg. Mas. are either those judged by a judge man (in case of the Project, Dr. Jatoi, counterpart specialized in genetic improvement) based on the criteria of judgement (page 15) or those calculated automatically with purity percentage of dam and sire when inputted data of birth report (In case any note is written in the column of 'the features differentiates from Kundhi breed', 25 points are manually deducted. In case of female, 47% is the minimum % to be inputted. As for male, 80% is the cutting point for data entry.) As for female buffalo, 27.3% of them are 100% purity, 23.9% of them are in the range of 90 to 99% purity, 16.1% of them are in the range of 80 to 89% purity, 15.5% of them are in the range of 70 to 79%, 7.8% of the are in the range of 60 to 69%, 9.3% of them are less than 59% of purity.

Average purity percentage by each farm is shown in the Table 4-4. There are 3 farms whose animals' average purity percentage is above 90%. It is natural that average purity percentage of pilot farms is low, i.e. in between 50 to 70%. The ratio of Kundhi buffalo whose purity percentage is more than 90% is 51.2% of total numbers of registered Kundhi buffalo. This ratio is higher at farms whose average purity percentage is high.

Average purity percentage of farm number 1010003 and 1010004 is slightly below 80. The ratio of Kundhi

Table 4-3 The breakdown of the data which was stored in

		Total	Possible number	Normal color	Abnormal color &
Buffalo cow	Head	472	472	387	85
	%	100	100	82	18
Buffalo Bull	Head	138	106	106	32
	%	100	77	77	23
Total		610	578	493	117
%		100	94.8	80.8	19.2

*Note: Impossible number of registered
Bull : Some traits to be genetically eliminated
(For example: White Tail, White spot on

Table4-4 The breakdown by the farm of the data which was stored in Reg. Mas.(~ March 31, 2018)

Farm CD	Cow			Bull	
	Registered		Average of Purity% (*)	Registered	Impossible number of registered
	Normal color	Abnormal color & other			
1010001	37		73.8	12	5
	27	10	(24.3)		
1010002	11		68.2	1	0
	8	3	(18.2)		
1010003	60		79.6	16	6
	53	7	(23.3)		
1010004	20		77.5	3	0
	14	6	(30.0)		
1010005	0			2	0
	0	0			
1010006	23		86.2	5	3
	15	8	(56.5)		
1010007	26		91.1	9	3
	26	0	(73.1)		
1010008	4		70.0	0	0
	4	0	(0.0)		
1010009	5		53.4	1	0
	2	3	(0.0)		
1010010	4		60.0	0	0
	2	2	(0.0)		
1010011	3		60.0	0	0
	2	1	(0.0)		
1010012	1		50.0	0	0
	1	0	(0.0)		
1020001	19		75.3	9	3
	10	9	(36.8)		
1020002	106		91.5	26	4
	90	16	(74.5)		
1020003	43		91.3	7	1
	41	2	(86.0)		
1020004	2		65.0	0	0
	1	1	(0.0)		
1020005	2		60.0	0	0
	2	0	(0.0)		
1020006	2		65.0	0	0
	2	0	(0.0)		
1020007	8		56.1	0	0
	5	3	(0.0)		
1020008	3		59.0	0	0
	2	1	(0.0)		
1030001	20		87.3	0	0
	17	3	(65.0)		
1030002	73		85.7	15	7
	63	10	(58.9)		
Total	472		83.1	138	
	387	85	(51.2)	106	32
%		82	18	77	23

(*): The rate of the Kundhi buffalo that Purity% is equal to or more than 90 % is shown.

buffalo whose purity percentage is more than 90% is low, i.e. 23.3% and 30.0%, respectively. The reason is that these farms have numbers of so-called 'Goshi', big body, crude looking rectangular face, specific way of sprouting horns and specific shape of sectional view of

Table 4-5 The content of abnormal color & other

		White tail	White spot on head	Horn Down	White Tail & Horn Down	White Tail & White spot on head	Other	Total
Cow	Head	74	1	6	3	0	1	85
	%	87	1	7	4		1	100
Bull	Head	29	0	1		2		32
	%	91	0	3	0	6		100
Total	Head	103	1	7	3	2	1	117
	%	88	1	6	3	2	1	100

horns. The Project have given them 80% purity for this type of Kundhi. This made the ratio of Kundhi buffalo whose purity percentage is more than 90% low of these farms.

Table 4-5 shows the details of abnormality in hair colour and horn. These features including white tail, white spot on head, horn down are not favoured by farmers. The data in Reg. Mas. was compiled as table 4-5.

White tail is most common. In total 103 heads of buffaloes, i.e. 88%, have white tail. Including horn down and white spot on head along with white tail, 108 heads of them (92%) have such features.

Horn down can be identified only after horn grows to show its shape. There is possibility to have more horn down buffalo than appeared in this data.

In addition, these features are disliked by farmers and some of buffaloes might have been eliminated. There is possibility that more number of such types of Kundhi buffaloes are born.

182 heads of female buffaloes could identify its sire. Table 4-6 shows details of female buffalo by sire.

There are only 2 heads of sire that does not have a calf with abnormal colour & other features. Both of them had only one calf as their daughter. It is, therefore, difficult to judge their calves will not have abnormal colour & other features. Among 289 heads of calves born to these sires, 79 heads of them carries abnormal colour & other features. The frequency of appearance of such feature in calves was 27%.

Table 4-6 The occurring frequency of Abnormal color & other every bull in Reg.Mas.

Father (Registerd)	Normal color	Abnormal color & other	Total
100100110	2	3	5
100100115	5	3	8
100100155	1		1
100100645	1	1	2
100100646	12	5	17
100100675	5	3	8
100100745	21	8	29
100100770	3	3	6
100100800	9	7	16
100100899	32	6	38
100100900	45	9	54
100100950	17	1	18
100100970	4	7	11
100101301	8	7	15
100101375	10	2	12
100101400	0	1	1
999000001	8	4	12
999000003	3	1	4
999000004	6	2	8
999000006	11	2	13
999000009	6	4	10
999900012	1		1
Total	210	79	289
%	73	27	100

Table 4-7 shows the data of calves stored in the 'Birth Mas' based on birth reports. Out of 163 heads, 117 heads (87%) have normal colour whereas 46 heads (28%) of them have abnormal colour & other. Male calves have higher ratio of abnormal colour & other calves than female calves.

Table 4-7 The input data of birth report and it has been shown the number of head & % of abnormal color

		Input data	Possible number of	Normal color	Abnormal color &
Cow	Head	95	95	72	23
	%	100	100	76	24
Bull	Head	68	46	46	22
	%	100	68	68	32
Total	Head	163	141	118	45
	%	100	87	72	28

Table 4-8 shows details of abnormal & other features. All female buffalo's cases were white tail. As for male buffaloes, 19 heads of them (86%) have white tail, 2 heads (9%) have both white spot on head and white tail, 1 head (5%) has horn down. Counting 19 heads

Table 4-8 The content of abnormal color & other

		White tail	Horn Down	White Tail & White spot on head	Total
Cow	Head	23	0	0	23
	%	100	0		100
Bull	Head	19	1	2	22
	%	86	5	9	100
Total	Head	42	1	2	45
	%	93	2	4	100

and 2 heads, total 95% of male buffaloes have white tail. White tail buffaloes of both male and female are 45 heads in total. Out of 163 heads of total buffalo inputted, 28% of them have white tale.

This figure is almost same as the data in Reg. Mas.

White tail appears at the rate of one in every four heads. Table 4-9 shows frequency of appearance of abnormal colour & others in calves by each sire. Only 3 sire do not have calves without abnormal colour & other.

Therefore, most of Kundhi buffalo reared in Sindh at the present are assumed to have genetic factor of white tail.

Colour of tail is determined by qualitative character controlled by gene. Suppose black tail gene is dominant gene B and white tail gene is recessive gene w. If elimination of any characteristics of buffalo are not taken

place, ratio of each combination of gene appears BB:1, Bw:2, and ww:1. Combination of ww (white tail) appears at the rate of 25%, which is equal to the result of data classification of pedigree registration.

To reduce rate of ww, eliminate bulls that have white tail. Besides, in case a dam of a bull has white tail, it is better to avoid using such bulls. If both male and female buffalo that have white tails are eliminated, the ratio of ww is further reduced.

It is not confirmed at this moment but white tail seems not influence milk production capacity of buffaloes genetically. This is same as black tail of Holstein does not influence milk production capacity of Holstein cow. Elimination of white tail buffalo, therefore, will give economic loss. In that sense, elimination of white tail may not be recommended from economic point of view. Therefore, phenotypic characters such as white tail might be included as a characteristic feature which might be appeared in some Kundhi buffalo but need not to be regarded as targets for elimination.

Table 4-9 The occurring frequency of Abnormal color & other every bull in Barth Report Mas.

Father (Registered No.)	Normal color	Abnormal color &	Total	
100100115	2	1	3	
100100155	2		2	
100100645	0	1	1	
100100646	12	3	15	
100100675	4	5	9	
100100745	13	4	17	
100100770	5	3	8	
100100800	2	1	3	
100100899	43	6	49	
100100900	3	1	4	
100100950	4	1	5	
100100970	8	10	18	
100101301	6	7	13	
100101375	3	1	4	
100101400	4	1	5	
999900001	5		5	
999900004	0	1	1	
999900012	1		1	
Father	Head	117	46	163
Total	%	72	28	100

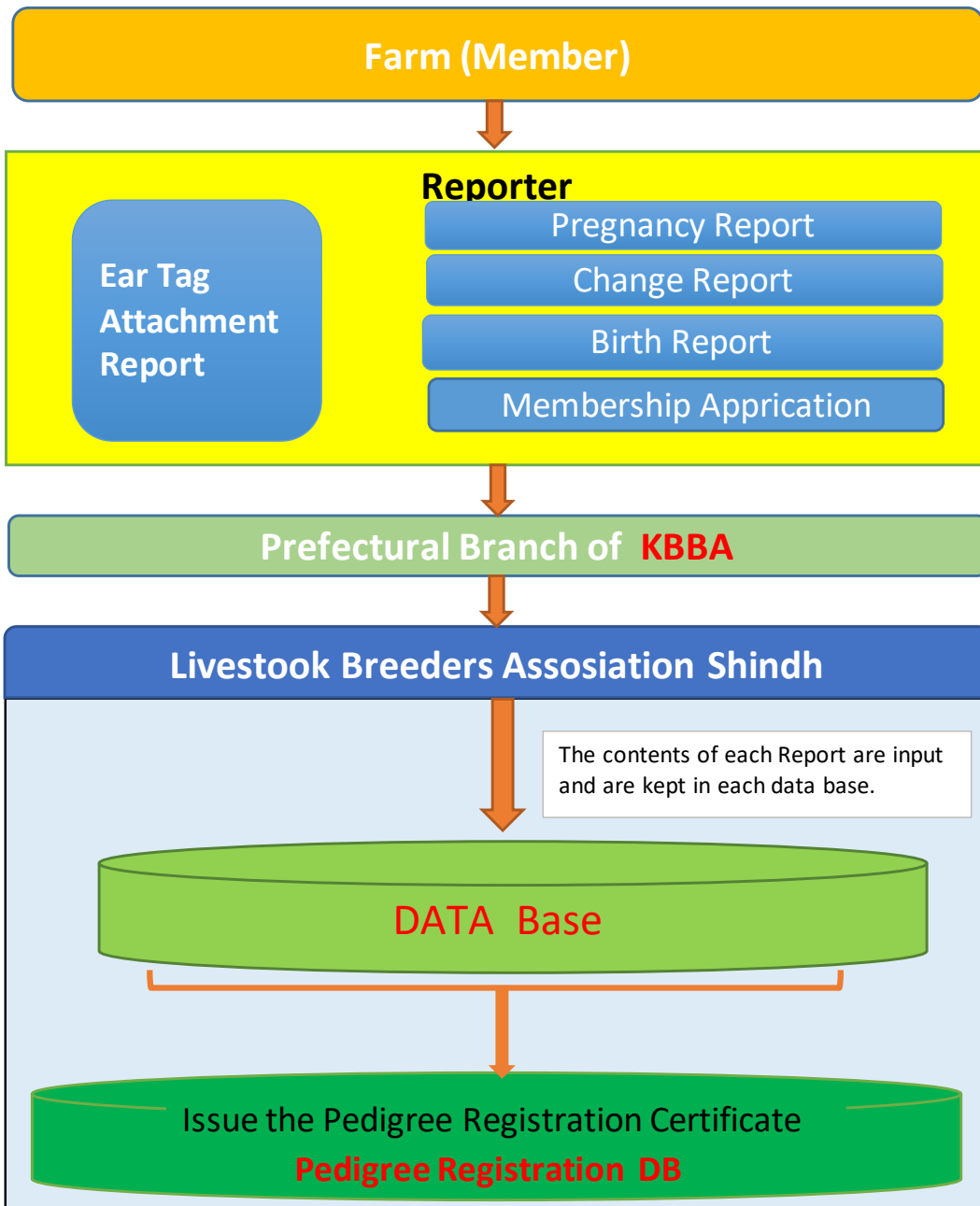
4.4 Recommendation on future pedigree registration procedure

During the project period, counterpart specialized in genetic improvement visit each breeder farm every month to collect information and fill various reports for pedigree registration. To continue this process and further expand pedigree registration activities, local reporters who visit farms to collect information and submit reports to secretariat of pedigree registration are needed.

If milk tests are carried out along with pedigree registration, it is suitable for milk inspector to collect information such as on birth, mating, sales, purchase, death of animals and submit reports when they perform the milk test at farms every month. Organization responsible for pedigree registration may assign suitable inspectors cum reporter. It is necessary to establish such pedigree registration system till the end of the Project.

Following figure shows proposed pedigree registration system in future.

The System of Kund Buffalo Pedigree Registration Certificate



Proposed organization structures are explained below.

Organization of the Livestock Breeders Association Shindh

Purpose and Activities of the Association

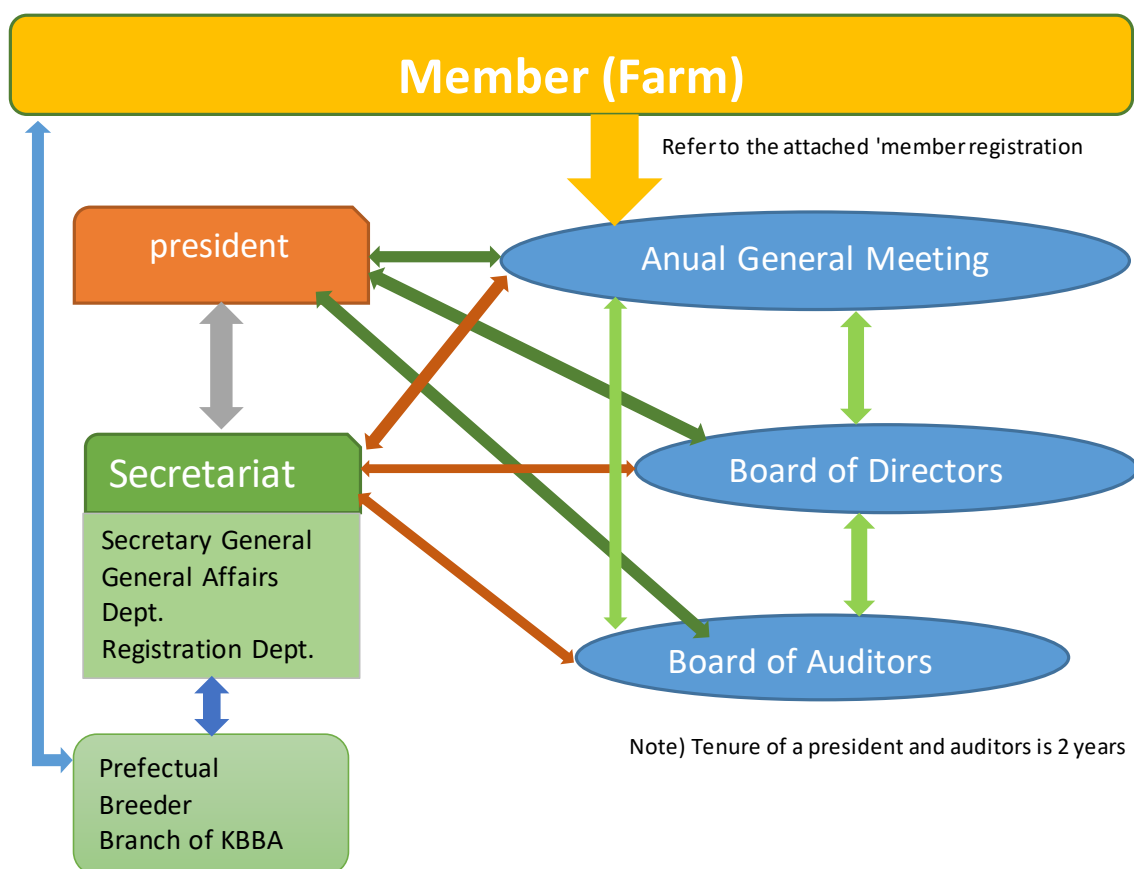
(Purpose) The association aims to undertake activities of genetic improvement of the Kundhi buffaloes, i.e. to make registration of an individual buffalo, to collect and provide necessary information of Kundhi buffalo genetic improvement and to promote the improvement of phenotypical features and capacity of Kundhi buffalo genetically. The association's activities are for the mutual benefit of the members.

(Activities)

The association carries out following activities.

- 1) To make registration, judgement and inspection of Kundhi buffalo
- 2) To collect information and carry out research concerning registration and genetic improvement of Kundhi buffalo and to provide information to members
- 3) To organize seminars and lectures on registration, inspection and judgement
- 4) Other activities necessary for achieving purposes of the association.

The above activities shall be carried out in Sindh province, Pakistan.



Anual General Meeting

- * Two types of general meetings shall be held, i.e. one is regular general meeting and the other is extraordinary general meeting.
- * General meeting is formed with all members of the association.
- * General meeting shall be called by the president with the approval of board of directors. With more than 1 / 10 of members consensus, members can request a president to call a general meeting to discuss one of the following articles or other necessary things to discuss (members has to explain reasons for calling a meeting).
- * General meeting shall discuss and make decision of the following articles.
 - 1) Dismissal of a member
 - 2) Selection and dismissal of board of directors and board of auditors
 - 3) Approval of total amount of remuneration of board of directors and board of auditors
 - 4) Approval of budget and financial statement (balance sheet) of the association
 - 5) Amendment of articles
 - 6) Dissolution of the association and disposal of remaining property
 - 7) Other topics to be discussed and decided in general meetig in the association's article

Board of Directors

- * A president shall be selected from board of directors. A president and vice-president shall be selected by a decision of board of directors.
- * Board of directors is comprised of directors. Directors shall participate in implementation of activities of the accosiation prescribed in the article.

Board of Auditors

- * Board of auditors is comprised of auditors.
- * Auditors shall audit activities of direcors and compile an audit report.
- * Auditors, at any time, can ask direcotrs and employees of the association to submit an activity report to survey an activity performance and financial

president
Vice-president

President represents te association and carries out his/her tasks.
Vice-president supports president and works as an acting president

Chapter 5 Milk Test

For the efficient genetic improvement, it is essential to examine genetic capacity of animals both with milk data and pedigree registration data. Milk tests allows to check milk production capacity of individual animal. Pedigree registration allows to examine blood relation of those animals. Genetically superior next generation of herds can be created through selection and elimination of individual animals based on data of milking capacity and blood relation.

For the above reason, the Project implemented both pedigree registration and milk tests of Kundhi buffaloes.

5.1 Overview of milk tests

5.1.1 Farms for piloting milk tests

Milk test are carried out at farms who joined pedigree registration activities. The Project started milk test once ear tags were attached with animals. Table 5-1 shows list of farms conducting milk test as of March 2018 and month and year they started milk test.

Table 5-1 Milk test Implementation farm list

Farm Name	District	Farm CD	Starting of milk test
Ghaus Dairy Farm	Matiari	1010001	Jun, 2014
Rahu Dairy Farm	Matiari	1010003	December, 2014
Haji Fateh Muhammad Rahu	Matiari	1010004	December, 2014
Talpur Dairy Farm	TMK	1020001	December, 2014
Bhitai Dairy Farm	TMK	1020002	December, 2014
Gujjar Farm	Badin	1030002	December, 2014
Abbas Dairy Farm	Matiari	1010006	December, 2016
Gul Dairy Farm	Matiari	1010007	December, 2016

Note: Pilot farms joined pedigree registration activities in 2017 are not listed in the above list. Milk test have been carried out at pilot farms since the beginning of the Project activities.

5.1.2 Milk test activities

Milk inspector appointed by the Project were assigned to each farm. Milk inspectors measured and recorded milk production yield of each milking animals of evening milking time and next morning time once in a month. Number of cases CP specialized in genetic improvement accompanied with milk inspector and collected milk test data record sheet from milk inspectors. Data in the record sheet was inputted onto recording format in PC by the national staff in charge.

The Project organized the training of milk inspector to improve accuracy of milk test.

The Project establish mini laboratory in the Livestock department building and appointed a staff in charge of the laboratory work. Milk fat analysis was started in December 2016. Gerber method was applied.

Milk samples are collected from individual milking buffalo once in a month. Sample milk are collected from evening milk by C/P at the time of monthly milk test. When C/P could not join monthly milk tests, he visited farms to collect milk samples on other days. In case C/P could not collect samples in a month, milk fat data of that month were regarded as N/A. The result of milk fat analysis are recorded in the format and inputted into database.

5.1.3 Milk test recording format

The current recording format was revised version in which column for the result of fat analysis were added in the latter half of the year 2016 as shown in the fig. 5-1 and 5-2. Besides, the following points were taken into consideration when the format was revised.

- 1) The recording format is printed out before hand and provided to milk inspector prior to milk test day.
- 2) Milk inspectors can record data directly onto the recording format at the time of milk test.
- 3) The recording format allow milk inspectors to compare previous month's data (milk yield and milk fat of individual milking animal as well as those average figures of a herd).
- 4) The recording format can accumulate past monthly data as a master data record.
- 5) In case milking buffalo entered into new parturition, use the new line to start making record of new parturition.
- 6) Once milk test completes, calculate milk yield for 305 days as well as fat weight and fill those figures in the recording format.

Sindh Livestock Breeders Association District Matiani													
Milk recording													
Kundi Buffalo													
Farm's CD & Name:	1010001	Ghaus Dairy Farm											
Owner's Name:	Ali Haider Shah												
Address:	New Saadabad Town												
Phone:	0301-399-7116												
Milking Time:	AM 05:00 ~ 06:00 , PM 17:00 ~ 18:00												
Name	Registration No.	Date of Birth	Delivery	Parity No.	Date of Dry	17-Mar-18							
						Am Milk	Fat %	Pm Milk	Fat %	Total Milk	Fat	Using calf or Oxtosa or Massage	Using Concentr.
Sehni	100100009	01-Jul-09	18-Aug-17	4		6.8	7.0	6.1	13.8	0.8		1	Yes
Abida	100100033	01-Jul-07	11-Nov-17	6		5.5	5.7	5.8	11.2	0.6		1	Yes
Nasima	100100041	01-Jul-08	25-Jun-17	5		3.0	2.9		5.9			3	Yes
Najma	100100043	01-Jul-08	01-Jul-17	5		3.3	3.1	6.2	6.4	0.4		1	Yes
Wadi	100100128	01-Jul-10	20-Jul-17	3		6.0	6.0	5.9	12.0	0.7		1	Yes
Nandhi	100100130	01-Jul-12	01-Aug-17	1		5.1	5.3	6.0	10.4	0.6		1	Yes
The number of the buffaloes which measured milk(kg)						6							
The total milk(kg)						59.7							
The average milk(kg)						10.0							
The number of the buffaloes which measured Fat%						5						0	
The total milk(kg) of the buffaloes with measured Fat%						59.7						0.0	
The total Fat(kg) of the buffaloes with measured Fat%						3.2						0.0	
The average Fat%						5.4						####	

Note: If using Calf write (1), if using Oxtosa write (2) and if using massage write (3).

DMY:

Fig 5-1 Milk test recorking format (the format is printed out and handed over to milk inspector before hand)

Sindh Livestock Breeders Association District Matiari																									
Milk recording																									
Kundi Buffalo																									
Farm's CD & Name:	1010001 Ghaus Dairy Farm																								
Owner's Name:	Ali Haider Shah																								
Address:	New Saeehabad Town																								
Phone:	0301-399-7116																								
Milking Time:	AM 05:00 ~ 06:00 , PM 17:00 ~ 18:00																								
Name	Registration No.	Date of Birth	Delivery	Parity No.	Date of Dry	Milk Production			18-Jun-14			17-Mar-18			Using Concentrator			Using calf or Oxtosin Massage			Using calf or Oxtosin F.				
						Days	Milk (kg)	Fat (%)	Am	Pm	Total	Am	Pm	Total	Milk	Fat %	Using Concentrator	Am	Pm	Total	Milk	Fat %	Using calf or Oxtosin F.		
						age			Milk	Fat		Milk	Fat					Milk	Fat		Milk	Fat			
Sohni	100100009	01-Jul-09	04-Aug-15	3	18-Sep-16	6	1	305	2.981																
Sohni	100100009	01-Jul-09	18-Aug-17	4																					
Soomal 016	100100016	01-Jul-07	04-Aug-14	2	18-Jun-15	7	1	305	2.335																
Abida	100100033	01-Jul-07	15-Sep-14	3	18-Apr-15	7	2	230	1.834																
Abida	100100033	01-Jul-07	24-Sep-15	4	18-Jul-16	8	2	281	2.196																
Abida	100100033	01-Jul-07	11-Nov-16	5	15-Aug-17	9	4	277	2.486																
Abida	100100033	01-Jul-07	11-Nov-17	6																					
Lakhaast-1	100100035	01-Jul-06	15-Aug-14	4	18-Aug-15	8	1	305	2.827																
Lakhaast-1	100100035	01-Jul-06	22-Oct-15	5	18-Aug-16	9	3	302	2.652																
Gudi	100100037	01-Jul-09	03-Nov-14	3	18-Jul-15	5	4	242	2.387																
Gudi	100100037	01-Jul-09	20-Dec-15	4	1-Apr-17	6	5	305	2.835																
Lakhaast-2	100100039	01-Jul-09	10-Nov-14	3	18-Dec-15	5	4	305	3.308																
Lakhaast-2	100100039	01-Jul-09	06-Sep-16	4	17-Jan-17	7	2	305	3.304																
Nasima	100100041	01-Jul-08	15-Oct-14	3	18-Jul-15	6	3	261	2.791																
Nasima	100100041	01-Jul-08	10-Dec-15	4	1-Mar-17	7	5	305	2.778																
Nasima	100100041	01-Jul-08	25-Jun-17	5																					
Najma	100100043	01-Jul-08	14-Oct-14	3	18-Jul-15	6	3	262	2.086																
Najma	100100043	01-Jul-08	22-Oct-15	4	16-Feb-17	7	3	305	2.528																
Najma	100100043	01-Jul-08	01-Jul-17	5																					
G.D.F 049	100100049	15-Oct-13	30-Aug-16	1	10-Oct-17	2	10	305	2.865																
Wadi	100100128	01-Jul-10	20-Jul-17	3																					
Nindhi	100100130	01-Jul-12	01-Aug-17	1																					
The number of the buffaloes which measured milk(kg)															①			22			8				
The total milk(kg)															②			57,771			71.0				
The average milk(kg)															③ (=②÷①)			2,626			8.9				
The number of the buffaloes which measured Fat%															④										
The total milk(kg) of the buffaloes with measured Fat%															⑤										
The total Fat(kg) of the buffaloes with measured Fat%															⑥										
The average Fat%															⑦ (=⑥÷⑤)										

Fig 5-2 Milk test recording format (milk record data and milk yield of 305 days by each

5.1.4 Calculation of milk yield for 305 days and milk fat

The Project applied simple calculation method for milk yield for 305 days (in case animal become dry before 305 days, less than 305 days are regarded as one lactation) and milk fat weight. Both milk yield and milk fat weight of each month are calculated by milk yield and milk fat weight (milk fat percentage x milk yield) of milk test day of each month multiplied by number of days of that month. The total milk yield and milk fat weight for 305 days are calculated by summing these monthly milk yield and milk fat weight. The format for calculation, sample format and points to be taken care are shown below (Please refer to Fig. 5-3,4 and 5).

Milk Production											
Farm CD	9999999	Farm Name	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	Parity No.	0	Age (y-m)	yy-mm				
Reg.No.	999999999	Name	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX								
Birth	dd-mm-yy	Delivery	dd-mm-yy								
Test Day	dd-mm-yy	dd-mm-yy	dd-mm-yy	dd-mm-yy	dd-mm-yy	dd-mm-yy	dd-mm-yy	dd-mm-yy	dd-mm-yy	dd-mm-yy	Total
Milk(kg)/day	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Fat %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Milking Days	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Milk(kg)/month	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fat kg/month	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
999999999	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	0 Days	Milk	0.0 kg	Fat	0.0 kg	Milk	0.0 kg	Fat	0.0 kg	Fat %
											#DIV/0!
											##### %
The change of Milk(kg)/day											
Milk(kg)/day											
14.0											dd-mm-yy
12.0											dd-mm-yy
10.0											dd-mm-yy
8.0											dd-mm-yy
6.0											dd-mm-yy
4.0											dd-mm-yy
2.0											dd-mm-yy
0.0											dd-mm-yy

Fig.5-3 Format for calculating milk yield and milk fat weight for one lactation (305 days)

Milk Production

FarmCD	1010003	Farm Name	Rahu Dairy Farm									
Reg.No.	100100639	Name	Rahu Dairy Farm 639									
Birth	10-Nov-13	Delivery	02-Apr-17	Parity No.	1	Age (y-m)	3-4					
Test Day	20-Apr-17	16-May-17	20-May-17	16-Jun-17	19-Jul-17	21-Aug-17	18-Sep-17	18-Oct-17	18-Nov-17	18-Dec-17	18-Jan-18	Total
Milk(kg)/day	7.8	9.0	12.5	12.0	11.7	11.7	9.4	9.6	8.7	9.3	7.9	
Fat %	5.5	5.8	6.3	6.3	6.0	6.0	4.8	5.9	5.9	7.0	5.4	
Milking Days	28	31	30	31	31	30	30	31	30	31	32	305
Milk(kg)/month	218.4	279.0	375.0	372.0	362.7	282.0	297.6	261.0	288.3	252.8	2989	
Fat kg/month	12.0	16.2	23.6	23.4	21.8	13.5	17.6	15.4	20.2	13.7	177.3	
100100639	Rahu Dairy Farm 639								305 Days	Milk	2,989 kg	
									Fat	177.3 kg	5.9 %	

The change of Milk(kg)/day

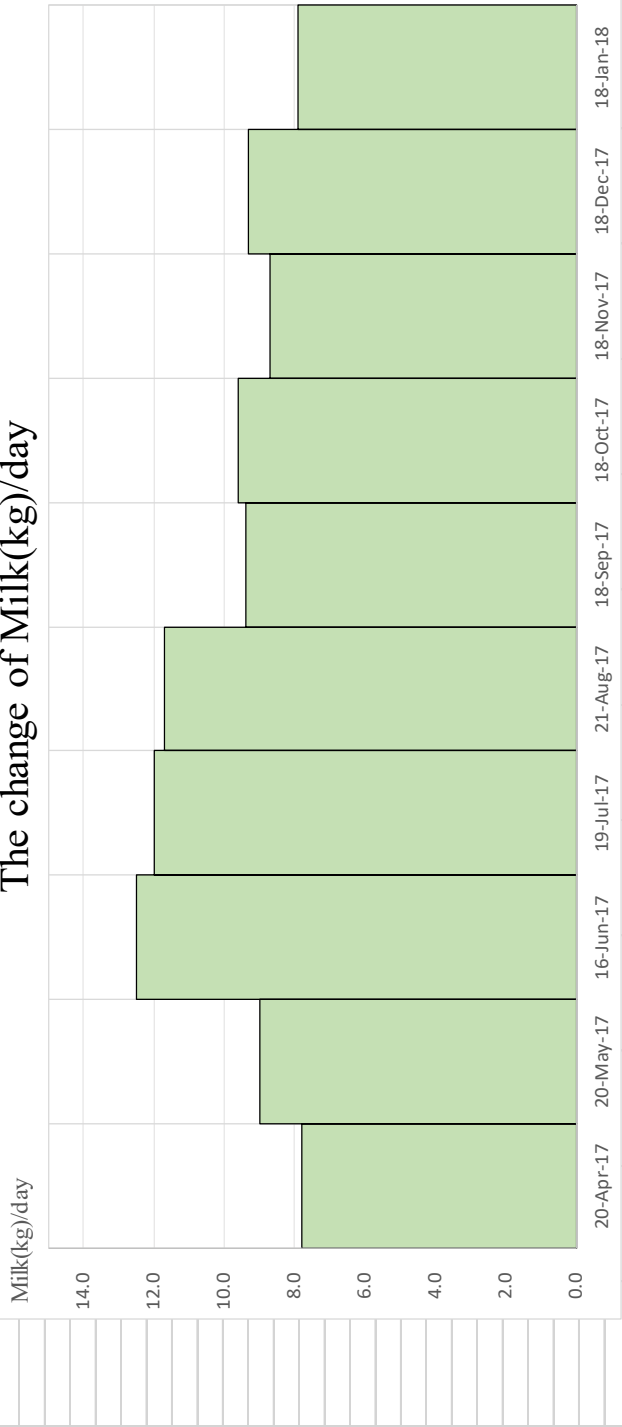


Fig 5-4 Sample format for calculating milk yield and milk fat weight for one lactation

These filled format were printed out and shared with concerned farmers for their information.

Milk Production											
① Farm CD	9999999		② Farm Name	XXXXXXXXXXXXXXXXXXXXXXXXXXXX							
③ Reg.No.	999999999		④ Name	XXXXXXXXXXXXXXXXXXXXXXXXXXXX							
⑤ Birth	dd-mm-yy		⑥ Delivery	dd-mm-yy		⑦ Parity No.	0		⑧ Age (y-m)	yy-mm	
⑨ Test Day	dd-mm-yy	dd-mm-yy	dd-mm-yy	dd-mm-yy	dd-mm-yy	dd-mm-yy	dd-mm-yy	dd-mm-yy	dd-mm-yy	dd-mm-yy	⑩ Total
⑩ Milk(kg)/day	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
⑪ Fat %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
⑫ Milking Days	0	0	0	0	0	0	0	0	0	0	0
⑬ Milk(kg)/month	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
⑭ Fat kg/month	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
⑰ 99999999	⑱ XXXXXXXXXXXXXXXXXXXXXXX						⑲ 0	Days	⑳ Milk	0.0	kg
							㉑ Fat	0.0	kg	㉒ #####	%
	Milk(kg)/day	The change of Milk(kg)/Day									
	14.0										
	12.0										
	10.0										
	8.0										
	6.0										
	4.0										
	2.0										
	0.0										
		dd-mm-yy	dd-mm-yy	dd-mm-yy	dd-mm-yy	dd-mm-yy	dd-mm-yy	dd-mm-yy	dd-mm-yy	dd-mm-yy	dd-mm-yy

Fig.5-5 Instruction and points to be taken care for using

Procedure

- ① Farm CD (Cord) : Input farm code of the buffalo.
- ② Farm Name: Input the farm name.
- ③ Reg No.: Input the registration number of the buffalo.
- ④ Name: Input the buffalo name registered with the Association.
- ⑤ Birth: Input the date of birth of the buffalo.
- ⑥ Delivery : Input date of delivery of the milk lactation period of the buffalo, of which milk production to be calculated.
- ⑦ Parity No.: Input parity number of the milk lactation period of the buffalo, of which milk production to be calculated.
- • • Input data 1 to 7 with reference to 'the breeder milking record file' and 'the registry data base'.
- ⑧ Age(y-m): Input age of the buffalo at the time of delivery

Formula: Date of delivery - Date of birth

e.g.1) 15-Mar-18 - 10-Feb-11 ⇒ 6 years and 1 month → input '6-1

e.g.2) 15-Mar-18 - 25-Feb-11 ⇒ 6 years and 0 month → input '6-0

⑨ Test Day: "Input date of milk test.

e.g.) 15-Mar-18

⑩ Milk(kg)/day : Input total daily milk production of the buffalo of each milk test day. In case that milking is done only one time in a day, make figure in red color. If no data is obtained on a test day, calculate and input average milk production of previous month and next month on a milk test day of a next month. Make figure in blue color.

⑪ Fat%: Input fat % of sampled milk upto first decimal place. In case no data is obtained on a test day, calculate and input average fat & of previous month and next month on a milk test day of a next month. Make figure in blue color.

Input data 9 to 11 with reference to 'the breeder milking record file'.

⑫ Milking Days: Input number of milking days of each month.

e.g.) 31 days for the month of Jan., Mar., May, Jul., Aug., Oct. and Dec.

30 days for the month of Apr., Jun., Sep. and Nov.

28 days for the month of Feb. 29 days for intercalary year."

1) In case milk test is started in the middle of month of delivery, count days from next day of delivery.

e.g.) The buffalo delivered a calf on 5 Jan. Milk test was carried out on 15 Jan. Number of milking days for the month of Jan. is 26 days, i.e. from 6 Jan. till 31 Jan."

2) In case milking test is started in the next month of delivery month, both number of milking days in the delivery month and number of milking days in the month of milk test are calculated as milking days.

e.g.) The buffalo delivered a calf on 15 Jan. Milk test was not carried out in January but was carried out on 22 Feb.

Number of milking days for the month of Feb. is calculated as 44 days, i.e. from 16 Jan. till 28 Feb. (16 days + 28 days)"

3) Milk (kg) and Fat (kg) are calculated with data of 1 lactation period, i.e. 305 days or days from next day of delivery till one day before dry period. The milking days are counted either till 305th day after delivery or till one day before dry period.

(1) In case milk test is conducted before 305th day or one day before dry period of that month, milking days of that month is counted till 305th days or one day before dry period. When the day of starting dry period is informed to milk inspector by a farmer, revise milking days of previous month accordingly.

e.g.) Milk test date is 15 March. In case 27 March is 305th day, number of milking days for the month of March is counted as 27 days. If 27 March is a date starting dry period, number of milking days for the month of March is counted as 26 days. When the day of starting dry period is informed to milk inspector by a farmer in April, milk inspector revise milking days of March.

(2) In case milk test is conducted after 305th day or one day before dry period of that month, add milking days of that month to the previous month. Milking days till 305th days or one day before dry period is added to milking days of the previous month.

e.g.) Milk test date is 15 April. In case 12 April is 305th day, number of milking days for the month of March is counted and corrected as 43 days (31+12). If 12 April is a date starting dry period, number of milking days for the month of March is counted and corrected as 42 days (31+11).

⑬ Milk(kg)/month: Milking(kg)/month is automatically calculated with the data of 10 and 12.

Formula: $\text{Milk(kg)/month} = \text{Milk(kg)/day} \times \text{Milking Days}$

⑭ Fat(kg)/month: Fat(kg)/month is automatically calculated with the data of 11 and 13.

Formula: $\text{Fat(kg)/month} = \text{Milk(kg)/day} \times \text{Milking Days} \times \text{Fat(\%)/100}$

⑮ Total "Total Milking Days, Milking(kg)/month, Fat(kg)/month is automatically calculated."

⑯ Fat%: "Fat % is automatically calculated with the data of 11 and 13.

Formula: $\text{Fat\%} = \frac{\text{Fat(kg)}}{\text{Milk(kg)}} \times 100$

⑰ 999999999: Registration number is displayed in bigger letters. 17 is interlinked with 3.

⑱ XXXX XXX: Buffalo name is displayed in bigger letters. 18 is interlinked with 4.

⑲ Days : Total Milking Days is displayed in bigger letters. 19 is interlinked with 12.

⑳ Milk kg: Total Milk (kg) is displayed in bigger letters. 20 is interlinked with 15.

㉑ Fat kg : Total Fat (kg) is displayed in bigger letters. 21 is interlinked with 15.

㉒ Fat %: Fat % is displayed in bigger letters. 22 is interlinked with 15.

㉓ Graph : Change of Milk (kg) / day is automatically displayed as a bar graph. 23 is interlinked with 10.

5.2 Outcome of milk test activities

The result of milk test of eight farms are shown in the graphs and tables below. Monthly changes of results of individual farms and total 8 farms are shown in the line graph. Annual average results by year are compiled in the table.

5.2.1 Change of results of total farms

Changes in number of milking animals that milk test were conducted, total milk yield, milk yield per head are shown in the Fig.5-6. Average data by year are shown in the table 5-2. The data of year 2015 and 2016 are of 6 farms data whereas year 2017 and 2018 are of 8 farms data. Number of milking animals decreases in the hot summer seasons. Consequently, the total milk yield

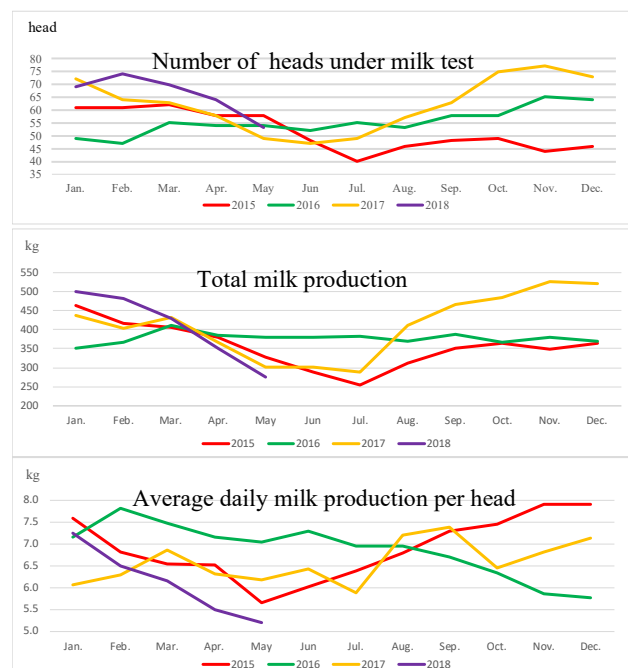


Fig.5-6 Change of results of total farms

decreases. Milk yield per head also decreases in the hot summer seasons, i.e. from May to July. Exceptionally, in year 2016, the total milk yield were not increased even after the hot seasons although number of milking animals increased. Milk yield per head was not recovered after the hot seasons in year 2016 unlike other years. Total number of milking animals in year 2015 and 2016 was around 50 heads. In year 2017 and 2018 the number was increased to around 60 due to increase of numbers of farms. The total milk yield per day increased accordingly. Average milk yield per head are same over the 4 years.

Table 5-2 Change of results of total farms (average)

milk test	2015	2016	2017	2018 (~5)
herd	51.8	55.3	62.3	66.0
total milk/day	356	379	411	408
milk/day/head	6.9	6.6	6.6	6.2

5.2.2 Change of results of each farm

Changes of the results of each farm are shown in the graph and table below.

There was no distinctive differences in farms. The milk yield per head, however, varies in farms. Milk yield per head increased in some farms whereas some farms decreased milk yield per head. The reasons behind these changes need to be examined. Exceptional characteristics of the year 2016 explained in the above section were influence of the results of farm 1020002 and 1030002 who rear numbers of animals.

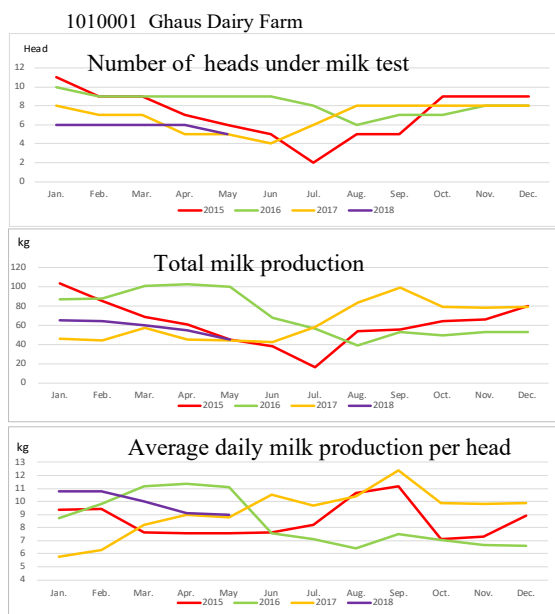


Fig.5-7 Change of results of Ghaus Dairy

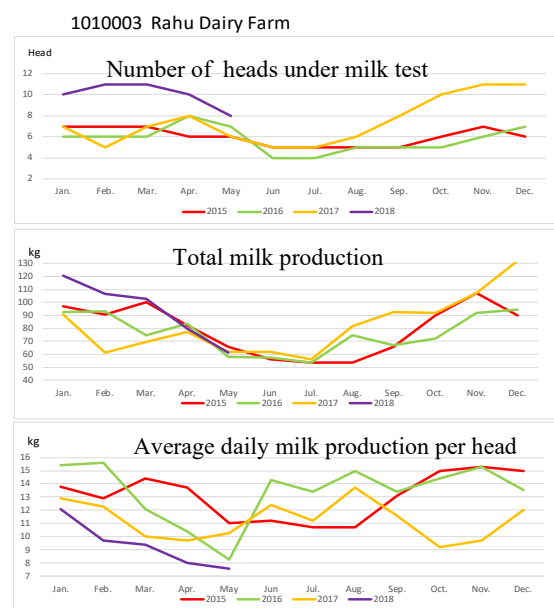


Fig.5-8 Change of results of Rahu Dairy

Table 5-3 Change of results of Ghaus Dairy farm (average)

milk test	2015	2016	2017	2018 (~5)
herd	7.2	8.3	6.8	5.8
total milk/day	61.4	70.8	62.9	57.8
milk/day/head	8.6	8.6	9.2	10.0

Table 5-4 Change of results of Rahu Dairy farm (average)

milk test	2015	2016	2017	2018 (~5)
herd	6.0	5.8	7.4	10.0
total milk/day	79.3	76.2	82.0	94.4
milk/day/head	13.2	13.2	11.1	9.4

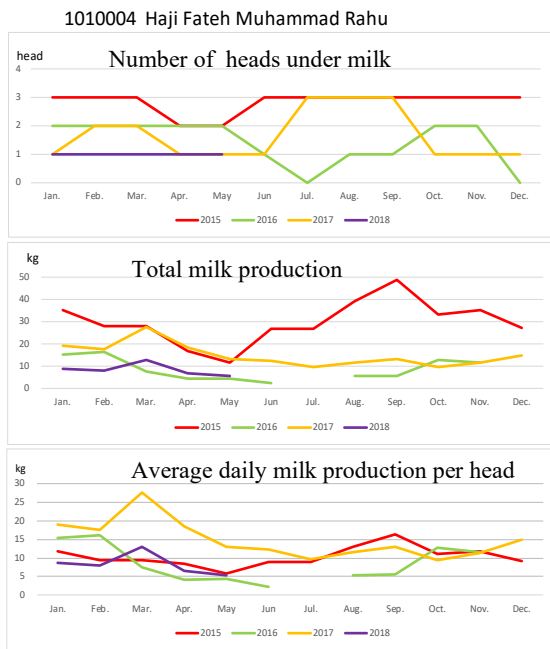


Fig.5-9 Change of results of Fateh farm

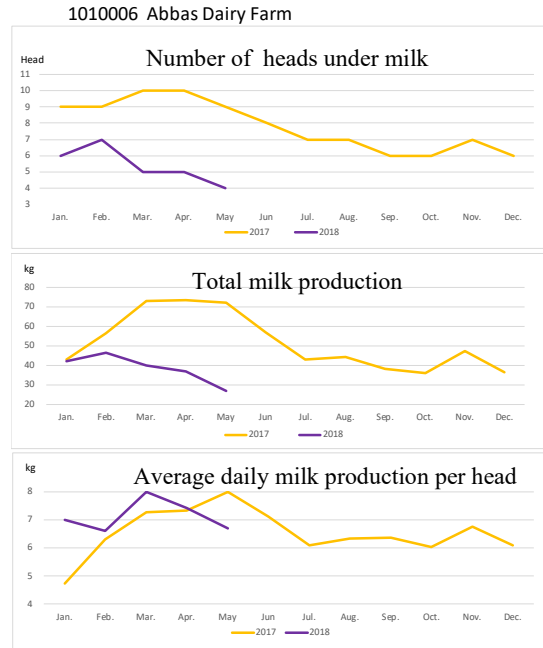


Fig.5-10 Change of results of Abbas Dairy farm

Table 5-5 Change of results of Fateh farm (average)

milk test	2015	2016	2017	2018 (~5)
herd	2.8	1.4	1.7	1.0
total milk/day	29.7	7.1	14.8	8.3
milk/day/head	10.5	5.0	8.7	8.3

Table 5-6 Change of results of Abbas Dairy farm (average)

milk test	2015	2016	2017	2018 (~5)
herd			7.8	5.4
total milk/day			51.6	38.5
milk/day/head			6.6	7.1

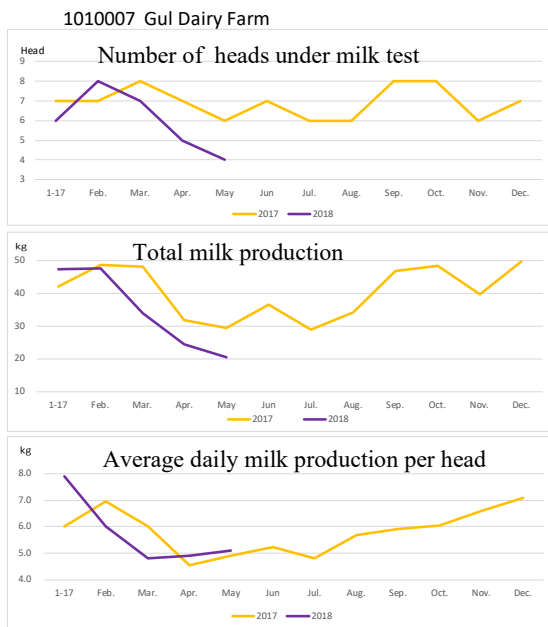


Fig.5-11 Change of results of Gul Dairy farm

Table 5-7 Change of results of Gul Dairy farm (average)

milk test	2015	2016	2017	2018 (~5)
herd			6.9	6.0
total milk/day			40.3	34.7
milk/day/head			5.8	5.8

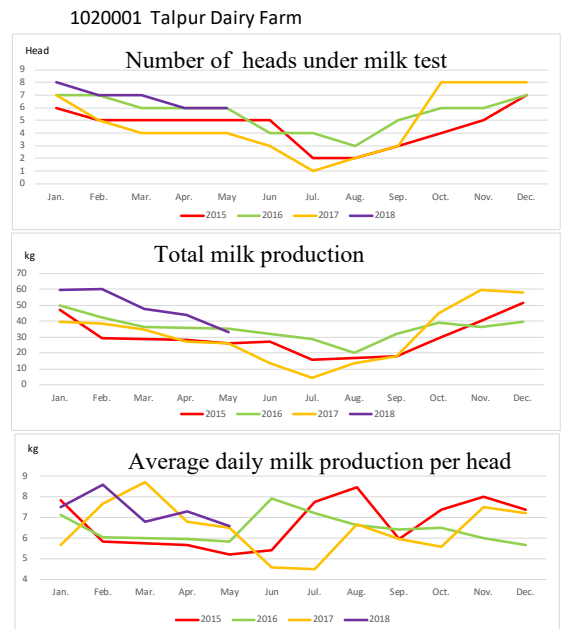


Fig.5-12 Change of results of Talpur Dairy farm

Table 5-8 Change of results of Talpur Dairy farm (average)

milk test	2015	2016	2017	2018 (~5)
herd	4.5	5.6	4.8	6.8
total milk/day	29.8	35.5	31.5	48.8
milk/day/head	6.6	6.4	6.6	7.2

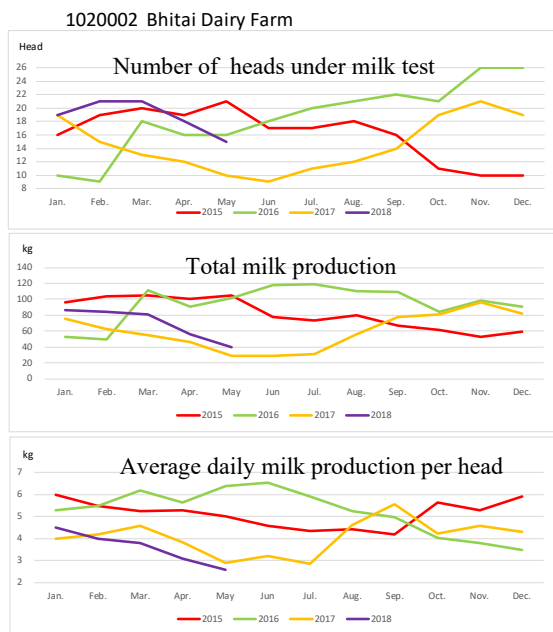


Fig.5-13 Change of results of Bhitai Dairy farm

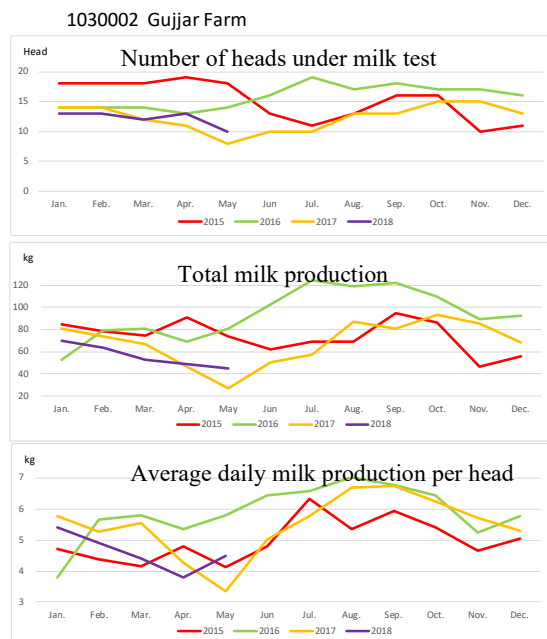


Fig.5-14 Change of results of Gujjar Dairy farm

Table 5-9 Change of results of Bhitai Dairy farm (average)

milk test	2015	2016	2017	2018 (~5)
herd	16.2	18.6	14.5	18.8
total milk/day	82	95	60	69
milk/day/head	5.1	5.1	4.1	3.7

Table 5-10 Change of results of Gujjar Dairy farm (average)

milk test	2015	2016	2017	2018 (~5)
herd	15.1	15.8	12.3	12.2
total milk/day	74	94	68	56
milk/day/head	4.9	5.9	5.5	4.6

5.2.3 Number of animals delivered a calf by month

In the case of Holstein cattle, conception rates fall down in the summer season. It is difficult to keep good conception rates in the summer. To examine the tendency of Kundhi buffalo, the numbers of animals delivered a calf by month are compiled in the table 5-11. The data covers those from year 2014 to 2017. The month that recorded maximum numbers of delivery varies in year.

This might because of number of samples were small.

Looking at total delivery numbers for 4 years, number of delivery was distinctively higher from the month of July to November. The gestation period of Kundhi buffalo is 310 days (about 10 months).

Delivery in the month of July means that that buffalo mated in September in the previous year. Delivery in the month of November means mating in the January. Those months have cool weather.

The mating took place in the lower air temperature environment.

Number of delivery decreases from December to May. To make buffaloes deliver a calf during these months, buffaloes have to be mated in the seasons when air temperature start to increase and reach to the hottest peak. Influence of hot weather on conception

rates is quite obvious. Besides, hot season comes right after the off-crop season when green fodder is in shortage. During off-crop seasons, physical strength of animals decreases if they are not properly fed. Physical strength of animals might not be fully recovered during hot seasons, which might be possible reasons for lowering conception rates.

Table 5-11 Number of buffaloes that undergo milk test delivered a calf by month

	2014	2015	2016	2017	Total
Jan.	1	2	2	2	7
Feb.	0	4	4	5	13
Mar.	1	0	6	2	9
Apr.	3	3	3	3	12
May	4	0	5	3	12
Jun	4	3	5	6	18
Jul.	5	8	9	10	32
Aug.	6	9	7	21	43
Sep.	6	6	11	10	33
Oct.	7	7	10	13	37
Nov.	13	4	5	6	28
Dec.	5	8	5	0	17

5.2.4 First parturition and calving interval

Number of buffaloes whose first parturition age is below 6 years with clear information of first parity, date of birth and date of first parturition are counted as 45 heads. Average age of first parturition is 47

months, i.e. 3 years and 11 months of age. Fourteen heads of them had first parturition below 3 years and 6 months of age, 15 heads had first parturition between 3.5 years and 4 years of age, 8 heads delivered a first calf between 4 years and 4.5 years, 4 heads had first parturition between 4.5 years and 5 years of age, and 4 heads had a first delivery above 5 years of age. Earliest first parturition was 35 months, i.e. 2 years and 10 months of age. Around 2/3 of buffaloes delivered a first calf below 4 years of age.

Average age of first parturition by farms is shown in the table 5-12. Average age of first parturition of 5 farms that started milk test is below 48 months, i.e. 4 years of age. Among them, farm 1010003 showed best results, i.e. 43 months (3 years and 7 months) of age. Average first parturition age of farm 1010006 and 1010007 that joined the activity since 2017 was older than those 5 farms.

Table 5-12 Numbers and average age of first parturition by farm

Farm CD	N=	Ave.
1010001	6	45
1010003	6	43
1010004	3	44
1010006	3	59
1010007	4	52
1020001		
1020002	14	48
1030002	9	44
Total	45	47

Calving interval by farms are shown in the table 5-13. The data of buffalo whose date of birth, date of delivery in consecutive parities and date of dry are clear enough were compiled.

Average calving interval of each farm is around 17 months. Total average calving interval is 17.3 months. Considering severe hot weather environment in Sindh province, the result is quite satisfactory. Nevertheless, for improving productive efficiency, efforts to reduce calving interval is required.

Calving interval of farm 1010006 is 14.3 months which means buffaloes have 4 months dry period in between 10 months lactation period. Calving interval of farm 1010007 is also short.

Farm 1010004 have longer calving interval, i.e. around 2 years. The buffalo have more than 1 year dry period. Herd of farm 1010004, however, has high milk production capacity which will be discussed in the later.

Table 5-13 Calving intervals of buffaloes

Farm CD	Calving-interval		milking days	dry days	N=
	Days	(months)			
1010001	512	(16.7)	359	153	16
1010003	502	(16.5)	326	176	12
1010004	716	(23.5)	344	372	4
1010006	435	(14.3)	307	128	5
1010007	520	(17.1)	397	123	4
1020001	532	(17.5)	388	144	12
1020002	506	(16.6)	322	184	35
1030002	557	(18.3)	402	155	30
Total	525	(17.3)	356	168	118

5.2.5 Milk production yield of one lactation (305 days) by farms

Table 5-14 shows milk production of each farm by year of parturition of buffaloes. The data is of milk production yield of buffaloes whose milk yield of one lactation could be calculated. In case one buffalo has plural lactation period data, each data was sorted out according to year of parturition.

Three farms of 1010001, 1010003 and 1010004 are located in district Matiari. Milk test of these three farms have started in 2014. Milk production yield of these farms are high. Especially, average milk production yield of farm 1010003 is above 3,000 kg in all 4 years. There is, however, huge variation in years. The possible causes are difference in individual buffaloes, fodder or weather.

Milk production of farm 1010001 seems gradually increased year by year. Especially the milk production increased as much as 600 kg in year 2017. The reason for increase needs to be examined.

Farm 1020002 is located in district Tando Muhammad Khan. Farm 1030002 is located in district Badin. They are rearing numbers of buffaloes. Their milk production yield, however, comparatively low.

Table 5-14 Milk Production by parity by farm

Farm CD	Year of Delivery	N=	Average					
			Age	Parity No.	Days	Milk (kg)		
1010001	2014	9	6	-	3	2.9	266	2,400
	2015	9	6	-	11	3.6	302	2,752
	2016	3	6	-	5	3.3	296	2,748
	2017	6	7	-	5	3.5	305	3,379
	all	27	6	-	9	3.4	279	2,774
1010003	2014	5	5	-	4	1.8	305	3,487
	2015	6	7	-	0	3.0	265	3,177
	2016	5	6	-	11	3.4	292	3,734
	2017	6	6	-	0	2.3	298	3,054
	all	22	6	-	4	2.6	289	3,340
1010004	2014	2	4	-	11	2.0	290	2,390
	2015	2	7	-	6	4.0	305	3,276
	2016	1	9	-	5	5.0	275	4,189
	2017	1	6	-	0	2.0	305	3,152
	all	6	6	-	9	3.2	295	3,113
1010006	2014	0	-	-	-	-	-	-
	2015	0	-	-	-	-	-	-
	2016	7	6	-	4	2.7	287	1,824
	2017	2	4	-	4	2.0	305	2,609
	all	9	5	-	11	2.6	291	1,998
1010007	2014	0	-	-	-	-	-	-
	2015	0	-	-	-	-	-	-
	2016	2	4	-	2	1.0	305	1,505
	2017	3	5	-	9	2.3	298	1,718
	all	5	5	-	1	1.8	301	1,633
1020001	2014	1	6	-	4	3.0	305	2,126
	2015	6	8	-	6	5.3	303	2,133
	2016	4	8	-	5	5.3	303	2,133
	2017	1	13	-	1	9.0	305	2,016
	all	12	8	-	9	5.4	298	2,123
1020002	2014	11	6	-	2	2.8	280	1,468
	2015	11	6	-	9	3.5	289	1,717
	2016	24	7	-	1	3.4	291	1,436
	2017	4	7	-	10	4.3	277	1,177
	all	50	6	-	10	3.3	287	1,484
1030002	2014	2	7	-	2	3.5	305	1,588
	2015	12	7	-	0	3.8	292	1,656
	2016	14	6	-	11	3.3	290	1,884
	2017	13	7	-	7	3.8	296	1,721
	all	41	7	-	2	3.6	293	1,751
Totale	2014	30	6	-	0	2.7	283	2,175
	2015	46	7	-	2	3.8	292	2,216
	2016	61	6	-	11	3.3	291	1,950
	2017	35	7	-	2	3.5	297	2,243
	all	172	7	-	2	3.5	297	2,120

5.2.6 Milk production yield by age and parity

Table 5-15 shows average milk production yield by age. Table 5-16 shows average milk production by parity. There is no distinctive tendency maybe due to less number of cases. Milk production is high at the age of 5 to 7 years and second and third parity. After that, milk production yield decreases. Overall tendency observed are same as tendency observed in the case of Holstein cattle breed.

Table 5-15 Average Milk Production by age

age	N=	Parity No.	Days	milk(kg)
~3	18	1.0	299	1,998
4	11	1.5	303	2,091
5	18	2.2	293	2,268
6	35	3.0	284	1,991
7	35	3.7	294	2,251
8	30	4.4	295	2,191
9~	25	5.6	279	2,028

5.2.7 Milk production yield by month of delivery

Like as the case of dairy cattle, milk production of buffaloes are affected by hot weather, which are clearly appeared in the monthly milk test results. To examine influence of hot weather on milk production yield of one lactation, total average milk production yield by month of delivery was calculated. As shown in the table 5-17, lowest milk production yield was of those delivered a calf in the month of June. Highest milk production yield was of those delivered a calf in the month of October. The difference was about 850 kg. Milk production yield of buffalo that reach their peak lactation period in the hot season is low. This result is quite logical.

5.2.8 Milk fat analysis

The Project started milk fat analysis in December 2016. Fat analysis was not always conducted in every month consecutively. Since consecutive data of individual buffalo are still not available, the data are not enough to estimate milk fat weight for one lactation (305 days).

Six hundred and six (606) samples were collected from December 2016 to June 2018. The average fat percentage is 5.8%. The average fat percentage by farms is shown in the Table 5-18. Except farm 1010007, average fat percentage of farms is within the range of ± 0.2 .

Average fat percentage by month is shown in the Fig. 5-15. There are wide variations of milk fat percentage from June 2017 and August 2017. The reasons have not been unraveled so far. Several abnormal data that are thought to be analysis errors were found, which made difficult analyze fat analysis data properly. The

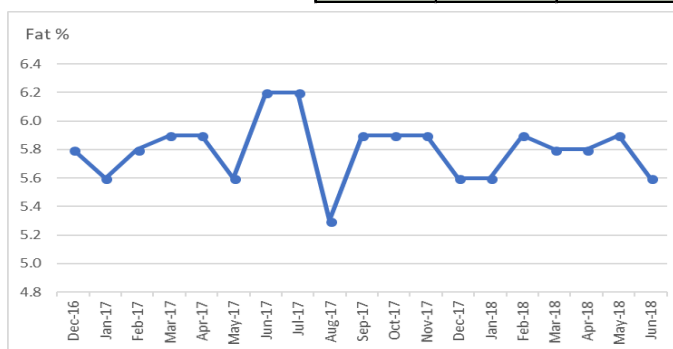


Fig. 5-15 Change of fat percentage by month

Table 5-16 Average Milk Production by parity

Parity No.	N=	Age(y-m)	Days	milk(kg)
1	26	3 - 11	301	1,920
2	27	5 - 8	287	2,296
3	45	6 - 11	288	2,257
4	35	7 - 7	294	2,039
5	21	8 - 6	294	1,943
6~	18	9 - 9	279	1,941

Table 5-17 Average Milk Production by month of delivery

month to be delivered	N=	Age (y-m)	number of days	milk (kg)
Jan.	6	6-1	293	2,131
Feb.	11	6-5	298	1,970
Mar.	7	5-4	299	1,909
Apr.	7	6-3	295	2,311
May	9	6-10	290	1,842
Jun	16	7-3	295	1,681
Jul.	21	6-7	296	2,470
Aug.	27	7-2	284	2,104
Sep.	20	7-2	290	2,060
Oct.	16	7-5	283	2,540
Nov.	20	6-10	289	1,991
Dec.	16	6-11	287	2,060

Table 5-18 Fat analysis by farm

Farm CD	N=	Ave.(%)
1010001	81	5.9
1010003	108	6.0
1010004	13	5.6
1010006	43	5.6
1010007	57	6.3
1020001	51	5.8
1020002	171	5.7
1030002	82	5.8
all	606	5.8

analysis of milk fat data can be analyzed in future when enough accurate data are accumulated.

Milk fat percentage of the months when no milk fat analysis was done was calculated as the average fat percentage of the previous month and the following month. With these data, milk fat weight of one lactation was calculated. Due to incomplete data set, only 7 heads of buffaloes' total milk fat weight and average milk fat percentage were calculated. The average milk production of one lactation (305 days) was 2,583 kg. The average milk fat weight was 160.3 kg. The average milk fat percentage was 6.2 %. The average age of buffaloes under milk test was 7 years and 2 months.

5.3 Challenges for the future

The Project piloted milk test with only 8 farms and 60 heads of animals. The results, however, was enough to tell the characteristics of Kundhi. At the same time, challenges of implementing milk test were identified. The purpose of milk test carried out by the Project was to identify the elite milking buffalo for selection of breeding bulls. The sons of those elite milking buffaloes were supposed to be provided to communities as breeding bulls. The Project, however, could reach up to the stage of searching candidate breeding bulls but have not selected proper breeding bulls as yet.

Breeder farms that participated in the milk test activities joined the activities in response to the call from the Project. They might not be fully aware of benefits of milk test on their farm management yet.

The Project organized the breeder's workshop in November 2017 and April 2018. These workshops provided the opportunities for the Project to explain the current situation of pedigree registration and milk test and the data of milk production yield by farms. Through these activities, it seems breeder farmers started having interest in the pedigree registration and milk test activities. The Project intends to organize two more breeder workshops during the project period.. It is essential that breeder farms fully understand importance of milk test and how to utilize milk test data for their farm management through those occasions.

The activities of pedigree registration and milk tests should be continued after the Project period by organizations established by these breeder farms. To continue activities, organization like 'breeders association' should be established and implementation structures needs to be established. The association will carry out both milk test and pedigree registration. They will set up secretariat office and will conduct following activities.

- 1) To recruit and train milk inspectors
- 2) To manage data of registered animals (This might require proper full time data management officer at the secretariat)

The data management is carried out as per the following procedures.

- a) The secretariat prepares monthly recording format and sends to milk inspectors. In the recording format, data of the previous month is to be filled to share with farms and inspectors.
- b) Upon receipt of recording format filled by milk inspectors, the secretariat check the data and input the data into the computer database.

- c) Once any buffalo completes one lactation (305 days), prepare 'Milk Production' sheet explained in the Chapter 5, issue and deliver to each farm.

Following points need to be examined in future.

- 1) In the Project area, suckling a calf as a stimulus for milking as well as for feeding a calf is common. Time duration of suckling calves varies in farms. Besides, time duration varies in lactation stage of milking buffalo even within one farm. It is, therefore, difficult to measure exact milking yield by simply measuring milk yield milked by human. The farms will milk all quantity of milk on the day of milk test and feed them it to a calf. Such types of rules need to be developed.
- 2) Some farms shift from two time milking to one time milking in the latter half of lactation period irrespective of daily milk production yield of buffaloes. The rule that fix a timing of shifting from two time milking to one time milking is necessary. Once daily milk production decreases to some certain point level, farms will shift to one time milking. Such type of rules can be developed. There are several reasons why farms change to one time milking, e.g. for maintaining physical strength of animals, for improving conception rates, for better growth of fetus. If proper feeding management based on data of milk production yield and body weight is practiced, two times milking can be possible up to 8th month after parturition.
- 3) It seems difficult to continue milk fat analysis after the Project period. Several points need to be cleared, such as how to maintain laboratory, laboratory staff, and cost of collecting milk samples.

Chapter 6 Physical constitution and characteristics of body shape of Kundhi buffaloes

6.1 Physical constitution of Kundhi buffalo reared at different farms participating the Project activities

To study physical constitution of Kundhi buffalo is important not only for setting targets for genetic improvement but also for calculating required feed provision to animals. The Project took measurement of body height, heart girth and body weight of 56 heads of 5 farms in November 2015. The age of 56 heads of buffaloes were in between 1 month and 112 months.

- 1) Growth curve of body height, heart girth, and body weight of 31 heads of buffaloes are shown in the Fig. 6-1, 2 and 3. The age of calves is in between 1 month and 37 months. Accuracy of data was high.
- 2) Correlation coefficient between heart girth and body weight of total 56 heads was calculated. The correlation coefficient was 0.981. The correlation was quite strong. The equation for calculating body weight from heart girth was set up. With this equation, body weight can be estimated without weighing scales. The Fig.6-4 shows the equation with high accuracy.

However, there were few data of buffalo above 16 months of age and was limited to data of breeder farms. To utilize this equation for estimation of body weight of animals reared in the ordinary farm, wider range of data should be collected to adjust equation according to those data.

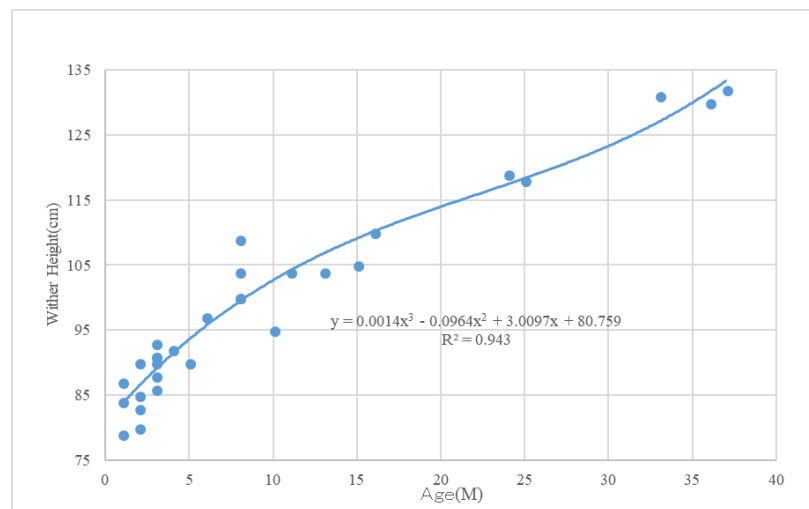


Fig.6-1 Growth Curve: Wither

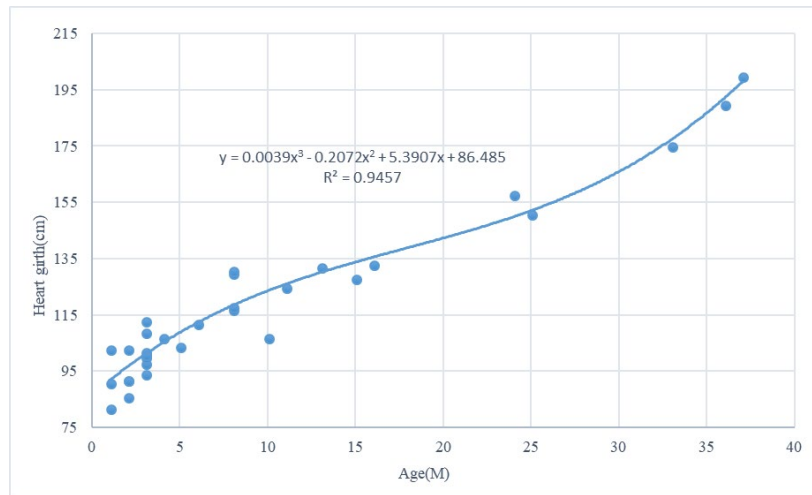


Fig.6-2 Growth Curve: Heart Girth (2015, Female)

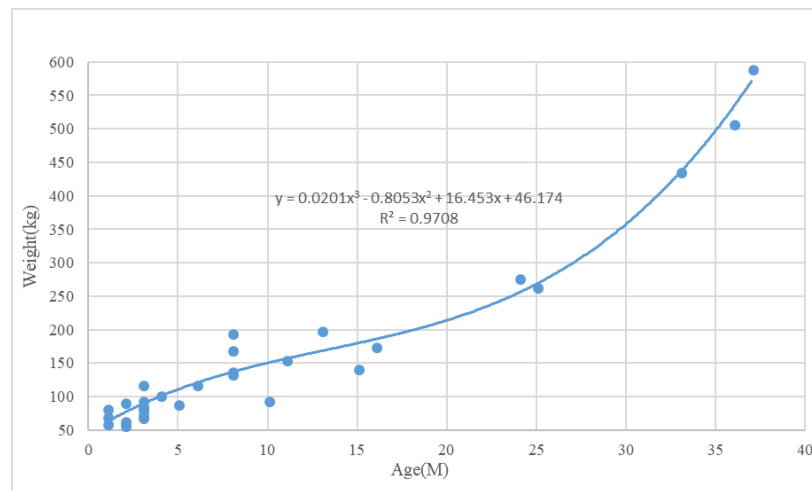


Fig.6-3 Growth Curve : Weight (2015, Female)

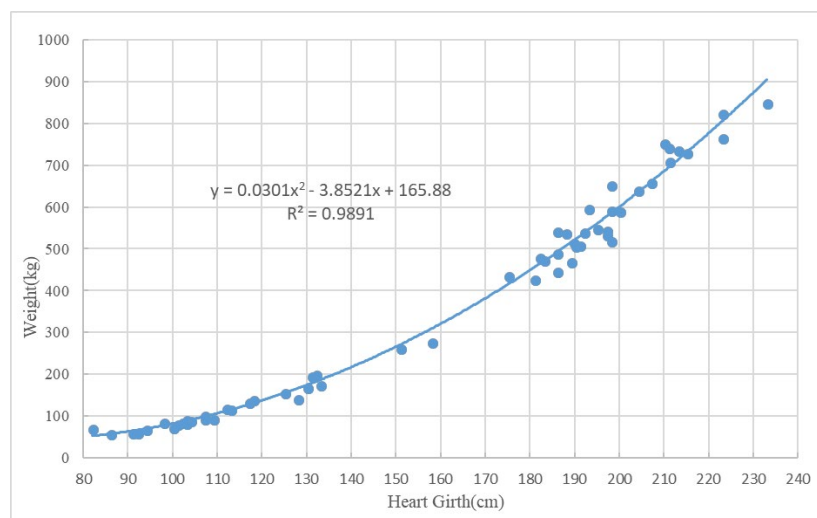


Fig.6-4 The relation between the Heart Girth and the weight (2015, Female)

6.2 Development of a measuring tape to estimate body weight of Kundhi buffalo

With the result of body data collection and analysis in November 2015, the Project decided to develop a measuring tape for body weight estimation. The Project developed a measuring tape for body weight estimation of Kundhi buffalo so that ordinary farmers who do not have body weighing scale could easily estimate body weight of their Kundhi buffalo.

The data used for development of a measuring tape were body weight and heart girth of buffaloes reared in the Project's pilot farms, buffaloes of breeder farms, buffalo calves reared in the Project's calf salvation center. The data included chronological data of same buffalo.

Number of data collected was around 1,400. Data including farm name, a tag number, sex, date of birth, date of measurement, heart girth and body weight were inputted into the data base.

Correlation coefficient of heart girth and body weight was calculated. Once correlation was confirmed to be strong enough, approximation curve and equation was developed. The estimated body weight against each heart girth was calculated.

6.2.1 Body weight estimation of female buffalo

Reference table for body weight estimation and heart girth were prepared according to following process.

- 1) One thousand two hundred and nine (1,209) data were used for preparing reference table.
- 2) Strong correlation between heart girth and body weight were found. The coefficient correlation was 0.9666.
- 3) Heart girth and body weight were plotted on the graph as shown in Fig. 6-5. With polynomial equation, approximation curve and approximation equation (quadratic equation) are calculated.
 $Y=0.0266x^2-3.2978x+141.58$ $R^2=0.9737$
- 4) Estimated body weight against heart girth by 1 cm was calculated with approximation equation. The reference table was developed as shown in table 6-1.

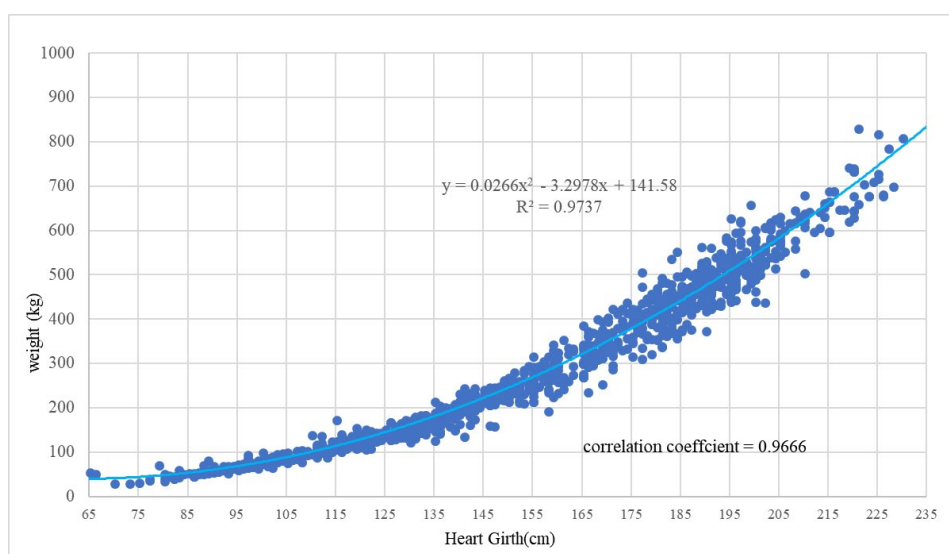


Fig.6-5 The relation between the heart girth and the weight (Female)

6.2.2 Body weight estimation of male buffalo

As for male buffaloes, numbers of cases whose heart girth exceed 165 cm are not enough for developing a measuring tape for body estimation. The data analysis is not going to be publicized but the trial analysis was shown in Fig. 6-6.

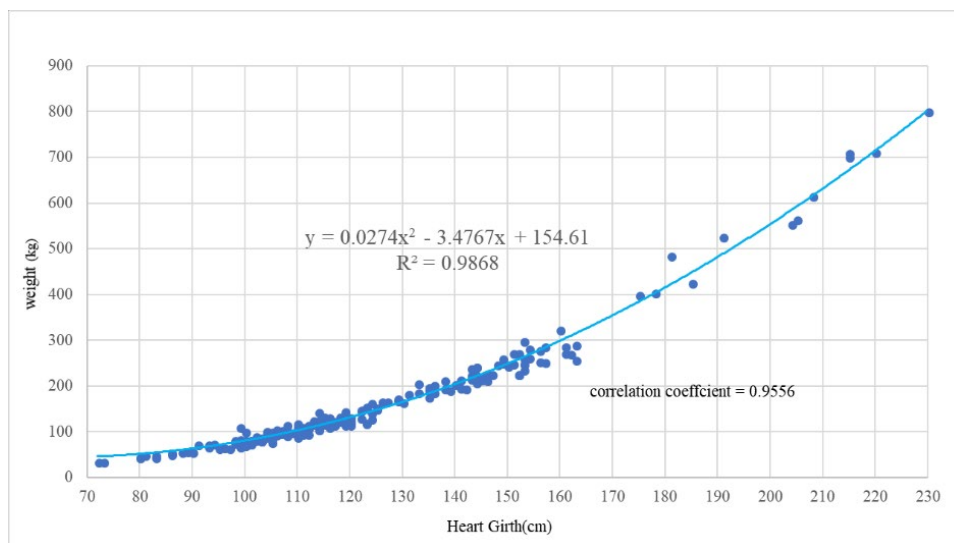


Fig.6-6The relation between the heart girth and the weight (Male)

- 1) The number of data used for analysis was 206.
- 2) Strong correlation between heart girth and body weight were found. The coefficient correlation was 0.9556.
- 3) Heart girth and body weight were plotted on the graph as shown in Fig. 6-6. With polynomial equation, approximation curve and approximation equation (quadratic equation) are calculated. $Y=0.0274x^2-3.4747x+154.61$ $R^2=0.9868$
- 4) Estimated body weight against heart girth by 1 cm was calculated with approximation equation. The reference table was developed as shown in table 6-2.

Table 6-1 The estimation of the weight from the heart Girth (Female)

Heart Girth	Estimated weight	Heart Girth	Estimated weight	Heart Girth	Estimated weight	Heart Girth	Estimated weight	Heart Girth	Estimated weight
61	39	96	70	131	166	166	327	201	553
62	39	97	72	132	170	167	333	202	561
63	39	98	74	133	173	168	338	203	568
64	39	99	76	134	177	169	344	204	576
65	40	100	78	135	181	170	350	205	583
66	40	101	80	136	185	171	355	206	591
67	40	102	82	137	189	172	361	207	599
68	40	103	84	138	193	173	367	208	606
69	41	104	86	139	197	174	373	209	614
70	41	105	89	140	201	175	379	210	622
71	42	106	91	141	205	176	385	211	630
72	42	107	93	142	210	177	391	212	638
73	43	108	96	143	214	178	397	213	646
74	43	109	98	144	218	179	403	214	654
75	44	110	101	145	223	180	410	215	662
76	45	111	103	146	227	181	416	216	670
77	45	112	106	147	232	182	422	217	678
78	46	113	109	148	236	183	429	218	687
79	47	114	111	149	241	184	435	219	695
80	48	115	114	150	245	185	442	220	703
81	49	116	117	151	250	186	448	221	712
82	50	117	120	152	255	187	455	222	720
83	51	118	123	153	260	188	462	223	729
84	52	119	126	154	264	189	468	224	737
85	53	120	129	155	269	190	475	225	746
86	55	121	132	156	274	191	482	226	755
87	56	122	135	157	279	192	489	227	763
88	57	123	138	158	284	193	496	228	772
89	59	124	142	159	290	194	503	229	781
90	60	125	145	160	295	195	510	230	790
91	62	126	148	161	300	196	517	231	799
92	63	127	152	162	305	197	524	232	808
93	65	128	155	163	311	198	531	233	817
94	67	129	159	164	316	199	539	234	826
95	68	130	162	165	322	200	546	235	835

Table 6-2 The estimation of the weight from the heart Girth (Male)

Heart Girth	Estimated weight	Heart Girth	Estimated weight	Heart Girth	Estimated weight	Heart Girth	Estimated weight	Heart Girth	Estimated weight
71	46	106	94	141	209	176	391	211	641
72	46	107	96	142	213	177	398	212	649
73	47	108	99	143	218	178	404	213	657
74	47	109	101	144	222	179	410	214	665
75	48	110	104	145	227	180	417	215	674
76	49	111	106	146	231	181	423	216	682
77	49	112	109	147	236	182	429	217	690
78	50	113	112	148	240	183	436	218	699
79	51	114	114	149	245	184	443	219	707
80	52	115	117	150	250	185	449	220	716
81	53	116	120	151	254	186	456	221	725
82	54	117	123	152	259	187	463	222	733
83	55	118	126	153	264	188	469	223	742
84	56	119	129	154	269	189	476	224	751
85	57	120	132	155	274	190	483	225	759
86	58	121	135	156	279	191	490	226	768
87	60	122	138	157	284	192	497	227	777
88	61	123	142	158	289	193	504	228	786
89	62	124	145	159	295	194	511	229	795
90	64	125	148	160	300	195	519	230	804
91	65	126	152	161	305	196	526	231	814
92	67	127	155	162	310	197	533	232	823
93	68	128	159	163	316	198	540	233	832
94	70	129	162	164	321	199	548	234	841
95	72	130	166	165	327	200	555	235	851
96	73	131	169	166	333	201	563	236	860
97	75	132	173	167	338	202	570	237	870
98	77	133	177	168	344	203	578	238	879
99	79	134	181	169	350	204	586	239	889
100	81	135	185	170	355	205	593	240	898
101	83	136	189	171	361	206	601	241	908
102	85	137	193	172	367	207	609	242	918
103	87	138	197	173	373	208	617	243	928
104	89	139	201	174	379	209	625	244	938
105	92	140	205	175	385	210	633	245	948

6.3 Growth curve

Growth curve of body weight and heart girth of female buffalo were developed with the data used for developing a measuring tape for body weight estimation. Gray plot shows average measurement value by age of month +1 standard deviation. Orange plot shows average measurement value by age of month. Blue plot shows average measurement value by age of month -1 standard deviation. Each colored line showing approximation curve and calculation formula is for each approximation equation. There was difference of standard deviation in age of month, which appeared in a wide gap between plot and curve. The possible reason was that the data of age of month were different from actual age since most of date of birth of individual animals was based on the memory but not accurate record. If unreliable data are excluded, more accurate growth curve might be developed.

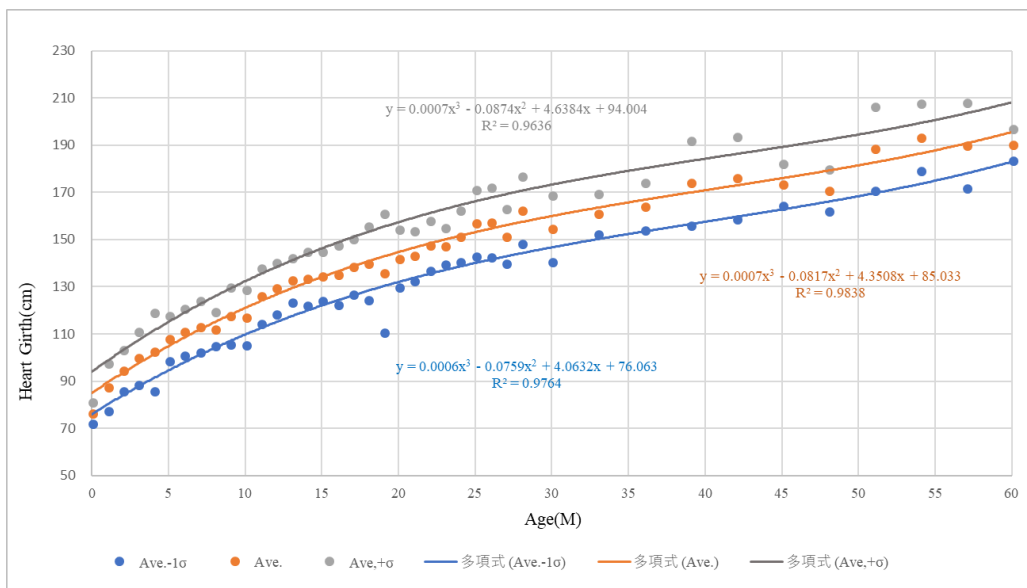


Fig.6-7 Growth Curve: Heart Girth (2017, Female)

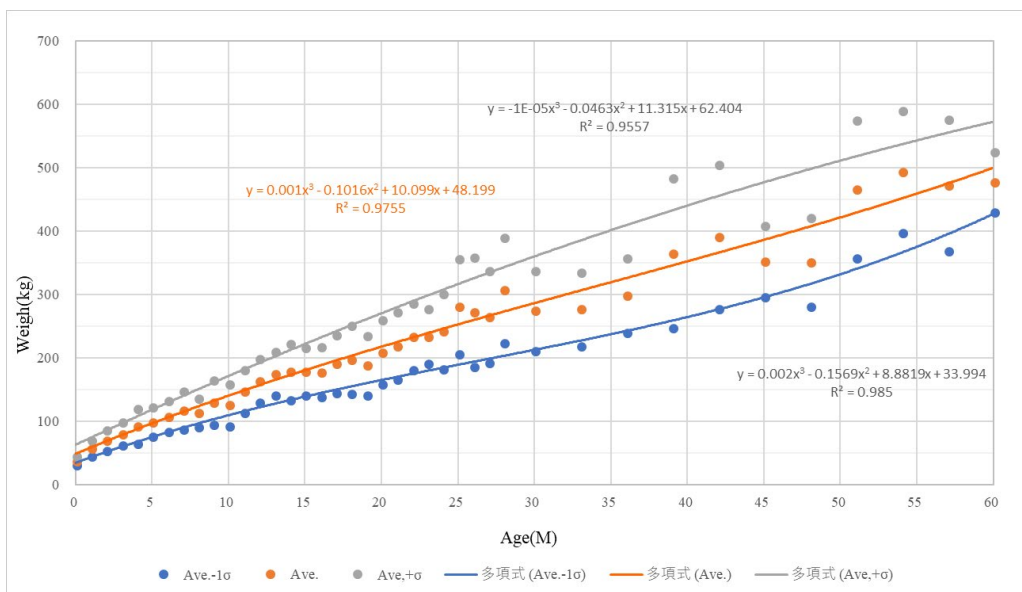


Fig.6-8 Growth Curve: Weight (2017, Female)

6.4 Physical constitution judgment

Criteria for judgement of physical constitution used for Holstein cattle breed in Japan cannot fit exactly for Kundhi buffalo breed. Nevertheless, trial on liner classification and classification according to Japanese criteria for judgments were made to understand the physical characteristics of Kundhi buffalo. The trial was made with milking Kundhi buffalo in 5 farms.

6.4.1 Physical constitution

Data of physical constitution of 3 farms are shown in the table 6-3. Milking buffalo of these 3 farms represent regional characteristics of Kundhi. There were huge differences among buffaloes of these 3 farms. Buffaloes of farm 1010003 were remarkably big in size. Buffalo of farm 1030002 (farm in Badin) might represent typical physical constitution of Kundhi buffalo.

Table 6-3 Physical constitution of buffaloes

(Only parous female buffalo) Measurement Date 10~12/11/2015					
Farm CD	Number of Measurement	Age(M)	Wither Height	Chest Girth	Weight
1010001	7	77	134	190	515
1010003	6	94	141	211	710
1030002	10	86	132	196	570



Photo 6-1
Farm CD 1010001
7 years and 4 months age
Body height 140 cm
Heart girth 207 cm
Body weight 660 kg

Photo 6-2
Farm CD 1010003
9 years and 4 months age
Body height 140 cm
Heart girth 215 cm
Body weight 730 kg





Photo 6-3
Farm CD 1030002
6 years and 4 months age
Body height 129 cm
Heart girth 193 cm
Body weight 598 kg

6.4.2 Characteristics of physical constitution

(1) Characteristics of body parts

1) Appearance and skeletal structure

Most of buffalo observed having depth of body and chest width in accordance with body height. The front and middle body were well enriched. Shoulder attachment was strong. However, there are several buffalo having weak back and waist. Width of thurl and ischial bone were appropriate in most buffaloes in accordance with width of hip bone. Buffaloes have characteristics shape of hips. Sacrum is high. Slope from the top of scrum to ridge and slope from the edge of scrum to thurl are very steep. On the other hand, slop from upper edge of hip born to upper edge of ischial bone is smaller than expected. Average slope angle of all buffaloes was $13.4 \text{ degree} \pm 4.0 \text{ degree}$. Ridge is in growing deeply, which is one of characteristics of Kundhi buffalo. No Kundhi buffaloes have ischial bone situated higher than hip bone like Holstein cattle. How hip angle affect function of Kundhi buffalo as well as how this hip angle has to be assessed are the themes needs to be examined further.

2) Legs and hoofs

The short length from knee to toe is characteristic of Kundhi buffalo. This characteristic is well appeared in the front leg. The front legs are straight. There are no particular problems in the front legs. As for the hind legs, hock-joint is clear and has enough width. Canal is well-set. Looking from the side, hock-joint is bending widely so that toes touch on the earth ahead of perpendicular line dropping from thurl. So-called 'stepping forward' types are often found. Looking from the back, hock-joints are close each other. So-called 'in-knock-knee' is often found as well. These buffalos 'he pastern are weak.

As for the hoof, some of buffalo's hoofs are good in size, thickness and angle. In case buffaloes are 'stepping forward' type, most of their hoof angles are small and heels are thin. These can be improved to some extent if hoofs are properly maintained.

3) Dairy strength

Neck is thin and long. Withers are firm and having acute angle. Ribs are spreading and flat. Certain percentage of buffaloes have tick inner thigh.

4) Mammary organ

Most of fore udder attachment are good enough. Rear udder attachment point is high. Widths of rear udder of some of buffaloes are expected to grow well in the peak period. On the other hand, buffalo with narrow width of rear udder are often found.

Capacity of udder is not well developed in most buffaloes. Especially, many of buffaloes have none developed rear udder. Observing bottom of udder, inclined to the fore udder is often found. Bottom of udder does not reach to hock even after several parturitions, which is preferable. This might be due to less milk production yield.

Teats are thick and long in many buffaloes. Some buffaloes do not have spaces between front and rear teats and/or between left and right teats. Front teats of some buffaloes are attached outer side of udder blocks. These alignments of teats might not be big problems as long as hands milking are applied to these buffaloes. Stimulation by suckling of calves are usually given to milking buffalo before milking by hands. The appropriate length and thickness of teats need to be examined in future.

6.4.3 Issues for improvement of physical constitution of Kundhi buffaloes

The small scale trial of studying characteristics of physical constitution of Kundhi buffaloes was made in the Project. The trial was made with reference to the Japanese assessment methods for Holstein cattle. From the results of the trial, it can be concluded that udders and legs and hoofs are identified as most prioritized parts for improvement in Kundhi buffalo. This is same as the case of Holstein cattle. There is no data of physical constitution of Kundhi buffalo currently. Accumulation of reliable data accurate enough for data analysis through proper observation and assessment is the first step for improvement of physical constitution of Kundhi buffalo. Before starting collecting these physical data, pedigree registration, milk test should be conducted in order.

The standard for physical constitution for assessment for Kundhi buffalo was drafted by the Project in consultation with the Pakistani counterparts in charge of genetic improvement. The following draft is shown as a reference. The standards are very similar to those of Holstein cattle breed.

Format used for the physical constitution judgments in the Project are show as a reference as well.

Reference table for judgement (kundhi Buffalo female)

Parts (score)		
Frame (25)		Moderate size and strength, attractive style with harmonious blending and correlation of parts, full of vigor and refinement with gentle temperament. Skin and hair color : Jet black skin and hair is the most common and most popular color.
Head	2	Head : comparatively small, sharply and clean cut in females but coarse and heavy in bull. The fore head is broad. Horn : short thick at the base, inclined backward and upward, and end in a moderately tight curl. Face : fine hollow Nostrils : wide apart Eyes : prominent, active and bright in females Ear : small, thin and pendulous
Shoulder, Back(Chine), Loin	7	Shoulder : moderately length, set firmly against the chest wall, smoothly blending with chest and withers, fullness at the point of elbow, and tightly connecting middle part of body. Back (Chine) : strong, long and appearing straight with spines well define. Loin : well-developed transverse process, broad, long, strong and Slightly higher than back, and slightly sloping towards the front.
Chest, Barrel	6	Chest : wide and well developed and wide across the brisket. Barrel : Medium sized. The front portion of the body is light and narrow, while the rear portion is heavy and wide, giving a wedge-shaped appearance.
Rump	10	Long and wide throughout with pin bones, sloping from hip bones. Hips : broad and smoothly covered. Thurl : wide apart and located at nearly equidistant from hips and pin bones, at moderate level of height. Pin Bones : prominent and far apart. Tail head : et slightly above and neatly between pin bones, nearly level with the top line. Tail : Long, thin and flexible and usually extends up to the middle of fetlock ending in black tuft. Vulva : nearly vertical.
Legs and Feet (20)		Length being well proportioned with the depth of body, standing wide apart in a right posture, clean-cut and strong with sound walk.
Legs	10	Fore Legs and Feet : short and straight. Fore Legs set : nearly perpendicular from thurl to mid point of hoof, standing apart with rear view and nearly straight. Hocks /Shank : clearly defined and well shaped, shank being flat and fully tight, tendons well defined. Pasterns : moderately long, strong, elastic.
Feet	10	Angle : moderate, and level sole. Size : well-shaped and wide feet with moderately deep heel and tight inter digital space (i.e. closed toes). Quality : black, shiny and fine. Coronet : tight and defined.
Dairy strength (15)		
Neck, Withers, Ribs, Flanks, Thighs	12	Neck : rather longer and leaner, blending smoothly into shoulders and chest, clear-cut throat and dewlap. Withers : well defined and moderately wedge-shaped with the dorsal process of the vertebrae rising slightly above the shoulder blades.

		<p>Ribs: wide apart among bones, rib bone broad, flat and long. Well-sprung fore ribs, and slanted toward the rear.</p> <p>Flanks: deeply arched and well defined.</p> <p>Thighs: outside surface being flat and moderately rounded out and its rear view being wide apart, slightly curving inward, well cut-up between thighs.</p>
Skin, Hair	3	The skin is thin, soft, smooth and Jet black with scanty hair.
Udder (40)		Udder being strongly attached and fully capacious, and four quarters being well-balanced, fine texture, and indicating heavy production and a long life of production.
Fore udder	7	Strongly attached with body wall, medium in length, moderate in capacity.
Rear udder	8	Attachment being high, wide and strong, constant width from top to bottom, and revealing slightly roundness.
Suspension of udder	5	Udder cleft halving right and left part equally, distinctly revealed, and suspensory ligament being strong.
Depth of udder	9	Udder floor being reasonably level and slightly higher than the hock.
Quality of udder	3	Soft, pliable, elastic and well collapsed after milking.
Teats	8	Cylindrical shape and uniform size with medium length (12cm?) and diameter (3cm?). Centrally placed under each quarter and plump.
Total	100	

Judging Sheet for Kundhi Buffalo

Judge No	Registration No.	Birth Date	Judgeman Cord	Judgeman Name				Defective Characteristics	
Judge Date		Age(Y-M)	Calving Date	Service Date	Lact. No.		Shoulder (1,2)		
							Back & Loin (1,2,8,9)		
Judge Score							Swelling Hock (1,2)		
Frame(15)	Rump (10)	D.Strength(15)	Legs & Feet(20)	Udder (40)	Final Score (100)		Pastern (1,2)		
							R.L.set Position (1,2,3, 7,8,9)		
Lineer Score							Corkscrew Claws (1,2)		
Stature	Chest Width	Body Depth	Angularity	B.C.S.	Rump Angle	Pin Bones w.	R. L. Side View	Open Toed Hoof (1,2)	
								Udder Balance (1,2,3,7,8,9)	
Bone Quality	R.L. Rear View	Foot Angle	Heel Depth	Locomotion	F.U. A.	R.U. Height	R.U. Width	Webbed Teat (1,2)	
U. Support	U. Depth	F.T. Placement	R.T. Position	F.T. length	U. Tilt				

B.C.S. = Body Condition Score R.L. = Rear Legs

U. = Udder

F.U.A. = Front Udder Attachment

R.U. = Rear Udder

F.T. = Front Teat

R.T. = Rear Teat

Afterword

It was truly unexpected that I participated in this project this time. After retirement and the period of reemployment is finished, I was planning to spend a life with my pension, taking care of my kitchen gardens and grandchild living nearby. I received a call from the Holstein Cattle Association of Japan I worked for a long time. It was about this project. After the call, I had a meeting with Dr. Tominaga, an expert of this project at the association. I replied to him that "I cannot speak a foreign language at all. If you don't mind it, I can join the Project". He replied "that's fine." I, then, decided to participate in the Project.

As for Overseas technical cooperation, I had an experience as a lecturer for JICA training program. JICA had been organizing training on artificial insemination of domestic animals at National Livestock Breeding Center for people from developing countries. I had been delivering 1 or 2 days' lecture on 'Registration and Assessment of Dairy Cattle' every year for 20 years. However, all the lectures I delivered were in Japanese with the assistance of Interpreter. This Project was my first technical cooperation in a developing country. I started my activities with full of anxiety wondering what will happen in a world where I cannot communicate with my language.

Climate, religion and eating habits - everything was surprise for me. Moreover, the Project targeted Kundhi buffalo that I had never seen before, unlike dairy cattle like Holstein or jersey that I have worked for a long time.

We spent a lot of time on developing and operating a pedigree registration system targeting buffaloes reared by Breeders, conducting milk test and analysis of data. As a result, we could produce outcomes as explained in this document.

Improvement of large livestock is not easy enough to show distinct results in the 5 years of the project period. What we did during the past 4 and half years is to demonstrate how to collect the basic data necessary to advance improvement so that stakeholders including C/P in charge and breeder farmers understand and experience the data collection methods for further improvement of the breed.

I hope that people who aim for improvement of Kundhi buffalo get together, set up an organization and continue the activities even after the Project is completed. If they keep the light made by the Project on and make it a bigger flame, it will be a great pleasure for me who involved in this Project.

I would like to express my gratitude to Mr. Hiroshi Okabe, the team leader and the president of Kaihatsu Management Consulting, Inc. (KMC) and the team members of KMC, Dr. Hideo Tominaga who guided me and extended support not only during my stay in Pakistan but also in Japan and all the livestock expert members, Ms. Noriko Hara, the team member and the project coordinator who assisted me to communicate with breeders and C/Ps as well as to document various reports and materials in English. Dr. Ghulam Sarwar Shaikh, General Coordinator who always gave smile and spoke to me, Dr. Muhammad Mubarak Jatoi (Main

counterpart specialized in Genetic Improvement) and Dr. Akthar Ali Shahani (Sub counterpart specialized in Genetic Improvement) who implemented and materialized the planned activities, Ms. Zahida Soomro who managed pedigree and milk data and Mr. Asim Shaikh who also supported my life during my stay in Pakistan.

Yoshio Chiba
Expert of Genetic Improvement

Body Condition Score PSLD of Kundhi buffalo

Body Condition Scores (BCS) is important technologies for obtaining stable milk production and good conception rates.

Considering BCS and milk yield, you can give the appropriate quantity of feed

The project has developed a method for anyone to judge easy and correct BCS

*How to determine BCS

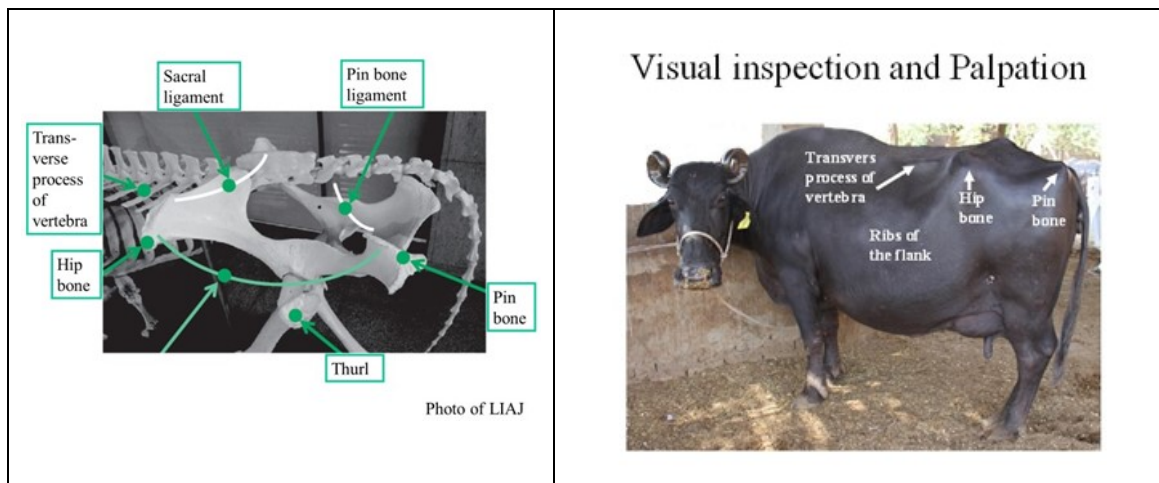
Visual inspection and palpation

First, visual inspection and palpation on hip bone and pin bone should be conducted to check whether there is subcutaneous fat or not. Then, visual inspection for ribs of the flank, transvers process of vertebra, sacral ligament and pin bone ligament should be conducted.

- If there is no subcutaneous fat on bones, you should check whether the lines of bones are clearly recognized.

- If there is subcutaneous fat on bones, you should check that the lines of bones cannot be recognized due to round shape.

- In case of fatty, you will feel elastic skin because of fat accumulation if you push the root of a tail.



(Skelton of cow is used for BCS Determination)

(Check points for BCS determination)

Note: For details, refer to the textbook for appropriate technology of dairy farming PSLD

Development of a local made weigh scales for cattle/buffalo

The project were developed locally weigh body scale applying Chinese scales.

Weigh scale system consists of A) a Platform, B) Load bars, C) a Cable and D) an Indicator.

The platform and the load bars were developed locally whereas the digital indicator and the cables were Chinese made.

Total cost of the model are 120,000 Rs. for the indicator, cables and load bars. The wooden platform cost 8,000 Rs.

<p style="text-align: center;">Weigh Scale System</p>	<p>Two sensors shall be attached onto each load bar.</p>



Estimate body weight for female Kundhi buffalo by the heart girth

The project analyzed about 1200 data and made the table below.
Just by measuring the heart girth, you can easily estimate the approximate body weight for female Kundhi buffalo.



Heart Girth	Estimated weight	Heart Girth	Estimated weight	Heart Girth	Estimated weight	Heart Girth	Estimated weight	Heart Girth	Estimated weight	Heart Girth	Estimated weight
65	40	101	80	137	189	173	367	209	614	245	930
66	40	102	82	138	193	174	373	210	622	246	940
67	40	103	84	139	197	175	379	211	630	247	950
68	40	104	86	140	201	176	385	212	638	248	960
69	41	105	89	141	205	177	391	213	646	249	969
70	41	106	91	142	210	178	397	214	654	250	979
71	42	107	93	143	214	179	403	215	662	251	989
72	42	108	96	144	218	180	410	216	670	252	1000
73	43	109	98	145	223	181	416	217	678	253	1010
74	43	110	101	146	227	182	422	218	687	254	1020
75	44	111	103	147	232	183	429	219	695	255	1030
76	45	112	106	148	236	184	435	220	703		
77	45	113	109	149	241	185	442	221	712		
78	46	114	111	150	245	186	448	222	720		
79	47	115	114	151	250	187	455	223	729		
80	48	116	117	152	255	188	462	224	737		
81	49	117	120	153	260	189	468	225	746		
82	50	118	123	154	264	190	475	226	755		
83	51	119	126	155	269	191	482	227	763		
84	52	120	129	156	274	192	489	228	772		
85	53	121	132	157	279	193	496	229	781		
86	55	122	135	158	284	194	503	230	790		
87	56	123	138	159	290	195	510	231	799		
88	57	124	142	160	295	196	517	232	808		
89	59	125	145	161	300	197	524	233	817		
90	60	126	148	162	305	198	531	234	826		
91	62	127	152	163	311	199	539	235	835		
92	63	128	155	164	316	200	546	236	845		
93	65	129	159	165	322	201	553	237	854		
94	67	130	162	166	327	202	561	238	863		
95	68	131	166	167	333	203	568	239	873		
96	70	132	170	168	338	204	576	240	882		
97	72	133	173	169	344	205	583	241	892		
98	74	134	177	170	350	206	591	242	901		
99	76	135	181	171	355	207	599	243	911		
100	78	136	185	172	361	208	606	244	920		

Retainer

The Project installed 3 types of retainers at pilot farms. The retainer allows to performing various activities easily including body weight measurement, rectal palpation, treatment, vaccination and deworming.

Iron pipe race retainer

This retainer made of iron pipe with 240-inch length corridor. This retainer allows multiple numbers of cattle into its corridor so that farmers can easily bring cattle into the retainer.

Wooden retainer

This retainer is made of wood. This retainer can be installed by farmers themselves and do not require spacious places for it.



Iron pipe race retainer



Wooden retainer

MS pipe retainer

This retainer is made of MS pipe. This retainer can be installed by farmers themselves within short time. The cost of MS pipe retainer is about 30,000 Rs. It has V-shape inductor fence, which makes it easier to drive cattle/buffalo into retainer than the wooden retainer.



添付資料 T1-14 シンド州標準飼料成分表

The Standard Table of Feed Composition in Sindh Province 2019

Source:: ○: Japan standard feed composition book
 ●: Handbook of Dairy Nutrition-Pakistan
 ※: Animal Feed Resouce Information System,FAO

Roughage			2020/3/21										Sanpling Area
Feed Name	Stage	Source	DM %	TDN DM%	CP DM%	EE DM%	CF DM%	ADF DM%	NDF DM%	CA DM%	Ca DM%	P DM%	
Maze fodder	Vegetative	PRI-PSL66	12.8		11.1	1.4		39.7	67.8	9.4			Hyderabad
	Late vegetative	PRI-PSLD4	12.6		12.1	1.8				11.2			PRI
	Late vegetative	○	10.3	66.4	12.6	2.9	30.1	37.9	59.2	11.7	0.41	0.36	
	Early bloom	PRI-PLSD70	18.4	68.3	10.9	0.9		32.3	57.9				Hyderabad
	Booting	PRI-PLSD71	20.3		9.4	1.1		40.5	61.9				Hyderabad
Sorghum	Vegetative	PRI-PLSD25	16.3		9.7	1.8			60.4	7.6			Matiari
	Late vegetative	○	14.9	69.5	10.7	2.7	32.2		61.1	8.7	0.41	0.36	
	Early bloom	○	20.3	59.6	8.9	2.5	33.0		62.6	8.4	0.30	0.31	
	Bloom	PRI-PLSD86	22.2		6.0	0.8		41.4	60.0				TA
	Milk stage	○	24.0	56.2	6.7	1.7	30.0	33.3	57.1	6.3	0.24	0.23	
Berseem	Early vegetative	●	14.2	63.1	21.5	3.7	14.2			14.0			
	Vegetative	Avg. PSLD	9.0		17.9	2.2			50.2	15.0			
	Early bloom	●	15.6	60.7	19.0	2.6	18.6			12.2			
	Bloom	●	22.7	60.0	18.9	2.2	19.1			11.5			
	4th(bloom)	Avg. PSLD	17.9		15.0	2.9			45.9	5.9			
Alfalfa	1st(Vegetative)	PRI-PSLD 6	15.2		29.4	2.4			28.2	12.5			TMK
	1st(Late vegetative)	○	18.3	67.3	26.2	3.8	19.7	25.7	33.3	11.5	1.27	0.40	
	Early bloom	●	24.3	63.4	22.8	2.9	19.0			10.1			
	Bloom	○	19.2	60.7	17.7	3.1	30.7	37.5	46.4	9.4	1.23	0.22	
Rice fodder	1st(Vegetative)	PRI-PSLD27	14.6		14.6	3.0			50.5	16.4			TMK
	Late vegetative	○	22.1	59.4	14.5	3.6	26.2	31.2	48.4	15.7			
	Regrowth	※	32.8	55.7	9.0	1.8	28.3			15.9			
	4th(dough Ripe)	PRI-PSLD31	19.2		6.7	0.4			55.6	18.3			TMK
Sugarcane top		●	33.5	52.2	6.2	1.6	29.5			9.1			
		○	29.0	49.2	5.9	1.7	33.5			8.5			
	Mature	PRI-PSLD2	36.6		3.8	1.7			74.1	6.4			Badin
	Side stems vegetative	PRI-PSLD35	18.1		7.3	1.6				13.0			TMK
Banana leaves	Vegetative	PRI-PLSD37			10.4	4.0				4.0			Matiari
		PRI-PLSD87	14.0		14.2	4.4		40.1	52.1				Matiari
		PRI-PLSD88	16.8		10.1	3.4		45.7	62.5				TA
Banana stem		PRI-PLSD89	4.8		5.5	0.1			54.4			TA	
Rice straw		○	87.8	42.9	5.4	2.1	32.3	39.2	63.1	17.4	0.30	0.14	
		Avg. PSLD	92.6		4.7	1.3			69.8	16.2			
Wheat straw		○	85.8	44.3	4.2	1.4	37.8	46.5	70.2	9.3	0.30	0.09	
		Avg. PSLD	91.9		4.6	1.1		48.0	71.9	13.4			
Mott grass	Early fruiting	PRI-PSLD5	23.6		10.4	2.2			73.2				PRI
Top grass	Vegetative	PRI-PSLD73	16.7		24.4	1.3		36.4	62.1				TMK
Oin grass	Vegetative	PRI-PSLD74	20.8		11.7	0.8		32.2	40.5				Badin
Kangor grass	Vegetative	PRI-PSLD75	33.2		6.9	3.6		49.1	71.3				Matiari

The Standard Table of Feed Composition in Sindh Province 2019

Source: ○: Japan standard feed composition book
 ◎: Master Agro Industries Ltd.
 ※: Animal Feed Resource Information System,FAO
 2020/3/21 NRC: National Research Council 2001 USA

Concentrate

Feed Name	Source	DM	TDN	CP	EE	CF	ADF	NDF	CA	Ca	P
		%	DM%	DM%	DM%	DM%	DM%	DM%	DM%	DM%	DM%
Maize crush	◎	89.6	81.2	9.8	4.1	2.8			1.5		
	○	86.5	93.6	8.8	4.4	2.0	3.6	12.5	1.4	0.03	0.30
	PRI-PLSD13	89.1		12.8		2.0			1.6		
	PRI-PLSD65	88.3		8.4		2.2					
Wheat crush	◎	92.7	78.9	12.8	1.8	2.3			1.9		
	○	88.5	89.0	13.7	2.0	2.7	3.8	11.5	1.9	0.05	0.36
	PRI-PSLD15	89.5		11.7	0.9				2.5		
	PRI-PSLD60	90.5		11.5	0.8						
	PRI-PSLD79	89.9		11.5	2.3						
Rice polish	○	87.3	87.6	15.0	5.6	1.2	1.9	4.8	3.5	0.03	0.72
	◎	92.6	89.9	12.4	15.8	4.2			11.7		
	◎	91.2	80.2	12.2	10.6	13.3			10.9	0.32	0.96
	PRI-PSLD10	87.9		14.9	4.0				6.8		
	PRI-PSLD53	85.9		17.3	6.5						
Wheat Bran	◎	91.4	71.0	15.0	4.3	12.5			5.7		
	○	86.8	72.3	18.1	4.9	10.9	14.1	42.7	5.9	0.12	1.14
	※	90.2		15.2	5.6	10.1			4.7	0.12	0.72
	PRI-PSLD18	89.5		16.5	3.3			43.8	5.5		
	PRI-PSLD59	90.0		21.2	2.9						
Cotton Seed cake	○	88.5	65.4	40.0	0.9	15.6	25.9	36.3	6.4	0.21	1.11
	◎	93.5	63.4	23.0	9.5	26.2			6.5		
	◎	88.8	78.5	27.4	8.0	18.9			6.4	0.21	0.84
	PRI-PLSD12	89.8		22.5	6.6			55.9	4.7		
	PRI-PLSD55	91.9		21.5	8.2						
	PRI-PLSD58	92.3		20.6	5.7			55.9			
Mustard cake	◎	91.7	74.0	28.0	9.6	19.8			12.0	0.60	1.00
	PRI-PSLD61	91.4		34.5	8.2						
Canola cake	NRC	90.3	69.9	37.8					7.4	0.75	1.10
Canola meal	PRI-PSLD14	90.8		43.3	0.9				7.6		
Rape Seed cake	◎	93.0	79.8	37.1	8.2	11.6			8.4		
	NRC	90.0	73.0	32.5	7.5	11.5			7.0	0.71	1.00
	PRI-PSLD49	94.6		37.8	3.9						
Rape Seed meal	○	88.2	74.6	42.3	3.3	10.7	21.2	27.2	7.5	0.71	1.26
	Avg. PSLD	92.4		36.1	9.7						
Mash churi	PRI-PSLD77	91.8		26.7	2.8						
Soybean meal	○	88.2	87.0	51.1	2.2	6.0	9.6	15.5	7.3	0.37	0.72
Soybean meal (Dehulled)	Avg. PSLD	90.3		51.3		0.9					
Sunflower meal	○	89.8	48.9	35.6	1.3	24.9	-	-	6.9	0.56	0.90
	PRI-PSLD17	92.1		22.6	0.9				8.8		
	PRI-PSLD46	92.2		18.7	1.9				8.8		
Safflower meal	○	91.5	44.7	22.6	1.1	37.9	-	-	5.2	0.44	0.64
Guar meal	◎	91.3	83.8	47.9	6.6	7.8			6.9		
	PRI-PSLD16	86.8		49.1	4.1				6.6		
Corn gluten meal 60	◎	91.8	94.6	64.7	8.2	3.5			2.6		
	○	90.1	88.4	70.7	2.8	0.9	-	-	3.6	0.02	0.38
	PRI-PSLD 8	91.0		57.0	1.1				1.8		
Palm kernel meal (Press extracted, 10% fat)	○	88.5	79.4	17.7	1.2	13.0	-	-	4.3	0.26	0.44
Soybean husk	○	89.7	63.7	15.8	5.0	31.7	33.6	51.6	4.4	0.56	0.20
	PRI-PSLD78	91.0		10.0	1.8						
Bone meal	◎	94.2	57.7	25.1	1.9	1.5			66.4		

