


THE SOCIALIST REPUBLIC OF THE UNION OF BURMA

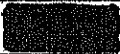
THE MASTER PLAN SURVEY REPORT
ON
THE IRRAWADDY BASIN
INTEGRATED AGRICULTURAL DEVELOPMENT

ANNEX G
ANIMAL HUSBANDRY

JICA LIBRARY

1194537 [5]

MARCH 1980

JAPAN INTERNATIONAL COOPERATION AGENCY

AFT

80-35

THE SOCIALIST REPUBLIC OF THE UNION OF BURMA

THE MASTER PLAN SURVEY REPORT
ON
THE IRRAWADDY BASIN
INTEGRATED AGRICULTURAL DEVELOPMENT

ANNEX G
ANIMAL HUSBANDRY

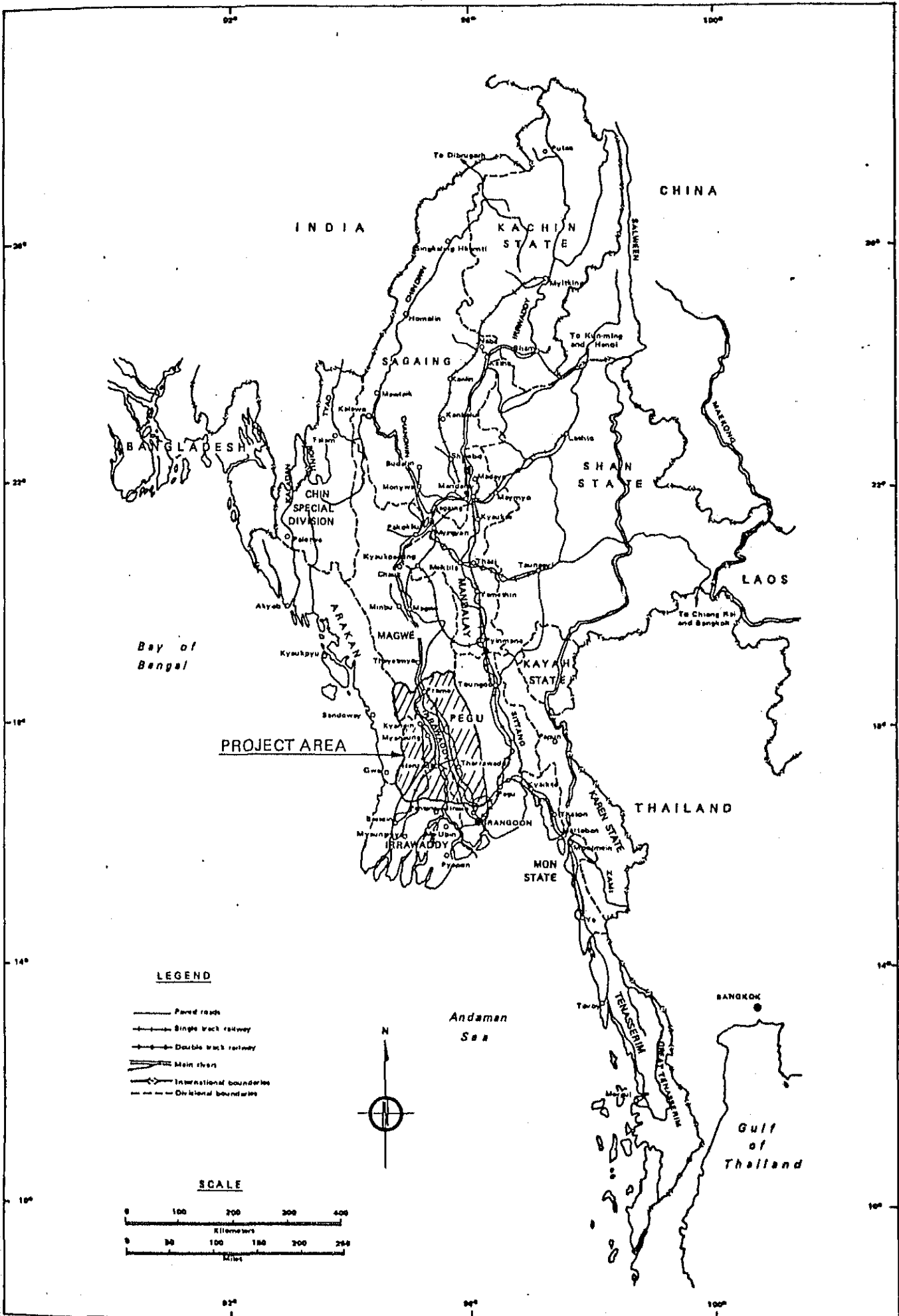
MARCH 1980

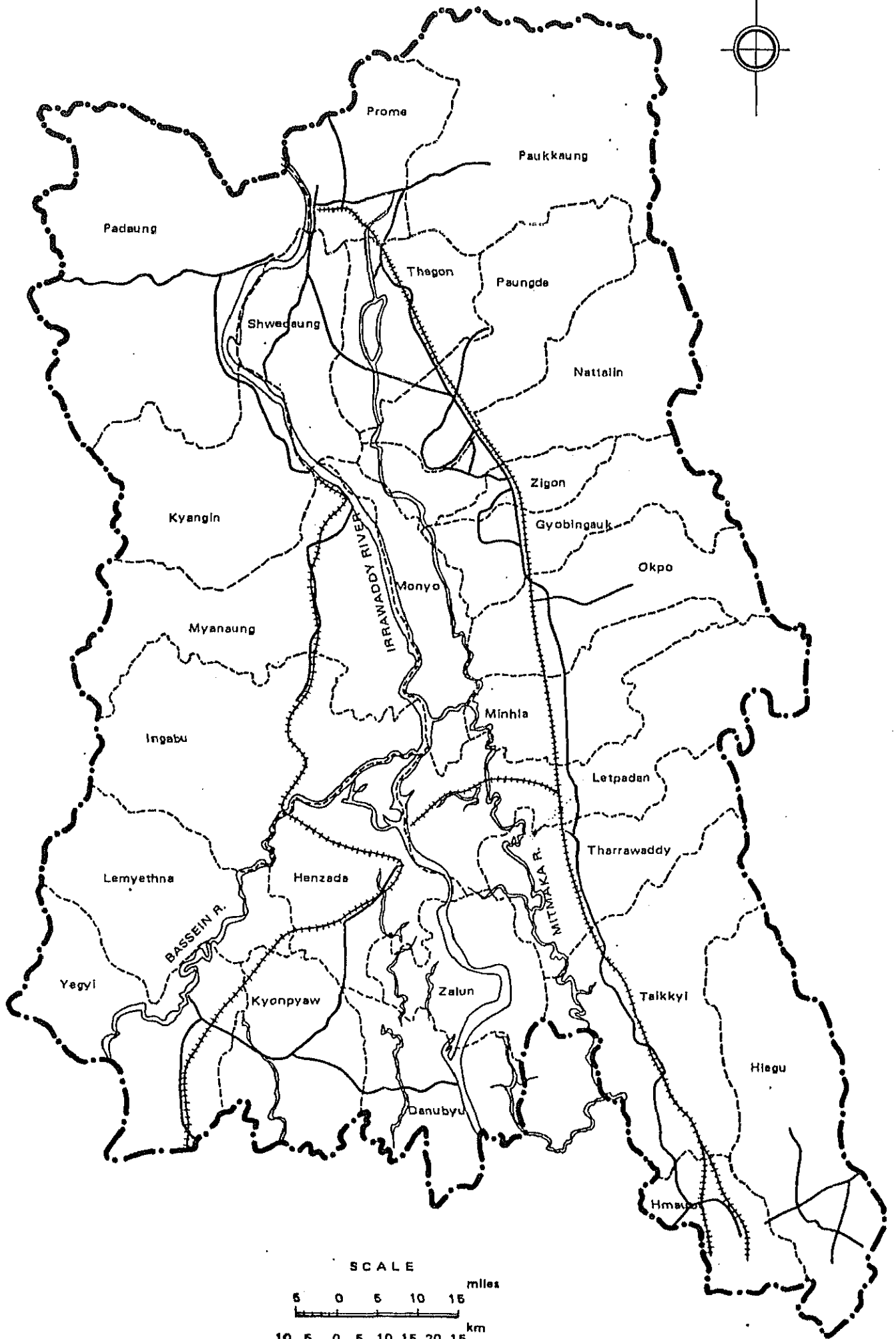
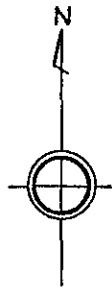
JAPAN INTERNATIONAL COOPERATION AGENCY

AFT
CR (7)
80-35



1194537 [5]





CONTENTS

	<u>Page</u>
LIST OF TABLES	i
LIST OF FIGURES	ii
ABBREVIATION, MEASURES AND GLOSSARIES	iii
SUMMARY	1
I. GENERAL DESCRIPTION OF ANIMAL HUSBANDRY IN BURMA	2
I.1. Progress in Livestock Breeding	2
I.2. Progress in Draught Cattle Breeding	2
I.3. Number of Farm-Household Keeping Livestock and Size of Livestock Keeping	3
I.4. Varieties of Livestock	6
I.5. Performance of Livestock and Poultry	7
I.6. Distribution of Livestock	8
I.7. Situation of Animal Husbandry in Burma	11
I.8. General Feeding Situation	12
I.9. Actual Condition of Livestock Reproduction	13
I.10. Number of Cattle by Age and Sex	14
I.11. Feedstuff Production	14
I.13. Production and Consumption of Animal Products	24
I.14. Measures for the Promotion of Animal Husbandry	25
I.15. Organization	26
II. GENERAL DESCRIPTION OF ANIMAL HUSBANDRY IN THE SURVEY AREA	29
II.1. Progress in Livestock Breeding	29
II.2. Progress in Number of Draught Cattle	29
II.3. Form of Livestock Keeping and Environment	29
II.4. Utilization of Composed and Barnyard Manure	33
II.5. Production of Feedstuff	34
III. CIRCULATION OF LIVESTOCK AND ANIMAL PRODUCTS	36
III.1. Supply Route of Cattle to Farmers	36
III.2. Distribution Route of Animal Products and its Price	37

	<u>Page</u>
IV. PROBLEMATICAL POINTS AND COUNTERMEASURES	39
IV.1. Mechanization of Farming and Draught Power	39
IV.2. Sanitary Management of Livestock	40
IV.3. Countermeasures for Feedstuff Production	40
IV.4. Securement and Improvement of Superior Breeders	42
IV.5. Improvement of Slaughter Facilities	43
V. ANIMAL HUSBANDRY PROMOTION PROGRAM	45
V.1. Necessity of Animal Husbandry Promotion	45
V.2. Feed Mill Plant Project	45
V.3. Pasture Land Development Project	46
V.4. Pig and Poultry Breeding Center Improve Project	48
V.5. Cattle Breeding Center Project	50
V.6. Slaughter House Project	53
V.7. Silage Supply Project	55
APPENDIX G-1 NUMBER OF LIVESTOCK AND POULTRY BY YEAR	
APPENDIX G-2 NUMBER OF DRAUGHT CATTLE	
APPENDIX G-3 COST ESTIMATION OF THE FEED MILL PLANT	
APPENDIX G-4 PICKLED GRASS	

LIST OF TABLES

TABLE G-1	PROGRESS IN LIVESTOCK BREEDING
G-2	PROGRESS IN DRAUGHT CATTLE BREEDING
G-3	PERFORMANCE OF LIVESTOCK
G-4	NUMBER OF LIVESTOCK BY DIVISION/STATE
G-5	NUMBER OF CATTLE BY SEX AND AGE 1978-79
G-6	NUMBER OF BUFFALO BY SEX AND AGE 1978-79
G-7	NUMBER OF MILK COW
G-8	ANNUAL LIVESTOCK DISEASE OUTBREAK
G-9	ANNUAL BIOLOGICS PRODUCTION
G-10	INTAKE OF PROTEIN PER DAY
G-11	LIVESTOCK PRODUCTS
G-12	CONSUMPTION OF ANIMAL PRODUCTS
G-13	LDMC FARM
G-14	NUMBER OF LIVESTOCK IN THE SURVEY AREA
G-15	NUMBER OF DRAUGHT CATTLE IN THE SURVEY AREA
G-16	CULTIVATED AREA PER PAIR OF BULLOCKS
G-17	PRODUCTION OF EACH CROP IN THE SURVEY AREA
G-18	PRICE OF ANIMAL PRODUCTS IN RANGOON CITY
G-19	DISTRIBUTION OF SELECTED SPECIES OF LIVESTOCK
G-20	NUMBER OF SLAUGHTERED LIVESTOCK
G-21	COST ESTIMATION OF THE FEED MILL PLANT
G-22	COST ESTIMATION OF PASTURE LAND DEVELOPMENT PROJECT
G-23	COST ESTIMATION OF BREEDING CENTER PROJECT
G-24	COST ESTIMATION OF CATTLE BREEDING CENTER PROJECT
G-25	COST ESTIMATION OF SLAUGHTER HOUSE PROJECT
G-26	COST ESTIMATION OF SILO PER VILLAGE

LIST OF FIGURES

- FIGURE G-1 PROGRESS IN LIVESTOCK BREEDING
- G-2 ORGANIZATION OF V.A.H.D. AND L.D.M.C.
- G-3 MARKET PRICE OF ANIMAL PRODUCTS IN RANGOON

ABBREVIATION, MEASURES AND GLOSSARIES

AC	Agriculture Corporation
ADB	Asian Development Bank
AE	Assistant Engineer
AGM	Assistant General Manager
AFPTC	Agricultural and Farm Produce Trade Corporation
AMD	Agricultural Mechanization Department
APS	Advance Purchase System
Ave	Average
BAG	Bachelor of Agricultural University
BKT	Basket(s)
CIF	Cost Insurance and Freight
°C	Degree Centigrade
DAGM	Deputy Assistant General Manager
DG	Director General
DGM	Deputy General Manager
Dy	Deputy
EE	Executive Engineer
EL	Elevation
EPC	Electric Power Corporation
FC	Foreign Currency
FiD	Fishery Department
FERD	Foreign Economic Relations Department
FIC	Foodstuff Industries Corporation
FOB	Free on Board
FoD	Forest Department
F/S	Feasibility Study
FY	Fiscal Year from April to March
GM	General Manager
GNP	Gross National Product
GWH	Giga Watt Hour
HP	Horsepower

HWL	High Water Level
HYV	High Yielding Variety (of paddy)
Hz.	Hertz per second
IBRD	International Bank for Reconstruction and Development
ID	Irrigation Department
IDA	International Development Association
KV	Kilo Volt
KW	Kilo Watt
KWH	Kilo Watt Hour
LC	Local Currency
LDMC	Livestock Development and Marketing Corporation
LIV	Local Improved Variety
LWL	Lower Water Level
LV	Local Variety
MAF	Ministry of Agriculture and Forests
MD	Managing Director
MHD	Meteorological and Hydrological Department
MI 1	Ministry of Industry No. 1
M/P	Master Plan
MPF	Ministry of Planning and Finance
MT	Ministry of Trade
MW	Mega Watt
MWL	Mean Water Level
PD	Project Director
pH	Potential of Hydrogen
PPFC	People's Pearl and Fishery Corporation, MAF
PPM	Part(s) per Million
%	Percent
PSD	Planning and Statistics Department
SD	Survey Department, MAF
SLRD	Settlements and Land Records Department, MAF
TC	Timber Corporation, MAF
TEM	Township Extension Manager
TSP	Triple Super Phosphate

UCC	University Computer Center
UGCF	Union Government Consolidated Fund
VAHD	Veterinary and Animal Husbandry Department
VIB	Village Tract Banks
WPSD	Working People's Settlement Department

MEASURES

Length

mm	millimeter (s)
cm.	centimeter (s)
m	meter (s)
km	kilometer (s)
inch	25.4 mm
ft	foot (feet) = 12 inch = 30.48 cm
mile	5,280 feet = 1.609 km

Area

sq.cm	square centimeter (s)
sq.m	square meter (s)
sq.km	square kilometer (s) = 100 ha
ac	acre (s) = 4,047 sq.m
sq.mile	square mile = 2.59 sq.km = 640 ac
ha	hectare

Capacity

ℓ	litter
cu.m	cubic meter
MCM	Million Cubic Meter
cu.ft	cubic foot (feet) = 28.32 ℓ
cu.yd	cubic yard = 0.765 cu.m
AF	Acre Foot (feet) = 1,233.48 cu.m
Qt	Quart = 1/4 gl = 1.136 ℓ (UK) = 0.946 ℓ (US)
gl	gallon = 4.543 ℓ (UK) = 3.785 ℓ (US)

Note: UK: British Measure

US: US Measure

Weight

g	gram (s)
kg	kilogram (s)
ton	metric ton
oz	ounce = 28.4 g
lb	Pound = 16 oz = 0.454 kg

Others

cm/sec	centimeter per second
m/sec	meter per second
km/sec	kilometer per second
mile /hr	mile per hour = 1.609 km/hr = 0.447 m/sec
ft/second	feet per second
cu.m/sec	cubic meter per second
cfs/cu.sec	cubic foot (feet) per second = 0.0283 cu.m/sec
gl/sec	gallon per second = 4.543 l/sec = 0.0757 l/min

Glossaries

lakh	100,000
crore	10,000,000
viss	1.633 kg
Pyi	2,127 kg
basket	20.9 kg (paddy)
basket	34.0 kg (rice)
bag	75.6 kg (rice)
Chaung	River or Stream
Kyat	Unit of Local Currency (about 30 Japanese Yen)
In	Lake or Swamp area
Yoma	Mountain range
1 US\$	6.44 kyats

SUMMARY

Animal husbandry in Burma is rarely carried on commercial basis but largely on an extensive agricultural basis in the villages. Cattle and buffaloes used for farming hold the central position and at present approximately 9,400,000 head are kept in the whole country, 47% of which, approximately 4,400,000 head, are draught animals. Eighty-seven percent of them are cattle. A bull is used for work and for that purpose it is a practice to castrate it about a year after its birth. The ratio of castrated bulls is over 90% and this obstructs the increase of superior cattle.

Main feedstuff is wild grass and straw, and rice bran and broken rice are given to pigs and chickens but feeding of nutrition is not enough and consequently the livestock are late-maturing and low-productive.

The major animal product consumption of the people is of pork, chicken and beef, but annual intake is at a low level of 3.4 kg per capita. The ratio of animal protein intake to all protein is 23% and it is higher than that of India and Pakistan.

VAHD takes charge of improvement of livestock and prevention of animal disease and LDMC takes responsibility for spread of improved breeds and proliferation.

In order to promote animal husbandry in Burma, fundamental problems that should be resolved for better management of animal husbandry such as improvement of breeds and establishment of basis for feed utilization are referred to and countermeasures are studied in this report.

I. GENERAL DESCRIPTION OF ANIMAL HUSBANDRY IN BURMA

I.1. Progress in Livestock Breeding

A progress in breeding of livestock and poultry according to Report to the Pyithu Hluttaw is as shown in the following table.

Compared with numbers of livestock in 1967-68 every breed has increased, especially increases in fowl and ducks are remarkable. (See Fig. G-1 and Table G-1.)

I.2. Progress in Draught Cattle Breeding

Growth in number of buffaloes and cattle used for carrying and farm operations is not remarkable, but they are steadily increasing. The annual increasing rate is 1.5% in cattle and 1.8% in buffaloes. In Burma a bullocks and buffaloes are used for work and a female cattle are kept for getting milk and calves. Female cattle are not used for hard labor of tilling or carrying loads. Accordingly, the number of draught cattle except calves and female cattle is as shown in the Table G-2.

The ratio of draught cattle to the total is 49.6% for cattle, 33.3% for buffaloes in 1977-78 and ratio of cattle to buffaloes in the draught cattle is 86.8% to 13.2%, showing the most part is cattle.

I.3. Number of Farm Household keeping Livestock and Size of Livestock Keeping

Data which shows the above items is not available, but on the presumption that 4,390,000 draught cattle are kept in 4,330,000 farm households evenly, a farmer is to keep a head. However, in Burma when using draught cattle, two head are used at once as a pair and consequently only a half of the whole farm households keep the pair of bullocks for farming in actual. Animal power is insufficient.

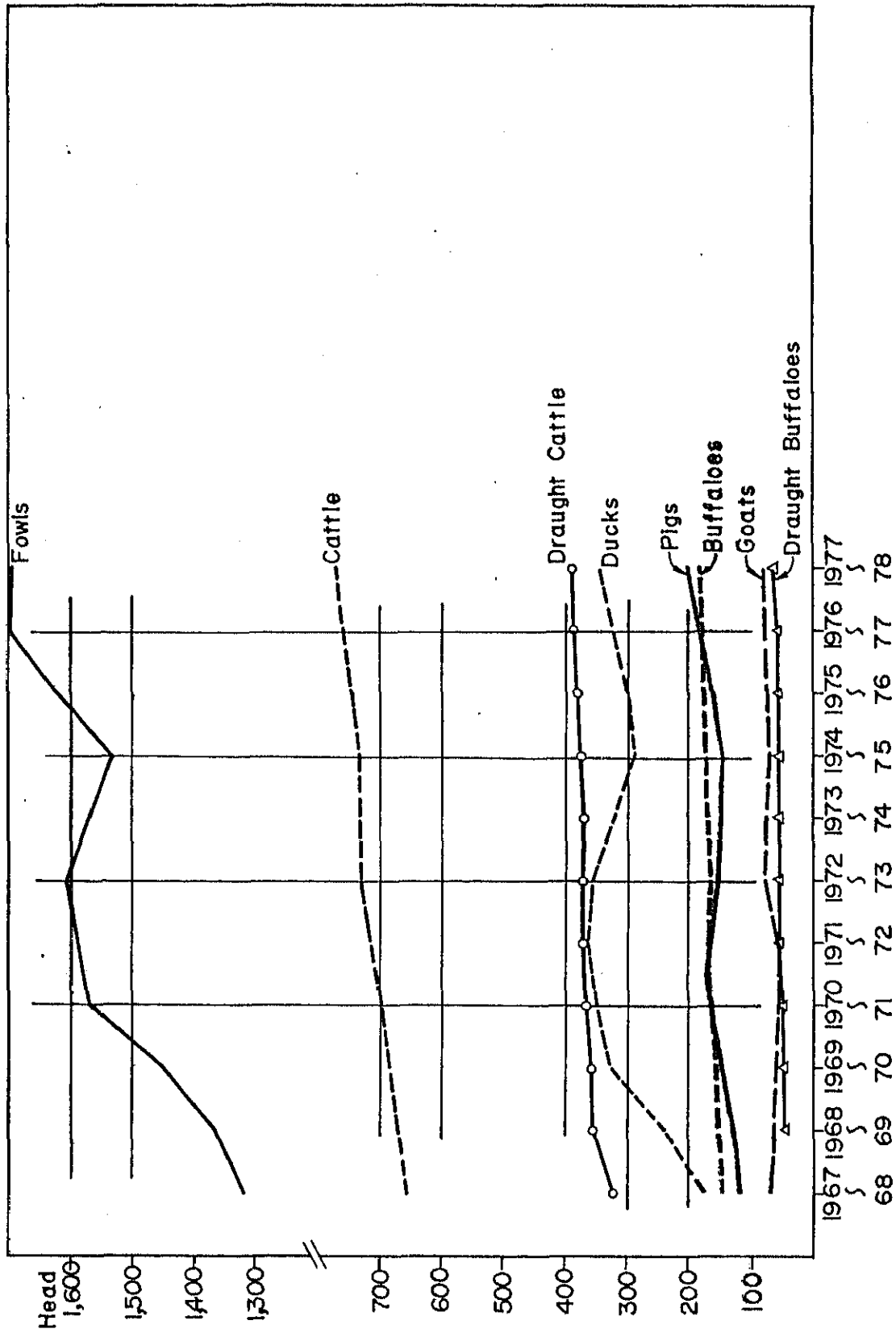


FIGURE G-1 PROGRESS IN LIVESTOCK BREEDING

FIGURE G-1 PROGRESS IN LIVESTOCK BREEDING

TABLE G-1 PROGRESS IN LIVESTOCK BREEDING

<u>Year</u>	<u>Cattle</u>	<u>Buffaloes</u>	<u>Goats</u>	<u>Pigs</u>	<u>Fowls</u>	<u>Ducks</u>
1967-68	6,558	1,436	695	1,175	13,220	1,724
68-69	6,694	1,496	632	1,259	13,616	2,353
69-70	6,833	1,541	619	1,478	14,446	3,248
70-71	6,993	1,597	582	1,605	15,652	3,464
71-72	7,158	1,643	570	1,604	15,840	3,596
72-73	7,235	1,601	766	1,489	16,068	3,536
73-74	7,267	1,646	732	1,461	15,682	3,186
74-75	7,299	1,690	699	1,432	15,296	2,836
75-76	7,405	1,718	725	1,578	16,407	2,916
76-77	7,526	1,723	750	1,780	16,975	3,176
77-78	7,689	1,729	773	1,947	16,931	3,412

(Numbers in thousand)

Source: Report to the Pyithu Hluttaw 1978-79

TABLE G-2 PROGRESS IN DRAUGHT CATTLE BREEDING

(Unit: heads)

<u>Year</u>	<u>Draught Cattle</u>		<u>Draught Buffaloes</u>		<u>Remarks</u>
	<u>NO</u>	<u>%</u>	<u>NO</u>	<u>%</u>	
1968-69	3,531,520	52.7	496,827	33.2	<u>Draught Cattle (Buffaloes)</u>
1969-70	3,557,518	52.1	516,949	33.5	Total number of cattle (Buffaloes)
1970-71	3,620,692	51.8	529,104	33.1	x 100 = %
1971-72	3,665,054	51.2	535,732	32.6	
1972-73	3,689,946	51.0	540,307	33.7	
1973-74	3,666,289	50.4	539,807	32.7	
1974-75	3,710,392	50.8	545,169	32.2	
1975-76	3,749,193	50.6	549,949	32.0	
1976-77	3,791,676	50.4	564,112	32.7	
1977-78	3,810,597	49.6	576,982	33.3	

Source: Report to the Pyithu Hluttaw 1978-79.

Furthermore, 1 to 3 pigs are kept at a rate of one to ten farm households in their garden and 90% of the total farm-households keep 5 to 10 domestic fowls.

I.4. Varieties of Livestock

(1) Cattle

Most cattle are indian cattle (*Bos Indicus*: Zebu) or are conspicuously descended from it. They are remarkably different from the varieties bred in Japan and Western countries. Major breeds are Red Sindh, Hariana and Tharparkar. The color of skin is milk-white, brown or yellowish brown, and size, type and constitution are also various, but they are generally small-sized and late-mature. The weight of an adult female cattle is 200 - 250 kg and that of an ox is 300 - 350 kg and it takes 3 to 4 years till maturity.

Most of the cattle are used for draught and they are indispensable livestock to farmers for tillage and conveyance. As draught cattle bullocks are used and they are called Ngwa. Foreign breeds of Friesian, Jersey, Guernsey, Ayrshire and Norwegian Red were once introduced for the purpose of improvement to performance of milk production of native cattle, but the pure-blooded has died out because of disease and only a few crosses between these and native breed remain.

(2) Buffalo

The majority of buffaloes are also used for tillage and conveyance. Buffaloes can stand heat and at the same time they can live on poor feed. Even during the dry season when forages are not available they find short wild grass and roots of grasses and eat them. There are two kinds of buffaloes; Murrah for milking and Swamp for draught, and in Burma most of the part is occupied by Swamp. Compared with cattle, buffaloes are slow in working speed and the meat is tough and the fibers are rough. The weight of a matured buffalo is 300 - 350 kg. It is called Kywe.

(3) Pig

Most of the pigs kept at farm households in general are called Burma breed, which is small-sized with average weight of about 60 kg. It is said that the place of origin is Pyinmana. A commercial pig breeder keeps foreign breeds of Berkshire, Landrace, Duroc and Large Yorkshire and crosses between these.

(4) Chicken

Chickens kept generally in the garden of farm households are native breed and at privately operated poultry yards for eggs of the scale of 100 - 1,000 chickens which have been recently popularized on the skirts of cities, Newhampshire, Australorp and White Leghorn are the principal breeds. The chickens are sold and distributed from the poultry farm under the jurisdiction of Livestock Development and Marketing Corporation.

I.5. Performance of Livestock and Poultry

(1) Cattle

Most of the cattle seen in Burma are indian cattle which has the line of Bos Indicus and generally small-sized.

Weight	: 250 - 300 kg
Meat production	: Average 150 kg per head
Lactation period	: Approx. 200 days
Quantity of milk	: 150 - 220 viss (245 - 360 kg)
Milk fat percentage	: 3.5 - 5%
Yield percentage	: 68% (Delivery interval 540 days)
First calving	: 3.5 years old

Performance as draught cattle is as follows:

(Providing that two as a pair works for 6 hours a day)

Plowing	: 0.2 ha/day
---------	--------------

Stamping and ground making: 0.8 ha/day
Threshing : 840 kg/day (140/hr)
Draughting capacity : 120 - 160 kg

(2) Buffalo

Weight : Average 300 kg
Meat production : Average 150 kg/head
Lactation period : 8 months
Quantity of milk : Average 150 viss/head (250 kg)
Milk fat percentage : 7%
Draughting capacity : 100 - 160 kg
Plowing : 0.2 ha/day
Stamping and ground making: 0.8 ha/day

(3) Pig (Native breed)

Weight : Average 65 kg
Litter size : 14 head
Meat production : 50 kg/head

(4) Chicken

Native breed

Weight : Average 1 kg
Egg production : 100 eggs/year

Foreign breed

Weight : 1.0 - 1.5 kg
Egg production : 120 - 160 eggs/year

The performance of livestock is shown in Table G-3.

I.6. Distribution of Livestock

Burma is divided into administrative districts of 7 states and 7 divisions and the distribution of cattle and buffaloes in each district is as shown in Table G-4.

TABLE G-3 PERFORMANCE OF LIVESTOCK

<u>Livestock</u>	<u>Body Weight</u> kg	<u>Performance of Production</u>	<u>Performance of Reproductive</u>
Cattle	250 - 300	Milk: 245.5 kg/year/head - 360 Beef: 147 kg/head (ave.)	Age of 1st Calving 3.5 year Delivery interval 18 months Length of pregnancy ±280 days
Buffaloes	300	Milk: 245.5 kg/year/head (ave.) Beef: 147 kg/head (ave.)	Age of 1st calving 4 year Delivery interval 20 months Length of pregnancy ±300 days
Goats	13	Milk: 60 kg/year/head Mutton: 10 kg/head Wool: -	-
Pigs (Native)	65	Litter size per year 14 (Piglets) Number of litters 1.8 Pork 50-58 kg/head	-
Fowls	1.3	Eggs 100 eggs/year/hen Chicken 0.98 kg The number of days of egg production 80 days/year	-
Ducks	1.8	eggs 100 eggs/year/duck Meat 1.15 kg The number of days of egg production 250 days/year	-

TABLE G-4 NUMBER OF LIVESTOCK BY DIVISION/STATE

(Unit: Thousand Heads)

<u>No.</u>	<u>Division/ State</u>	<u>Cattle</u>	<u>Buffaloes</u>	<u>Pigs</u>	<u>Goats</u>	<u>Sheep</u>	<u>Chicken</u>	<u>Ducks</u>
1.	Kachin	145	114	120	9	-	610	19
2.	Kayah	44	22	25	1	-	157	2
3.	Karen	204	45	62	24	-	588	81
4.	Chin	49	12	109	18	-	538	1
5.	Sagaing	1,383	259	219	52	64	1,994	44
6.	Tenasserim	66	84	33	5	-	388	72
7.*	Pegu	854	179	278	12	-	2,541	891
8.	Magwe	1,240	67	135	154	39	1,698	28
9.	Mandalay	1,286	94	209	203	102	2,175	138
10.	Mon	266	60	52	20	-	502	149
11.	Arakan	444	179	45	53	-	868	71
12.*	Rangoon	354	92	166	13	-	1,872	838
13.	Shan	737	369	174	8	1	1,017	65
14.*	Irrawaddy	855	194	352	18	-	2,655	972
	<u>Total</u>	<u>7,929</u>	<u>1,770</u>	<u>1,979</u>	<u>590</u>	<u>206</u>	<u>17,603</u>	<u>3,371</u>

Note: * Including Project Area

Source: VAHD

Buffaloes are relatively many in the zone of much rain such as Tenasserim, Kachin and Shan and cattle are many in Central Burma and Upper Burma where grassland are large and Foot and Mouth Disease (F.M.D.) is rare. Approximately 50% of the cattle and buffaloes range in 5 divisions of Pegu, Magwe, Mandalay, Rangoon and Irrawaddy in Central Burma. In Sagaing, Mon and Tenasserim there are about 2,000,000 head and other 2,000,000 head range in the environmental states, especially many in Shan State.

I.7. Situation of Animal Husbandry in Burma

In Burma cattle, buffaloes, pigs, fowls and ducks are large in number and hold major position but they are not kept on commercial basis but they are for draught or for family use breeding in the garden. Particularly, cattle and buffaloes play exceedingly important role as draught power in agriculture because agricultural machines such as tractor are remarkably few (6,086 tractors at now, of which 2,779 belong to the tractor center and 3,307 to the village cooperative).

However, in Burma since draught cattle are used at a unit of two as a pair, 4,350,000 head of cattle make only 2,175,000 pairs meeting the demand of only half of the all farm-households.

A ratio of draught cattle to buffaloes is 87% to 13% and therefore more cattle are used for draught work. For cultivation of rice after soil becomes soft by rain a pair of cattle cultivate the soil pulling a wooden plow. The depth of plowing is only 6 to 8 cm because of large tractive resistance. After plowing soil is stamped once or twice and puddled about 6 times. Performance of the pair of bullocks is generally as follows:

Plowing	:	0.2 ha/day
Stamping and ground making:		0.8 ha/day

Note: Working hour of the draught cattle is about 6 hours.

In case of plowing, as acreage of cultivated land per farm household is average 2 ha for the whole country, it is to take 10 days only for the plowing.

Moreover, the draught cattle do not only plow but they also thresh (performance in threshing is about 140 kg/hr) and transport agricultural products to the buying depot of the government.

As above-mentioned, only 2,175,000 pairs are available and consequently an area that a pair can cover is 4.3 ha.

Draught cattle is indispensable for farming in Burmese agriculture as mentioned before, but the shortage in number at present will cause the important problem of supplement of draught cattle in case of double cropping and two crops a year hereafter.

1.8. General Feeding Situation

The feeding of cattle and buffaloes has close relationship with rice farming and each farmer keeps a few for farming and transportation. One or two head per farm household is usual but rarely more than 40 heads are kept. Cattle are kept in a shed made of straw in his own site.

As no crops are cultivated for feedstuff, usually cattle graze after harvest in the paddy fields or feed the wild grass of roadsides. In the rainy season they have comparatively much feedstuff such as wild grass but in the dry season sometimes cattle happen to die from shortage of forages.

A bull is castrated in order to easily control for draught work and it is sold at a higher price than a female cattle in general. Its ability of draught work begins to go down between 8 and 12 years old but it is forbidden to slaughter it until 16. A bull at the age of 4-5 has the strongest power and can be used easily. There is no

age limitation for slaughter of a female cattle, and usually it is slaughtered when it cannot reproduce any more.

I.9. Actual Condition of Livestock Reproduction

As mentioned before, it has become a practice to castrate male cattle about a year after their birth to use them as draught cattle. Consequently, as even cattle of good quality is often castrated, it is impossible to select good bulls having productive and draughting performance and also impossible to intend to leave their abilities to offsprings hereditarily. Moreover, as bulls and cows are kept in a group, natural mating is done between them and that is not desirable on the viewpoint of genetics. Although the government takes measures of setting age limitation for slaughter of male cattle for proliferation, it is difficult to progress performance even though the number of cattle is maintained in the present condition.

The performance of calf production of a cow itself is low and the rate of reproduction is approximately 68% because feedstuff of good quality is hard to get.

Improvement of cattle is done by frozen semen imported from Canada and crossbreeding with foreign breeds under VAHD control. Fifty percent of dairy cattle are crosses with Jersey and Friesian. Particularly a cross between Jersey and Zebu (Tharparkar, Red Sindh) has heat resistance and good productivity.

Frozen semen is produced by VAHD and actual artificial insemination is done by one or two veterinarians staying at each township.

Regarding to proliferation of a pig and fowl, genetic factors are not considered as well as that of cattle in rural districts. However, LDMC is promoting the improvement of productivity and spread of improved breed by producing excellent piglets and chicks at 27 farms all over the country and distributing them to farmers.

I.10. Number of Cattle by Age and Sex

To know the number of cattle by age is necessary to estimate the reproductive ability and to make proliferation plan. The number by age and township according to the data of LDMC is as shown in Table G-5 and G-6.

In Burma the age of three years is an important point because cattle over 3 years are used as draught animal and first calving is also in the age of three. The ratio of over 3 year is 75% for cattle and 69% for buffaloes, of which the ratio of female having reproductive ability is 24% for cattle and 36% for buffaloes. In the two Tables over 3 year bulls and oxen are considered as cattle possible to draught work and they are 3.59 million head of cattle and 0.61 million head of buffaloes which well correspond to the number of progress in draught cattle shown in Report to the Pyithu Hluttaw, 1978 - 79. (See Table G-2)

Among these, dairy cattle are approximately 340,000 head as shown in Table G-7. Among cattle, dairy breeds are Red Shindh, Hariana, Tharparkar and crosses between these breeds and native breed and 17% of 340,000 are Murrah of buffaloes. These dairy cattle occupy only 4% of all cattle and this shows that milk production is secondary.

I-11. Feedstuff Production

Since no crops are raised especially for livestock, cattle graze wild grasses growing naturally on the roadside or bank of a dike in the rainy season. The area where these grasses grow is estimate about 1,000,000 acres in the whole country. During dry season as the wild grasses run dry, rice straw, rice bran and chopped sorghum stalks are given mainly to cattle and buffaloes and rice bran and broken rice are also mainly to pigs and fowls.

TABLE G-5 NUMBER OF CATTLE BY SEX AND AGE 1978-79

(Unit: Heads)

No.	Division or State	Over 3 years						Under 3 years			Total
		Bull	Oxen (castrated)		Female	Sub-total	Male	Female	Sub-total		
			Female	Male							
1	Sagaing	130,466	596,316	324,193	1,050,975	163,877	155,659	319,536	1,370,511		
2	Mandalay	115,728	476,284	346,630	938,642	164,190	168,323	332,513	1,271,155		
3	Magwe	34,046	164,702	90,791	289,539	44,322	41,423	85,745	375,284		
4	Pegu	83,633	445,043	146,301	674,977	100,905	78,206	179,111	854,088		
5	Rangoon	26,088	153,289	80,364	259,741	51,343	42,576	93,919	353,660		
6	Irrawaddy	75,429	395,390	173,891	644,710	117,520	92,416	209,936	854,646		
7	Tenasserim	14,769	11,592	16,712	43,073	11,524	11,281	22,805	65,878		
8	Kachin	21,920	42,975	36,259	101,154	20,873	21,482	42,355	143,509		
9	Chin	2,994	637	9,221	12,852	2,057	1,889	3,946	16,798		
10	Shan	119,854	165,051	237,915	522,820	102,858	110,925	213,783	736,603		
11	Kayah	6,768	9,083	13,137	28,988	6,913	4,827	11,740	40,728		
12	Karen	212,845	63,192	59,758	335,795	34,100	34,125	68,225	404,020		
13	Mon	16,870	96,196	70,177	183,243	43,220	39,359	82,579	265,822		
14	Arakan	10,884	101,118	137,861	249,863	67,698	66,789	134,487	384,350		
	Total	872,294	2,720,868	1,743,210	5,336,372	931,400	869,280	1,800,680	7,137,052		

Source: Livestock Development and Marketing Corporation.

TABLE G-6 NUMBER OF BUFFALO BY SEX AND AGE 1978-79

(Unit: Heads)

No.	Division or State	Over 3 years						Under 3 years			Total
		Bull	Oxen (Castrated)		Female	Sub-total	Male	Female	Sub-total		
1	Sagaing	54,448	22,283	103,030	179,761	38,456	40,464	78,920	258,681		
2	Mandalay	22,626	7,749	36,378	66,753	12,905	13,889	26,794	93,547		
3	Magwe	9,194	11,310	26,406	46,910	10,317	20,663	30,980	77,890		
4	Pegu	36,246	29,224	61,993	127,463	25,175	26,035	51,210	178,673		
5	Rangoon	11,714	18,039	35,455	65,208	13,593	28,407	42,000	107,208		
6	Irrawaddy	36,323	31,840	72,147	140,310	27,312	26,813	54,125	194,435		
7	Tenasserim	12,677	10,127	32,820	55,624	13,800	14,698	28,498	84,122		
8	Kachin	19,126	13,095	21,935	54,156	19,341	39,737	59,078	113,234		
9	Chin	1,376	995	4,894	7,265	2,081	4,735	6,816	14,081		
10	Shan	77,798	65,993	122,527	266,318	48,871	54,092	102,963	369,281		
11	Kayah	3,348	3,405	8,011	14,764	3,517	1,741	5,258	20,022		
12	Karen	32,098	5,686	49,100	86,884	7,614	8,310	15,924	102,808		
13	Mon	7,269	12,041	20,961	40,271	9,316	9,737	19,053	59,324		
14	Anakan	31,273	22,736	68,933	122,942	27,767	28,846	56,613	179,555		
	Total	355,516	254,523	664,590	1,274,629	260,065	318,167	578,232	1,852,861		

Source: L.D.M.C.

TABLE G-7 NUMBER OF MILK COW

(Unit: Thousand heads)

<u>Particulars</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>
Cattle			
Draught-Bulls	746	754	765
Bullocks	2,920	2,956	2,585
Cows	1,183	1,513	1,561
*Milk Cows	270	287	268
Cows-Bulls	29	30	31
Cows	35	40	32
Young stock	1,788	1,819	1,662
Buffaloes			
Draught-Bulls	294	299	301
Bullocks	246	246	249
Cows	595	597	401
*Milk Cows	86	45	45
Others-Bull	2.3	2.4	2.6
Young stock	519	524	525

Although rice straw occupies much portion of feed quantity, protein, calcium and vitamin lack in them. Low reproductivity seems to result largely from inferiority of feed adding to genetic factor.

Formula feed is manufactured in two plants at Mandalay and Danyingon. The plant at Danyingon produces 30 t/day of feed and the plant at Mandalay is much smaller in capacity.

I.12. Disease and its Outbreak

As the diseases of livestock frequently broke out in Burma, foot and mouth disease (FMD), anthrax, haemorrhagic septicaemia, black quarter, pig cholera, newcastle disease and coccidium are the representative ones. In the decade between 1965-66 and 1974-75 the largest number of disease of former four diseases is FMD and three are the same outbreak numbers in general. (See table G-8)

The highest mortality is 88% of black quarter and then anthrax, haemorrhagic septicaemia and FMD follow in descending order and mortality of FMD is very low showing 0.02%. Vaccination against rinder pest is very successful and no outbreak of this disease has been seen for these 20 years. The vaccine is produced at Veterinary Research Laboratory in Insein and transferred to the concerned agents of townships through the concerned organization of States and Divisions. Actual vaccination is done by a veterinarian at each township and it is free of charge.

The supply of the vaccine meets only 10% of the total livestock and at present a plan to expand the supply to 50% is under consideration in VAHD. (See Table G-9)

Along with before-mentioned infectious disease, parasitosis, disease of digestive organs and one related to impediment in nutrition are many, which fundamentally result from bad feed and management at farmers.

TABLE G-8 ANNUAL LIVESTOCK DISEASE OUTBREAK

(Unit: heads)

Year	Foot and Mouth Disease		Anthrax		Haemorrhagic Sep		Black quarter				
	No. of Outbreak	Mor- bidity tality	No. of Outbreak	Mor- bidity tality	No. of Outbreak	Mor- bidity tality	No. of Outbreak	Mor- bidity tality			
1965-66	576	52,625	318	1,384	1,314	327	3,998	3,910	215	1,169	1,069
1966-67	300	149,611	304	1,269	999	233	1,354	1,214	308	1,596	1,432
1967-68	1,256	72,826	203	865	779	269	730	690	208	931	870
1968-69	1,723	153	269	1,358	1,029	188	1,523	1,407	260	1,419	1,321
1969-70	327	28,223	102	631	243	98	850	720	137	751	721
1970-71	790	30,691	65	289	243	77	838	626	63	213	189
1971-72	1,383	993,339	32	194	167	31	1,729	884	77	731	395
1972-73	1,359	6,113	21	156	101	39	786	242	32	104	100
1973-74	153	76,918	7	245	210	31	445	339	16	116	92
1974-75	134	47,077	22	160	144	60	992	82	24	387	345

Source: VAHD

TABLE G-9 ANNUAL BIOLOGICS PRODUCTION

No.	Particulars	Unit	Production			
			1974/75	1975/76	1976/77	1977/78 9 months
1.	Rinderpest vaccine	Dose	570,700	254,500	140,000	380,000
2.	Anthrax vaccine (Mukteswar)	Dose	2,887,800	2,529,000	2,832,300	3,435,000
3.	Anthrax vaccine (S.A)	Dose	19,385	11,190	378,490	
4.	Haemorrhagic Septicaemia Vaccine (Alum)	Dose	1,793,520	1,689,840	2,902,400	3,407,400
5.	Haemorrhagic Septicaemia Vaccine (Oil Adj:)	Dose	476,900	390,800	397,800	
6.	Black Quarter Vaccine	Dose	641,220	645,120	1,035,700	1,408,720
7.	Avian Pasteurellosis & Duck Septicaemia Vaccine	Dose	1,426,650	1,758,000	1,273,950	1,352,100
8.	New Castle Disease Vaccine (C.F)	Dose	1,173,400	2,588,100	2,355,100	9,244,000
9.	Newcastle Disease Vaccine (Komarov)	Dose	3,691,000	7,713,000	10,016,000	
10.	Fowl Pox Vaccine (for day old)	Dose	439,500	756,500	495,500	1,288,900
11.	Fowl Pox Vaccine (for growers)	Dose	221,500	297,000	201,000	
12.	Swine Pasteurellosis Vaccine	Dose	407,400	502,200	505,650	408,150
13.	Hog Cholera Tissue Culture Vaccine	Dose	115,640	149,380	137,050	105,220
14.	Anti Rabies Vaccine (LEP)	Dose	3,539	3,395	2,864	1,131
15.	Semple's Rabies Vaccine	Dose	10,710	10,640	11,998	9,660
16.	Canine Distemper Vaccine	Dose	1,363	1,270	1,832	300
17.	Pullorum Stained Antigen	Dose	52,300	63,310	64,000	30,000

Note: April to December
Source: VAHD

TABLE G-10 INTAKE OF PROTEIN PER DAY

<u>Country</u>	<u>Intake</u> g/day/person	<u>Animal Protein</u>	
		g/day/person	%
India	53.0	5.9	11.1
East Pakistan	57.5	7.5	13.0
Viet Nam	69.6	23.0	33.0
Burma	54.9	12.8	23.3
Japan	69.7	27.2	39.0
United Kingdom	88.0	54.0	61.4
U.S.A.	82.0	75.1	91.6

TABLE G-11 LIEVESTOCK PRODUCTS

(in Thousand)

Particulars	Unit	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78/	
											1968-69	
Cattle												
Hide and skin	No.	280	288	291	298	299	282	310	315	319	325	1.16
Fresh milk	t	186	147	149	153	153	239	255	259	263	277	1.49
Beef	t	25	26	26	27	27	28	28	28	29	29	1.16
Mutton	No.	699	403	645	667	356	391	357	370	383	394	0.56
Pork	"	395	466	503	506	469	529	487	540	609	666	1.69
Skin(goat and sheep)	"	764	443	706	730	381	413	440	400	414	426	0.56
Poultry												
Fowl meat	No.	33,015	34,210	30,145	40,067	40,131	39,499	38,355	41,207	43,441	42,524	1.29
Duck meat	"	5,583	7,451	8,301	8,640	8,462	9,267	6,886	7,121	7,756	8,332	1.49
Turkey and geese meat	"	167	138	283	272	294	430	319	360	385	419	2.51
Fowl egg	"	341,101	352,240	403,121	405,091	405,725	472,565	458,879	492,218	509,257	543,508	1.59
Duck egg	"	61,871	81,449	90,942	94,399	92,815	106,847	79,398	81,660	88,937	95,542	1.54

Source: Report to the Pyithu Hluttaw 1978-79.

TABLE G-12 CONSUMPTION OF ANIMAL PRODUCTS

(Unit: kg/caput/year)

<u>Year</u>	<u>Beef</u>	<u>Mutton</u>	<u>Pork</u>	<u>Milk</u>	<u>Egg</u>	<u>Chicken</u>
1968-69	0.95	0.26	0.74	7.05	21.16	1.23
1969-70	0.95	0.15	0.85	5.44	21.37	1.25
1970-71	0.95	0.23	0.90	5.41	23.93	1.40
1971-72	0.95	0.23	0.89	5.43	23.50	1.39
1972-73	0.92	0.12	0.80	5.33	23.04	1.36
1973-74	0.97	0.13	0.89	8.12	26.26	1.31
1974-75	0.94	0.11	0.80	8.59	25.21	1.26
1975-76	0.94	0.11	0.87	8.53	26.47	1.33
1976-77	0.92	0.11	0.97	8.46	26.80	1.38
1977-78	0.92	0.11	1.03	8.74	27.98	1.38

Source: VAHD

Note: egg in number

I.13. Production and Consumption of Animal Products

Livestock products are as shown in Table G-11. As mutton, pork, fowl meat and duck meat are indicated in number of head that were slaughtered, yield is not known but production of meat is estimated as follows: 28,000t of pork, 29,000t of beef, 3,100t of mutton, 44,000t of fowl meat and 12,000t of duck meat.

This tells that fowl meat, pork and beef are much consumed. Fresh milk production has rose one and half times in the recent decade and along with fowl and duck eggs demand for fresh milk will increase hereafter, but because of the perishableness, a producing area is limited to the area close to the consuming district. Two kinds of milk - diluted milk with water and condensed milk - are sold. Milk plant are at Rangoon and Maymyo, where 1,400t/year of milk is sterilized and processed.

According to report to the Pyithu Hluttaw in 1978-79, national consumption of meat is 3.7 kg/capita/year and it is increasing by 4% year by year.

According to Table G-12, animal protein intake in 1977-78 is as follows:

Meat:	3.44	kg/capita/year
Fish:	16.2	"
Milk:	8.74	"
Egg :	28	eggs (1.26 kg) - Supposing an egg is 45 g.

Based on this, average animal protein intake of Burmese people is estimated as follows:

	<u>Protein Content (%)</u>	<u>Intake (kg/year)</u>	<u>Animal Protein Intake (kg/year)</u>
Meat	20	3.44	0.69
Fish	22	16.2	3.56
Milk	3	8.74	0.26
Egg	13	1.26	0.16
<u>Total</u>			<u>4.67 - 12.8^{g/day}</u>

Annually 4.67 kg (12.8 g/day) of animal protein is to be ingested. Comparison of this with that of foreign countries is shown in Table G-10.

I.14. Measures for the Promotion of Animal Husbandry

The government distributed 3.8% (272 million Kyat) of public investment to promote animal husbandry and fishery in the second four-year plan and the investment is increased to 9.37% in the third four-year plan to fill up this field.

In the second four-year plan the following three were the main aims in animal husbandry: 1) production for self-support within the country, 2) increases in meat consumption per capita and 3) to meet demand for draught cattle. The result of the second four-year plan ending in 1977-78 is as follows:

	<u>1974/75</u>	<u>1975/76</u>	<u>1976/77</u>	<u>1977/78</u>	<u>Target</u>	<u>Attainment Ratio (%)</u>
Meat production	62	65.8	70.0	72.0	72.0/average year	93.6
Meat consumption per capita	2.05	2.13	2.22	2.24	2.41 final year	92.9
Production of draught cattle	139,000 head for 4 years.				604,000 head	23.0

To attain the established aims, efforts to secure feedstuff,

to prevent epidemics and to examine sick livestock were made and cattle, sheep, goats, pigs, chickens and ducks were distributed from LDMC Farms. Of 27 LDMC Farms (See Table G-13), at farms in Mandalay, Taungdwingyi, Pyawbwe, and Taunggyi central distribution centers were established and they take a leading part in calf supply.

I.15. Organization

The organization relating to animal husbandry is divided into Livestock Development and Marketing Corporation (LDMC) and Veterinary Research Laboratory - Insein, which is under administration of VAHD.

Vaccination and artificial insemination are actually done by a veterinarian of each township. Each township has one or two veterinarians, and in a small township one or two assistants and in a large township 4 assistants stay.

LDMC produces young livestock at 27 farms in the whole country and takes charge of the field directly related to livestock production. The frozen semen produced at Veterinary and Animal Husbandry Department is supplied with its material from farms of 9th Mile Farm, Hlawga, and Pyimebem of LDMC.

TABLE G-13 L.D.M.C. Farms

(Unit: head)

No.	Farm Place	Cattle	Poultry	Pig	Buffalo	Horse	Sheep		Donkey	Duck
							Ass			
1.	9th Mile	189	-	-	-	-	-	-	-	-
2.	Danyingon	1	-	181	-	-	-	-	-	-
3.	Hlawga	74	611	47	-	9	-	-	-	-
4.	Pegu	37	2,379	85	-	-	-	-	-	-
5.	Mudon	48	967	150	-	-	-	-	-	-
6.	Pa-an	-	639	68	-	-	-	-	-	-
7.	Kawkareik	-	-	12	-	-	-	-	-	-
8.	Pyawbwe	69	2,133	144	-	-	-	-	-	-
9.	Mandalay	152	2,054	206	-	-	-	-	-	-
10.	Shwebo	-	2,064	92	-	-	-	-	-	-
11.	Taungdwingyi	159	877	83	-	-	-	-	-	-
12.	Naunghkio	94	474	98	4	-	-	-	-	-
13.	Tayaw	148	1,118	73	8	-	-	-	-	-
14.	Thaphan	2	-	-	-	-	826(S)	-	-	-
15.	Loilen	2	567	58	-	10	3(A)	1	-	-
16.	Pyawbwe	464	-	-	-	-	-	-	-	-
17.	Lonkyaw	170	-	31	-	1	-	-	-	-
18.	Banyin	156	-	-	2	8	-	-	-	-
19.	10th Mile	-	-	-	-	-	-	-	-	-
20.	Kanbalu	7	-	164	-	4	-	-	-	-
21.	Wanbaein	-	-	-	-	-	-	-	-	6,179
22.	Duck Farm,	-	-	-	-	-	-	-	-	747
23.	Poultry Farm	-	-	-	-	-	-	-	-	-
24.	Loikaw	63	-	-	-	-	-	-	-	-

Note: (S) = Sheep

(A) = Ass

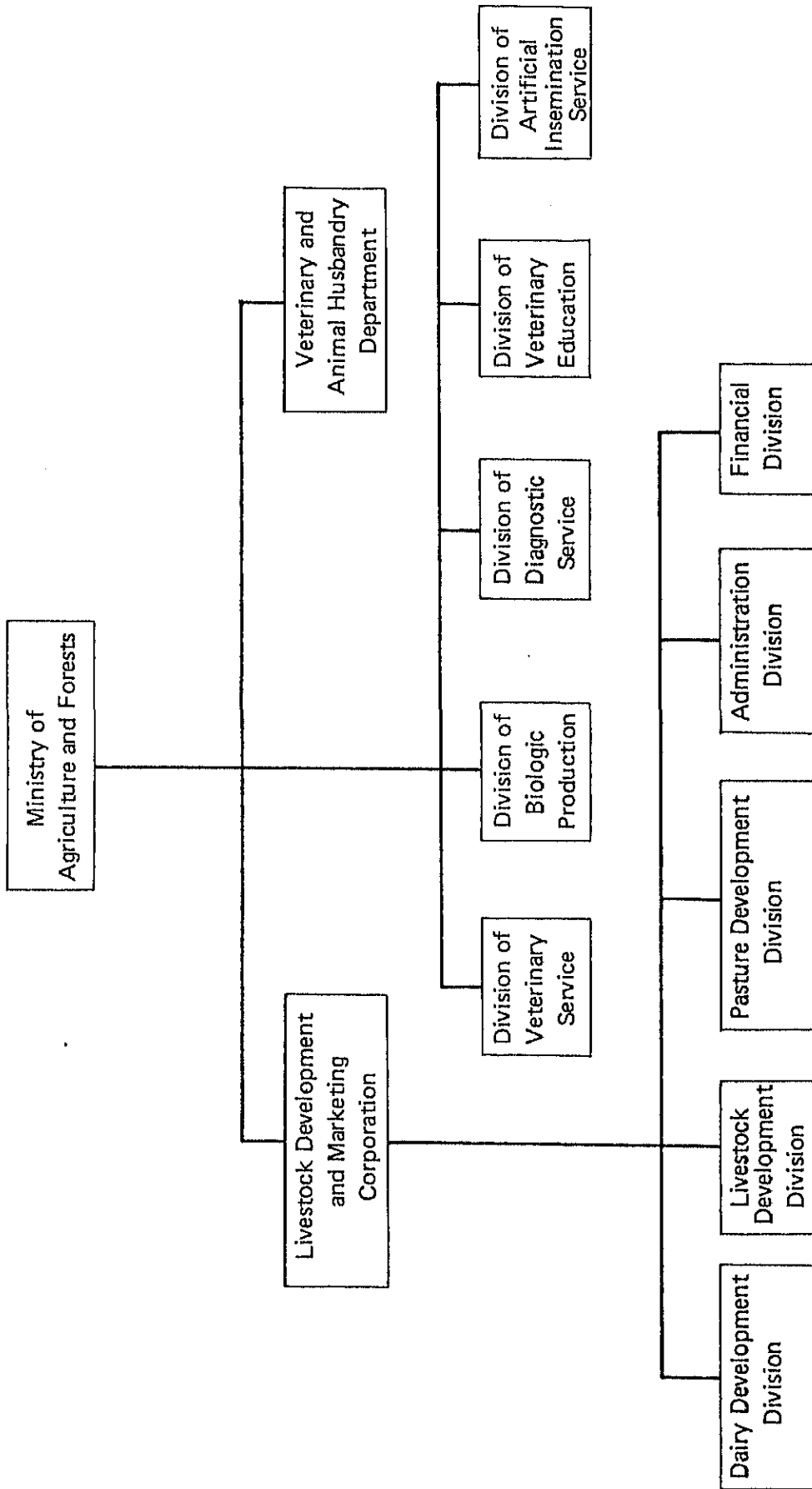


FIGURE G-2 ORGANIZATION OF V.A.H.D. AND L.D.M.C.

II. GENERAL DESCRIPTION OF ANIMAL HUSBANDRY IN THE SURVEY AREA

II.1. Progress in Livestock Breeding

Transition in number of livestock in the Survey Area is shown in Table G-14.

Increases are seen in the number of pigs but that of cattle and buffaloes has not changed.

II.2. Progress in Number of Draught Cattle

The changes in number of draught cattle and buffaloes in the Survey Area are shown in Table G-15.

Although marked increase in number is not seen, the Table G-15 shows that the percentage of draught cattle for farming in the Survey Area is high because in the area rice crop is principal.

Table G-16 shows the relation between cultivated area and number of draught cattle. The township exceeding reasonable area of 10 acres which a pair of bullocks can cultivate is only Padaung and other townships are in the range of 10 acres. Contrary to this, average of the whole country is 11.5 acres which is little excessive to draught cattle.

II.3. Form of Livestock Keeping and Environment

Cattle and buffaloes are generally kept in straw sheds in the farm households site and grazed in the wild grassland or tied at a stake while grazing. Usually any watchman does not attend and when cattle move in a large group, 2 or 3 children attend. They do not have any fixed place for grazing and it is a custom from the old time to let them walk and graze freely.

TABLE G-14 NUMBER OF LIVESTOCK IN THE SURVEY AREA

(Unit: Heads)

<u>Year</u>	<u>Cattle</u>	<u>Buffalo</u>	<u>Goat</u>	<u>Pig</u>	<u>Fowl</u>	<u>Duck</u>	<u>Remarks</u>
1972-73	830,998	66,915	12,383	218,823	2,735,860	455,662	
1973-74	840,184	67,614	12,015	214,938	2,833,520	420,280	
1974-75	849,369	68,312	11,646	211,053	2,931,180	384,898	
1975-76	835,933	67,689	11,842	209,920	3,009,521	385,059	
1976-77	863,881	66,479	12,085	242,603	3,161,368	453,295	
1977-78	842,912	60,208	11,861	282,250	3,167,488	486,775	
1978-79	924,618	69,809	12,442	304,311	3,193,728	543,264	
1978-79/ 1972-73	1.1	1.0	1.0	1.4	1.2	1.2	
Project Area/ National(%)	11	3	2	14	19	14	1977-78

Note: Number of livestock: see appendix G-1 page 1 ~ 4

Source: VAHD

TABLE G-15 NUMBER OF DRAUGHT CATTLE IN THE SURVEY AREA

(Unit: Heads)

<u>Year</u>	<u>Cattle</u>	<u>Buffalo</u>	<u>Remarks</u>
1972-73	801,832	64,365	
1973-74	795,121	64,888	
1974-75	790,080	65,412	
1975-76	830,459	65,226	
1976-77	848,994	64,305	
1977-78	880,345	68,015	
1978-79	861,135	67,664	
1978-79/ 1972-73	1.1	1.1	
Project Area/ National	23	12	1977-78

Note: Number of cattle and buffalo by township, see Appendix G-2, page 1 - 2

TABLE G-16 CULTIVATED AREA PER PAIR OF BULLOCKS

No.	Township	Total Occupied Area ac	Number of draught Cattle (Heads)			Cultivated Area per Pair of Bullocks ac
			Cattle	Buffaloes	Total	
1	Paukkaung	58,224	25,602	4,208	29,810	3.9
2	Prome	91,216	31,572	1,397	32,969	5.5
3	Padaung	58,865	3,770	1,146	4,916	23.9
4	Paungde	79,535	28,433	1,583	30,016	5.3
5	Thegon	103,811	29,791	3,168	32,959	6.3
6	Shwedaung	80,387	27,139	450	27,589	5.8
7	Nattalin	119,736	38,047	2,526	40,573	5.9
8	Zigon	46,806	15,911	400	16,311	5.7
9	Gyobingauk	90,030	28,597	869	29,466	6.1
10	Monyo	85,632	32,608	3,338	35,946	4.8
11	Okpo	90,431	30,022	2,855	32,877	5.5
12	Minhla	86,377	31,775	1,930	33,705	5.1
13	Letpadan	122,982	43,389	1,726	45,115	5.5
14	Tharrawaddy	108,529	29,290	1,527	30,817	7.0
	<u>Sub-total</u>	<u>1,222,561</u>	<u>395,946</u>	<u>27,123</u>	<u>423,069</u>	<u>5.8</u>
15	Taikkyi	174,900	38,585	6,086	44,671	7.8
16	Hlegu	185,097	32,731	15,271	48,002	7.7
17	Hmawbi	85,434	17,194	8,036	25,230	6.8
	<u>Sub-total</u>	<u>445,431</u>	<u>88,510</u>	<u>29,393</u>	<u>117,903</u>	<u>7.6</u>
18	Kyangin	52,642	22,205	1,165	23,370	4.5
19	Myanaung	162,663	49,710	1,444	51,154	6.4
20	Ingabu	168,439	67,409	2,792	70,201	4.8
21	Lemyethna	81,710	26,929	1,209	28,138	5.8
22	Yegyi	154,818	45,718	1,290	47,008	6.6
23	Henzada	191,254	51,062	155	51,217	7.5
24	Zalun	125,712	32,737	225	32,962	7.6
25	Kyonpyaw	168,950	39,671	1,471	41,142	8.2
26	Danubyu	139,363	41,238	1,397	42,635	6.5
	<u>Sub-total</u>	<u>1,245,551</u>	<u>376,679</u>	<u>11,148</u>	<u>387,827</u>	<u>6.4</u>
	<u>Total</u>	<u>2,913,543</u>	<u>861,135</u>	<u>67,664</u>	<u>928,799</u>	<u>6.3</u>

Note: Number of draught cattle: 1978-79

$$\text{National } \frac{25,263^{1,000} \text{acre}}{2,193,790} = 11.5 \text{ acre/one pair of Bullocks}$$

Grasses in the wild grassland are almost thoroughly eaten up but the quantity is not sufficient. Consequently, it is impossible to individually feeding control the cattle according to the ability.

There is no shed for domestic fowls and pigs. They are kept in the garden of farm household, and therefore they are defenseless against infectious disease through human being. In any case production is not put on commercial base and they are kept extremely extensively with purpose of self-sufficient.

II.4. Utilization of Composed and Barnyard Manure

The barnyard manure of livestock has efficient balanced ingredients for crops as under-mentioned (see the following table), and it is an important source of fertilizer. In Burma, however, as cattle and buffaloes are pastured freely, it is difficult to collect barnyard manure and utilize intensively. Consequently, barnyard manure actually utilized seems to be extremely little.

	<u>Feces</u>	<u>Urine</u>
N	0.30	0.80
P ₂ O ₅	0.25	-
K ₂ O	0.10	1.40

Note: Percentage in dry matter.

It is said that in Burma a pair of bullock produces 5 tons of barnyard manure per year in which about 15 kg of Nitrogen contents are to be involved. Nitrogen contents put into paddy fields is approximately 14 kg per ha in local variety and when composed and barnyard manure is efficiently utilized a pair can manure the 2.6 acres of field.

II.5. Production of Feedstuff

The animal husbandry in Burma is considered to be supported by wild grass and agricultural by-product. Table G-17 shows cropping situation of each crop in the Survey Area, of which straw and maize can be used as feedstuff for cattle and buffaloes.

Yield of straw per acre in Burma is 1,336 kg and total yield in the Survey Area is 2,926,873 t. In Burma as the seed of maize are eaten by the people, the stems and leaves are usable for feedstuff. The ratio of ears, stems and leaves in weight is 13 : 59 : 28. As in statistics only the yield of seed is shown, the yield including stems and leaves which can be used for feed staff is 103 Bt/ac (5,150 kg/ha) judging from before-mentioned ratio of ears to stems and leaves and the yield of seed. From this, the yield of stems and leaves of maize produced in the Survey Area is estimated at 2,006^{1,000} Bt (40,112t).

It is difficult to know the acreage of wild grassland in the Survey Area but since the total area of the wild grassland of the whole country is said to be 1.0 million ha and that of the Survey Area is equivalent to 4.3% of the country land, the wild grassland in the Survey Area is estimated as approximately 43,000 ha. Nutritive quantity (TDN) of cattle and buffaloes supplied from this feed source is counted as follows:

Straw TDN	:	2,926,873t x 0.37 =	1,082,943t
TDN of maize stem and leaf	:	40,112t x 0.10 =	4,001
Wild grass TDN:		43,000 ha x 25 t/ha x 0.19 =	204,250
<u>Total</u>			<u>1,291,204t</u>

As compared with this, required quantity of TDN necessary for cattle and buffaloes in the Survey Area is as follows:

Cattle	:	924,618 head x 4.1 kg/day x 365 days =	1,383,691t
Buffaloes:		69,891 head x 4.1 kg/day x 365 days =	104,469
<u>Total</u>			<u>1,488,160t</u>

TABLE G-17 PRODUCTION OF EACH CROPS IN THE SURVEY AREA (1975-76)

Item	Sown Area ac	Matured Area ac	Yield per acre	Production	Remarks
Paddy Rice	2,217,733	2,190,773	42.20 Bt/ac	92,447,063 Bt	
Pre-monsoon Jute	28,403	22,407	231.49 Viss	5,187,071 Viss	
Monsoon Jute	27,742	22,461	235.24 Viss	5,283,669 Viss	
Ground nuts Rain	13,678	13,439	21.84	293,537	
" Winter	132,746	130,829	28.09	3,674,643	
Early Sesamum	18,628	17,242	3.97	68,473	
Late Sesamum	17,196	16,906	3.84	64,902	
Matpe	64,945	49,605	5.26	260,866	
Bocate	15,326	14,977	6.84	102,460	
Pelum	9,647	7,706	7.14	55,009	
Maize Seed	21,200	19,472	15.42	300,258	Leaf-Stem production 2,006,000 BKT
Cotton	8,300	7,623	79.40	605,266	
Others	337,700				

Source: Total of each township statistics.

That is, 196,956t of TDN is short and if it is supplied with grassland having yield of 40t per ha, approximately 26,000 ha is required.

For pigs and fowls, rice bran and broken rice are fed and the quantity produced in the Survey Area is estimated as follows:

In Burma, broken rice and rice bran that are by-product of unhulled rice are 8% and 6% of broken rice and rice bran are as follows:

Broken rice: $1,929,369t \times 0.08 = 154,350t$

Rice bran : $1,929,369t \times 0.06 = 115,762t$

III. CIRCULATION OF LIVESTOCK AND ANIMAL PRODUCTS

III.1. Supply Route of Cattle to Farmers

Cattle and buffaloes are distributed through livestock market opened once a week. It is under the charge of peoples' Council in the township. The average price of livestock and poultry in 1978-79 is as follows:

Draught cattle	Adult	Male	: 1,000 Kyat/head
		Female	: 600
	Calf	Male	: 150
		Female	: 90
Buffalo	Adult	Male	: 1,500
		Female	: 1,000
	Calf	Male	: 250
		Female	: 180
Pig			: 400
Goat			: 100
Fowl			: 20
Duck			: 17

Source: LDMC

Bulls are sold at high price than cows because cattle are usually used for draught. The reason why buffaloes are more expensive than cattle is because the number of buffaloes is less and also because they have more power for cultivation.

III.2. Circulation Route of Animal Product and its Price

Animal products such as meat and eggs are brought to the market by a broker. Weight of cattle and buffaloes at shipment to a slaughterhouse is 150 - 180 kg and that of pigs is about 65 kg. The meat is sold in fresh meat at all times for lack of refrigeration facilities. Selling price at Rangoon in the past seven years is shown in Table G-18.

Except milk is sold in relatively stabilized price, other prices rose as 2.2 - 2.9 times as before but recently sign of downward trend is seen. (See Figure G-3)

TABLE G-18 PRICE OF ANIMAL PRODUCTS IN THE RANGOON CITY

<u>Year</u>	<u>Beef</u>	<u>Mutton</u>	<u>Pork</u>	<u>Chicken</u>	<u>Milk</u>	(Unti: Kyat/kg)	
						<u>Fowl Egg</u>	<u>Duck Egg</u>
1971-72	8.00	13.03	6.26	9.58		3.22	2.61
1972-73	9.40	14.63	11.20	11.19		4.09	3.43
1973-74	10.99	15.58	11.80	13.11		4.79	3.79
1974-75	14.96	15.58	11.80	13.11	Approximately 4-5.5 KS/Viss	4.79	3.79
1975-76	23.00	28.97	19.24	21.48		7.80	7.00
1976-77	24.41	31.71	19.37	25.81		7.59	6.57
1977-78	23.53	31.12	17.97	25.05		7.21	6.29
1971-72/ 1977-78	2.9	2.4	2.9	2.6		2.2	2.4

Note: Egg - price per dozen

Source: CSO (Central Statistical Organization) Selected Monthly Economic Indicators.

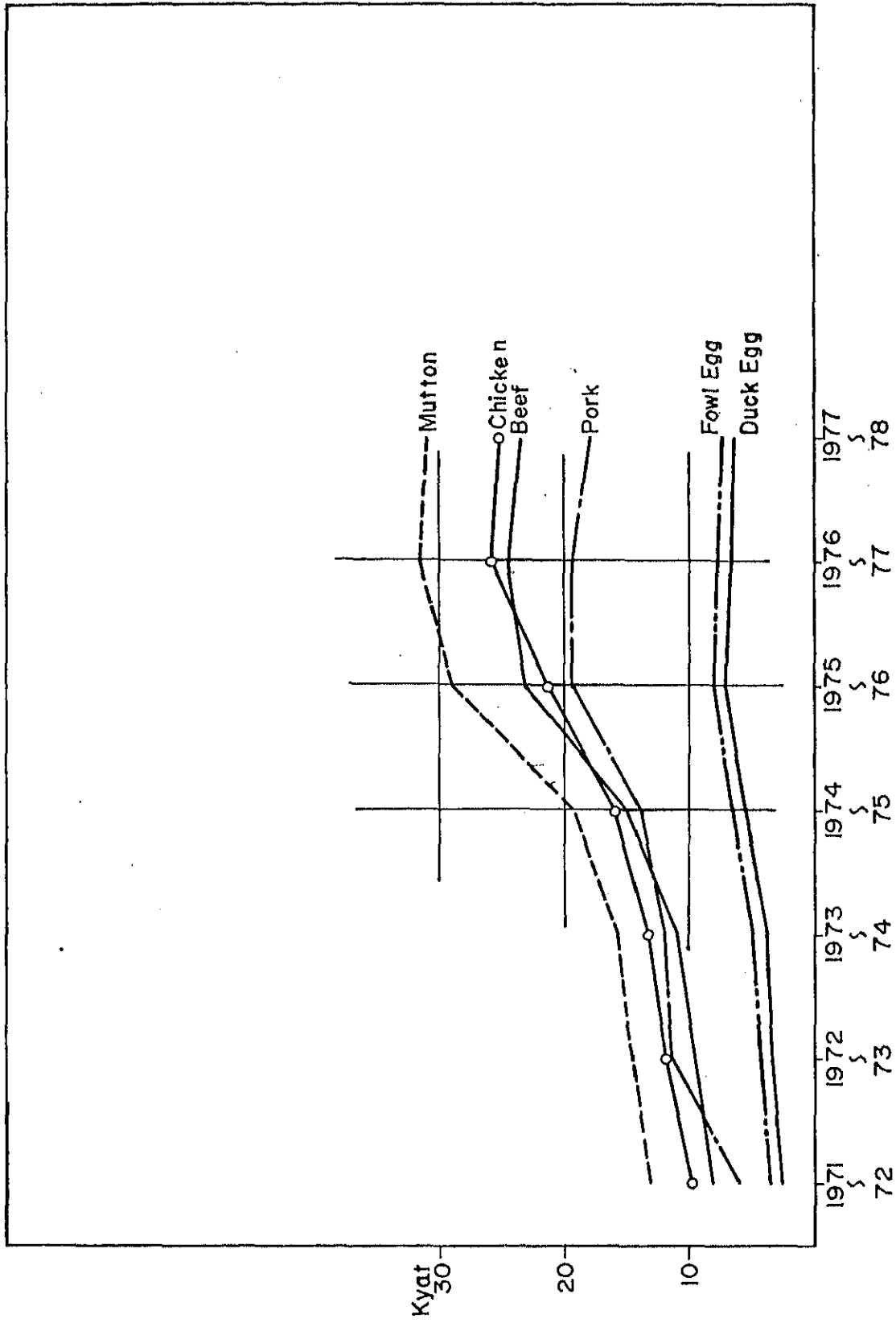


FIGURE G-3 MARKET PRICE OF ANIMAL PRODUCTS IN RANGOON

IV. PROBLEMATICAL POINTS AND COUNTERMEASURES

IV.1. Farm Mechanization and Animal Power

Annex C on Agriculture discusses the farm mechanization plan in the Survey Area. In the discussion, the farm mechanization was proposed to be limited to a minimum scale in view that a full-scale mechanization is not necessarily required as the best policy in the Project, and a plan was made to mechanize only the land preparation works; plowing and soil breaking would be carried out by tractors, while levelling, furrowing, and hauling the inputs outputs would be made by traditional way of works in using draught power. Hence, the draught animals would be released from the burden of works in plowing, soil breaking and threshing.

The proposed land use illustrated in Table C-3-1 in Annex C on Agriculture revealed that it was planned to cultivate about 3.65 million acres of the present cultivable lands of 2.885 million acres. (cropping intensity: 127%)

In Burma, empirically speaking, a pair of draught animals can over the works for about 10 acres. Thereby, about 365,000 pairs of animals are required to cover the above proposed cultivation area of 3.65 million acres, unless the farm mechanization is introduced in the Survey Area.

According to Table G-15, about 465,000 pairs of draught animals have been kept in the Survey Area, and one percent of them is said to be increased in number year by year. Since the Project plans to alleviate the heavy burden of the animals in their farming works, the animal power would produce surplus to considerable extent. Therefore, the animal husbandry should place an emphasis on progress in ability of individual cattle and improvement of quality of the meat.

IV.2. Sanitary Management of Livestock

In Burma many diseases including foot and mouth disease have broken out and it became one of factors of fall-off in productivity. Though vaccination against these diseases is performed it cannot be said to completely that system for prevention of epidemics is sufficient because of shortage of supply of vaccine and lack of veterinarians.

Rats, mosquitoes and flies often carry disease germs and the people also becomes a cause of outbreak of epidemics and therefore, vaccination is necessary, but if farmers take account of sanitary management for livestock, considerable effect can be expected. Some countermeasures are as follows:

- (1) To establish one or two dipping bathes in a village to dip grazed cattle.
- (2) To exterminate rats, mosquitoes and flies which carry disease germs.
- (3) To periodically disinfect hen houses, pig sheds and cow sheds.
- (4) To thoroughly give vaccination to all cattle, pigs and fowls and to periodically exterminate parasites.
- (5) To isolate or slaughter sick animals and to infect sheds in case of outbreak of disease.
- (6) To burn dead animals and contaminated things.

IV.3. Countermeasures for Feedstuff Production

In Burma cattle and buffaloes are used for milk and meat production and also as draught cattle for farming and transport. Consequently, production increase in these is inevitable for improvement of peoples' living and expansion of agriculture (such as two crops a year). However, in the present condition nature of livestock is unsatisfactory; small-sized, late-mature, of low fertility, of low dressing percentage, of small milk yield and so on.

Furthermore, there exist fundamental problems that should be solved for animal husbandry management, such as outbreak of epidemics and lack of nutritive roughage. Now, let's examine feed condition, one of the above-mentioned problems.

Cattle and fed by pasturing in the wild grassland and by grazing in paddy field after harvest and nutrition is in extremely bad condition. It is clear that this effects on the fertility, dairy performance and draught power ability.

Consequently, together with improvement of livestock, their productive ability should be raised through fullness of basis of feedstuff hereafter.

In rainy season cattle gaze mostly on wild grass but in dry season grass runs dry. Therefore, straw is the main feedstuff in the dry season. In any case supply of wild grass and straw do not meet the TDN requirement as mentioned before.

VAHD promotes the spread of silage as preserved feedstuff for dry season by distributing leaflets with illustrations showing how to make silage, but it has not been popularlized. (See Appendix G-4)

In Burma in the period between October and April the feed is short. In this period hay and silage are considered as feed but since harvest time is during the rainy season natural dehydration is difficult and therefore, preservation of silage, straw and stems and leaves of maize should be studied.

For the feed during the rainy season as related in II.5, development of improved pasture and cultivation of forage crop using Kaing land should be studied to meet nutrition requirement.

Rice bran and broken rice are the main feed for fowls and pigs

now, but in the future to supply formula feed including oil cake, fish meal, vitamins and minerals, increase of feed mill plants is required. The plants are only two at Danyingon and Mandalay. Supply of formula feed is indispensable to increase production of chicken and pork consumed much as protein source.

IV.4. Securement and Improvement of Superior Breeders

In Burma approximately 90% of bulls are castrated as draught cattle. Castration makes a bull meekly and raises its draughting ability and this is an advantageous aspect of castration but from viewpoint of proliferation it is a great disadvantageous factor, that is, even a superior bull with a big body is castrated, and superior bulls selected for mating become scarce. Even now it is a practice to castrate a bull of about 1 year old and there is no regulation to forbid it. Moreover, as cows and bulls are pastured together, mating is done naturally without considering line breeding and this result in few chances of getting superior calves.

In order to improve dairy cattle mating is done between native cattle and Jersey and Guernsey through artificial insemination by importing frozen semen from Canada. A cross between Jersey and Zebu has heat resistance and this produced a good result. Accordingly, for dairy sector improvement should be hastened in this form. On the other hand, for improvement of draught cattle which are the core of farming power superior breeder should be selected and secured in the first place. It can be said that the number of draught cattle to a cultivated acreage in the Survey Area is almost appropriate according to Table G-16. Consequently in the future, improvement should be carried out in the production of cattle having more ability through mating considering more about line and ability and artificial insemination than securing number of head. Also in the course of improvement of draught cattle, for improvement of meat production of native breed mating with foreign beef type breed having heat resistance and measures to lower the slaughter are limit should be examined.

Productivity of pigs and fowls is extremely low as mentioned in I.5. Pork and chicken occupy most part of meat consumption of Burmese people. Though improved chicks and piglets produced at LDMC Farms are distributed, expansion of LDMC Farms is necessary for popularization of improved breed. (See Table G-19)

TABLE G-19 DISTRIBUTION OF SELECTED SPECIES OF LIVESTOCK

(Unit: Heads)

<u>Animals</u>	<u>1973-74</u>	<u>1974-75</u>	<u>1975-76</u>	<u>1976-77</u>	<u>1977-78</u>	<u>1977-78/ 1973-74</u>
Cattle	819	1,332	483	918	225	0.3
Pig	1,316	2,105	1,482	2,508	6,331	4.8
Goat, Sheep	197	457	318	314	905	4.6
Fowl	60,019	108,524	89,187	151,575	528,382	8.8
Duck	13,247	16,140	837	27,083	13,295	1.0

Source: Report to the Pyithu Hluttaw 1978-79

IV-5. Improvement of Slaughter Facilities

Five hundred slaughter houses are in Burma, but they are not modernized and fully equipped with treatment facilities and refrigerator. Local slaughter houses are for chickens and ducks. A public slaughter house is in Rangoon, where hygienic examination putting emphasis on that of liver and lungs is performed, and livestock infected by pig erysipelas, tuberculosis, foot and mouth disease, blood poisoning, septicalmia and parasitosis are discarded according to the symptoms. However, as any water is not used besides boiling water for scalding, it is unsanitary. At a small-sized slaughter house in the local district and at farm household, any disease is checked at the time of slaughter and the sanitary conditions are more worse. The number of slaughtered livestock in the whole country including that at Rangoon slaughter house is shown in Table G-20. Treatment capacity at Rangoon slaughter house is 120 head of cattle and buffaloes, 250 - 400 head of goats and sheep and 400 - 500 pigs.

TABLE G-20 NUMBER OF SLAUGHTERED LIVESTOCK

(Unit: Heads)

Year	Rangoon Slaughter House					National				
	Cattle	Buffalo	Pig	Goat	Cattle Buffalo (1,000)	Pig (1,000)	Goat (1,000)	Fowl (1,000)	Duck (1,000)	
1968-69	30,377	1,151	121,273	134,977	280	395	699	33,015	5,583	
1969-70	31,078	625	124,818	108,288	288	466	403	34,210	7,451	
1970-71	27,734	-	143,140	79,255	291	503	645	30,145	8,301	
1971-72	13,242	3,095	146,672	60,831	298	506	667	40,067	8,640	
1972-73	30,710	6,467	111,046	54,343	299	469	356	40,131	8,462	
1973-74	31,176	2,627	-	71,338	282	529	391	39,499	9,267	
1974-75	18,815	1,745	113,848	60,682	310	487	357	38,355	6,886	
1975-76	19,197	1,253	-	39,023	315	540	370	41,207	7,121	
1976-77	21,038	2,674	175,410	48,742	319	609	383	43,441	7,756	
1977-78	21,749	2,569	189,272	53,703	325	666	394	42,524	8,332	

Source: VAHD, LDMC Report to the Pyithu Hluttaw

Burma exports chicken and duck meat and hide and skin and earns the foreign currency. To expand this field slaughter houses with refrigerator and hides treatment equipment will be needed.

V. ANIMAL HUSBANDRY PROMOTION PROEJCT

V.1. Necessity of Animal Husbandry Promotion

Animal husbandry of Burma has a close relation with rice production which is the main crop of agriculture and 9,400,000 head of cattle and buffaloes occupy major part. In the Survey Area approximately 900,000 head of cattle are kept which almost meet the requirement for cultivation. However, its quality is not good and productivity is also low. The other side, chicken and ponk occupy the centering place and increases in demand in the future can be considered but for production increase by improved breed in the villages expansion of LDMC Farms is inevitable.

To promote improvement and proliferation of livestock, consolidation of feed staff supply and mating between superior breeds considering line are more important than any other things.

Further, in the aspect of supply, supply facilities where slaughtered livestock are treated hygienically and hygienically safe meat is supplied and animal product export is well delt with should be prepared.

Considering above points projects as follows are recommended promote animal husbandry.

V.2. Feed Mill Plant Project

A LDMC farm where pig sheds and personnel houses have already completed is in Henzada and LDMC is planning to make breeding station here but the plan is suspended at the stage of completion of the buildings. According to the project 50 sows and 10 sires

were expected to be kept and piglets to be distributed. A formula feed mill plant is to be constructed in this Farm and is to supply feed to the pigs and fowls in the Farm and at the same time surpluses are to be distributed to those of the neighboring farmers. At present 2 feed mill plants are in the country and they manufacture 50t/day. They are located at Mandalay and Danvingon and not in the Survey Area. The reason why the farm was built in Henzada is the central point of pig and poultry enterprises of 25 townships at the delta zone south of Henzada. Furthermore, there is a railway station here and it is convenient for transportation. It will be also favorable for transporting piglets, chicks, formula feed and carrying other feed materials. As Henzada has the broadest cultivated land among the 26 townships in the Survey Area, which will give favorable conditions for supplying raw materials, such as rice bran, broken rice and oil cake. This feed mill plant project is inevitable for supplying of piglets and chicks to the neighboring townships and it will give great effects on production increase in pigs and poultry by contributing much in the field of feedstuff production.

Equipment and cost are shown in Table G-21.

V.3. Pasture Land Development Project

At present Burma does not have any grassland for forage production according to statistics. Cattle and buffaloes are fed with wild grass, straw and other agricultural by-product. Wild grass and straw as roughage have low nutritive value and the quantity itself is insufficient as shown in II.5. Therefore, cattle are small-sized with low productivity and late-mature. To improve these points along with line breeding, high nutritious roughage should be given and through this nutrition of the cattle will be improved and the productivity and reproductive performance will be raised.

TABLE G-21 COST ESTIMATION OF THE FEED MILL PLANT

(Unit: Kyat Thousand)

<u>Description</u>	<u>F.C</u>	<u>L.C</u>	<u>Total</u>
Equipments	22,983	-	22,983
Buildings	-	859	859
<u>Sub-total (1)</u>	<u>22,983</u>	<u>859</u>	<u>23,842</u>
Engineering Fee etc. (15% of 1)	3,447	129	3,576
Preparation (10% of 1)	2,298	86	2,384
Tax and Transportation (50% of 1)	11,492	-	11,492
<u>Total (2)</u>	<u>40,220</u>	<u>1,074</u>	<u>41,294</u>
Contingency (3) (15% of 2)	6,033	161	6,194
Price Escalation ^{1/} (19% of 2 + 3)	8,788	235	9,023
<u>Grand Total</u>	<u>55,041</u>	<u>1,470</u>	<u>56,511</u>

Note: ^{1/} 8% per annum
See Appendix G-3, page 1.

The LDMC has an intention to make the area on the right side of the Irrawaddy River the animal husbandry promotion area by developing grassland, because this area is topographically favoured. Padaung selected as the Project Area of this project is on the right side of the Irrawaddy River and suitable for grassland development.

According to this project 2,000 ac for grazing pasture and 250 ac for seed production pasture are to be established. Approximately 2,500 head of cattle can be grazed with this grassland and approximately 500 lbs of seed can be collected in the 250 ac of seed production pasture. It will be possible to make simple improvement of grassland from wild grass land around villages by distributing seeds. This pasture land development project has the role of a pilot.

Cost estimation is shown in table G-22.

V.4. Pig and Poultry Breeding Center Improve Project

As mentioned in V.2., in Henzada the LDMC farm has already established and pig sheds and personnel houses are completed. The LDMC intends to keep 50 sows and 10 sires and make the farm a breeding station in the delta zone. However, pigs have not been introduced yet and the farm is left unused. The completed facilities are as follows:

Sow house	:	4
Manager house:		2
Office	:	1
Store	:	1
Laborer house:		11
Pump house	:	1

TABLE G-22 COST ESTIMATION OF PASTURE LAND DEVELOPMENT PROJECT

(Unit: Kyat Thousand)

<u>Description</u>	<u>F.C</u>	<u>L.C</u>	<u>Total</u>
Pasture Land Development	-	1,300	1,300
Pasture Managing Machinery	980	-	980
Buildings	-	410	410
Engineering Fee etc.	147	257	404
Preparation	98	171	269
Tax and Transportation	490	-	490
<u>Total (1)</u>	<u>1,715</u>	<u>2,138</u>	<u>3,853</u>
Contingency (2) (15% of 1)	257	321	578
Price Escalation ^{1/} (17% of 1 + 2)	335	418	753
<u>Grand Total</u>	<u>2,307</u>	<u>2,877</u>	<u>5,184</u>

Note: ^{1/} 8% per annum
See Appendix G-3, Page 2.

Since Henzada occupies the central position of 25 townships in the delta zone in poultry and pig enterprises and a railway station is also there, traffic conditions are good. Therefore, it is very convenient to carry on the farm.

As the acreage is 35 ac (14 ha) on the whole and still considerable space is left, the feed mill plant stated in V.1. will be built there. Chick houses are also newly built. The farm will be made as a breeding station of chicks and piglets.

Chicks and piglets produced there are expected as 900 chicks and 400 piglets. Equipments and cost estimation are shown in Table G-23.

V.5. Cattle Breeding Center Project

In Burma cattle are kept for the purpose of draught. It is a practice to castrate a young bull at the age of about 1 year. Consequently, more than 90% are bullocks. A bull with a superior conformation is also castrated and this results in scarcity of superior calves.

Cattle are kept in a group together with male and female without considering line. Therefore, this makes difficult to proliferate with efficient bulls.

Since the requirement number of draught cattle in the Survey Area is satisfied, it should be more important to strive for the level-up of the ability of each cow and ox than to secure the number of head. Therefore, it should be considered to select cow and bull with good quality and to improve through artificial insemination using them. Cost estimation is shown in Table G-24.

TABLE G-23 COST ESTIMATION OF BREEDING CENTER PROJECT

(Unit: Kyat Thousand)

<u>Description</u>	<u>F.C</u>	<u>L.C</u>	<u>Total</u>
Poultry Shed	-	522	522
Breeder (Chicken)	230	-	230
Equipments	1,330	-	1,330
Breeder (Pig)	180	-	180
Engineering Fee etc.	261	78	339
Preparation	174	52	226
Tax and Transportation	870	-	870
<u>Total (1)</u>	<u>3,045</u>	<u>652</u>	<u>3,697</u>
Contingency (2) (15% of 1)	457	98	555
Price Escalation ^{1/} (13% of 1+2)	455	98	553
<u>Grand Total</u>	<u>3,957</u>	<u>848</u>	<u>4,805</u>

Note: ^{1/} 8% per annum

See Appendix G-3, page 3.

TABLE G-24 COST ESTIMATION OF CATTLE BREEDING CENTER PROJECT

(Unit: Kyat Thousand)

<u>Description</u>	<u>F.C</u>	<u>L.C</u>	<u>Total</u>
Pasture Land Establishment	-	36	36
Buildings	-	365	365
Pasture Land Managing Machinery	579	-	579
Equipments for Frozen Semen	700	-	700
Engineering Fee etc. Preparation	192	69	261
Tax and Transportation	128	46	174
	640	-	640
<u>Total (1)</u>	<u>2,239</u>	<u>576</u>	<u>2,815</u>
Contingency (2) (15% of 1)	336	121	457
Price Escalation ^{1/} (16% of 1+2)	412	112	524
<u>Grand Total</u>	<u>2,987</u>	<u>809</u>	<u>3,796</u>

Note: 1/ 8% per annum

See Appendix G-3, page 4.

The center is to be located in Prome which is favored with roads and railways and also which has a favorable condition of even land good for establishment of pasture land.

In Prome a national cattle breeding and research center is to be founded with fund 50% of which is from UNDP. The center is to produce seeds of grass and perform rotational grazing in the 3,000 ac of 10,000 ac, also produce calves by natural mating and distribute them to 9 townships of the left side of the Irrawaddy River. The center will be completed in March of 1980. Therefore, in near future calves will be produced at the national cattle breeding and research center by the frozen semen produced at this center.

V.6. Slaughter house Project

There are about 500 slaughter houses in Burma, two of which are in Rangoon, and any of them do not have modernized equipment and unsanitary aspect is seen at every slaughter house because water is not used much.

At Rangoon Slaughter house 267,293 head of large livestock are slaughtered in 1977-78 and that is about 20% of the livestock slaughtered in the whole country as shown in Table G-20. It began to have some bad effect to the circumference because facilities are not complete and it is located within Rangoon City.

Now Burma exports duck, chicken and hide and skin, and has an intention to export pork and beef in the near future. For that purpose, it is necessary to have a check system for disease livestock, completed sanitary facilities and a refrigerator.

The purposed slaughter house is to be built at Hmawbi about 40 km far from Rangoon City and have favorable conditions of transport either by railway or truck.

In Burma as some people do not eat pork for religious reason equipment should be arranged to treat cattle, pigs and poultry separately.

A tanning plant, processing plant for gelatin and other by-product and sewage disposal facility should be attached to this slaughter house.

Treatment capacity per day is estimated 1,500 head that is one and half times of the present in order to cope with increases in demand and exports in the future.

Required equipments and cost are shown in table G-25.

Table G-25 COST ESTIMATION OF SLAUGHTER HOUSE PROJECT

(Unit: Kyat Thousand)			
<u>Description</u>	<u>F.C</u>	<u>L.C</u>	<u>Total</u>
Equipments	25,100	-	25,100
Buildings	-	6,055	6,055
Engineering Fee etc.	3,765	908	4,673
Preparation	2,510	606	3,116
Tax and Transportation	12,550	-	12,550
<u>Total (1)</u>	<u>43,925</u>	<u>7,569</u>	<u>51,494</u>
Contingency (2) (15% of 1)	6,589	1,135	7,724
Price Escalation ^{1/} (20% of 1+2)	10,103	1,741	11,844
<u>Grand Total</u>	<u>60,617</u>	<u>10,445</u>	<u>71,062</u>

Note: 1/ 8% per annum

See Appendix G-3, page 5.

V.7. Silage Supply Project

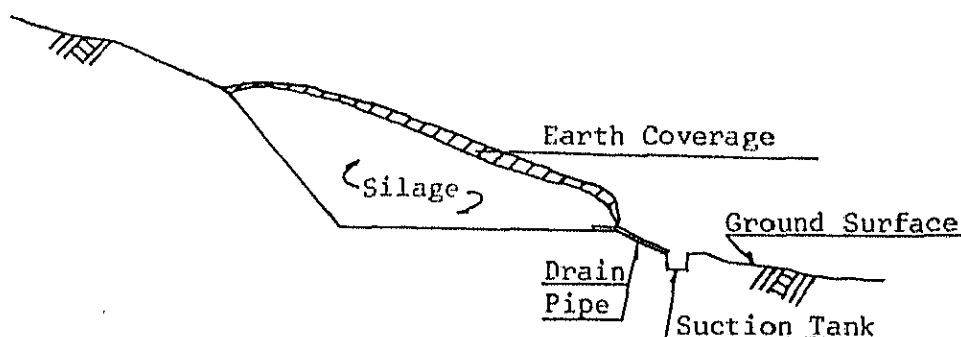
In Burma wild grass is used during the rainy season but in the dry season as the wild grass runs dry cattle sometimes happen to die. In the dry season straw is the main feedstuff but it lacks nutrition and also calcium and phosphate are short. It is desirable that straw is used as supplementary feed to roughage. When straw is used as the main feed cattle cannot display reproductivity and productive ability.

The VAHD is promoting the spread of silage to provide against the lack of feedstuff during the dry season by distributing a booklet with contents as shown in Appendix G-3; but it has not been popularized yet. Its importance should be recognized thoroughly. Silage is prepared without less influence by the weather than hay and its nutritive value is left more.

Accordingly, in this project a trench silo with a scale corresponding to the head of keeping cattle at each village is to be built and to store wild grass, straw and maize stems. One month after stuffed they are used as silage.

A trench silo can be built as follows according to where it is built:

- (1) In case of a silo at the hillside and on the slope;



(2) In case of a silo on the level land;

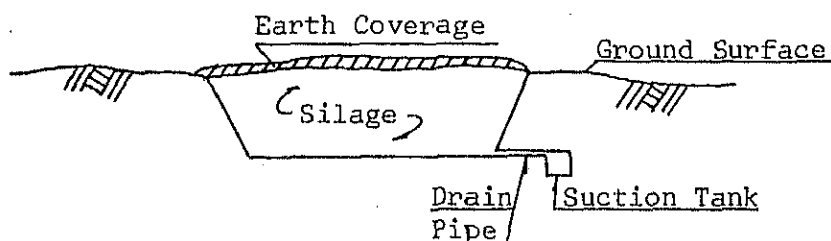


FIGURE G-4 TRENCH SILO

As silage is made through lactic acid fermentation better silage will be got if molasses are added to the raw material such as wild grass, straw and maize as shown in the booklet. After the materials are stuffed it should be pressed by foot and weighed down with soil put on. On the silo a roof is necessary to keep off the rain.

On the two silos which are illustrated on Figure G-4, one numbered (1) on the slope is more convenient.

As an average village in Burma keeps approximately 150 head of cattle, scale of the silo is estimated as follows:

Average weight : 350 kg/head
 TDN requirement/day: 4.4 kg/head
 TDN of silage : supposing 15%
 Silage use period : 6 months (October - April)

$$\frac{4.4 \text{ kg} \times 180 \text{ day}}{0.15} \times 150 \text{ head} = 792\text{t}$$

Weight of silage of 1m³: 700 kg 792 ÷ 0.7 = 1,131 m³

Depth of silo 2m : 1,131 ÷ 2 = 566 m²

Seven hundred and ninety-two tons of silage is necessary for 150 head of cattle and area of 566 m² and depth of 2 m of silo is required.

In the dry season not only the silage but concentrate such as rice bran and oil cake are desirable to be given.

Cost estimation is shown in table G-26.

TABLE G-26 COST ESTIMATION OF SILO PER VILLAGE

(Unit: Kyat Thousand)

<u>Description</u>	<u>F.C</u>	<u>L.C</u>	<u>Total</u>
Digging	-	45	45
Materials	-	50	50
Engineering Fee etc.	-	14	14
Preparation	-	10	10
<u>Total (1)</u>	<u>-</u>	<u>119</u>	<u>119</u>
Contingency (2) (15% of 1)	-	18	18
Price Escalation (20% of 1 + 2)	-	27	27
<u>Grand Total</u>	<u>-</u>	<u>164</u>	<u>164</u>

When this Project will be done in 9076 villages in the Survey Area, this facility will be constructed in each village. Therefore, total Project Cost is as follows;

$$164 \times 10^3 \text{Kyats} \times 9,076 \text{villages} = 1,488,464 \times 10^3 \text{Kyats}$$

say 1,500 Million Kyat.

Note: See Appendix G-3, page 6.

APPENDICES

APPENDIX G-1 NUMBER OF LIVESTOCK AND POULTRY BY YEAR

(Unit: Heads)

No.	Township	1972-73					1973-74						
		Cattle	Buffaloes	Goats	Pigs	Fowls	Ducks	Cattle	Buffaloes	Goats	Pigs	Fowls	Ducks
1.	Paukkaung	22,672	2,933	135	2,712	72,109	2,730	22,799	2,956	164	2,661	72,256	2,744
2.	Prome	30,296	1,276	213	1,616	58,488	7,983	30,498	1,309	282	1,529	54,978	7,391
3.	Padaung	37,694	1,048	89	3,579	73,878	4,801	37,833	1,092	118	3,439	73,088	4,687
4.	Paungée	24,375	1,748	310	5,979	98,524	9,842	24,344	1,732	266	5,594	93,902	9,085
5.	Thegon	26,307	2,900	213	3,887	60,186	9,484	26,051	2,943	190	3,559	52,650	8,325
6.	Sweadaung	27,844	495	161	1,740	17,275	6,919	28,011	518	171	1,786	17,467	7,059
7.	Nattalin	32,318	2,088	149	8,526	189,651	24,061	33,566	2,120	149	8,856	186,308	24,290
8.	Zigon	13,245	476	222	5,978	90,924	18,296	14,023	511	230	6,082	91,338	17,579
9.	Cyobingauk	26,379	1,106	323	5,917	94,711	14,761	27,480	1,105	302	5,911	128,345	15,133
10.	Monyo	27,854	2,512	283	5,031	92,943	12,222	27,935	2,565	318	4,790	90,980	12,489
11.	Okpo	26,959	2,205	854	9,386	94,159	15,250	27,388	2,247	783	9,043	95,386	15,547
12.	Minhla	28,802	1,565	513	6,862	133,146	12,179	28,993	1,709	370	5,701	132,120	11,130
13.	Letpadan	39,323	1,274	527	12,345	149,740	26,372	40,637	1,410	433	11,294	157,947	21,091
14.	Tharrawaddy	23,631	1,705	461	6,088	72,188	8,764	22,921	1,562	394	5,760	83,340	7,978
	Sub-total	387,699	23,331	4,453	79,646	1,297,922	173,664	392,479	23,779	4,190	76,005	1,350,155	164,528
15.	Taikkyi	45,288	6,982	736	22,294	258,307	26,246	45,625	6,850	710	21,465	252,312	22,487
16.	Hlegu	34,727	18,753	579	13,798	173,267	26,809	34,712	18,573	673	11,991	164,054	21,614
17.	Hmadwbi	18,474	8,365	534	11,435	262,515	66,680	19,776	8,784	572	11,477	266,520	48,018
	Sub-total	98,489	34,100	1,849	47,517	694,089	119,735	100,113	34,207	1,955	44,933	682,866	92,119
18.	Kyangin	19,867	735	286	3,080	34,294	5,714	20,148	770	281	3,151	35,174	6,044
19.	Nyanaung	49,718	1,460	851	8,208	62,250	13,372	49,737	1,463	869	8,226	63,220	14,062
20.	Ingabu	67,609	2,675	892	15,480	85,210	36,082	67,545	2,558	845	13,873	108,518	36,688
21.	Lemyethna	22,207	738	490	8,295	66,285	14,623	22,402	757	496	8,590	68,655	13,915
22.	Yegyi	34,972	718	287	6,947	61,211	10,453	36,066	822	351	8,518	89,504	11,794
23.	Henzada	48,388	143	470	18,090	154,419	21,079	48,395	144	478	17,911	154,535	21,099
24.	Zalun	31,183	175	1,224	7,806	93,985	14,295	31,339	214	1,205	8,282	97,869	13,744
25.	Kyonpyaw	34,502	1,335	976	10,393	41,131	27,673	35,292	1,383	900	11,166	54,988	25,642
26.	Danubyu	36,364	1,505	605	13,363	145,064	18,972	36,668	1,517	445	13,883	147,973	19,645
	Sub-total	344,810	9,484	6,081	91,660	743,849	162,263	347,592	9,628	5,870	94,000	820,449	163,633
	Total	830,998	66,915	12,363	218,323	2,735,860	455,612	840,184	67,614	12,015	214,938	2,833,500	420,240

Source: Veterinary and Animal Husbandry Department

APPENDIX G-1 NUMBER OF LIVESTOCK AND POULTRY BY YEAR (Cont'd)

No.	Township	1974-75											1975-76										
		Cattle	Buffaloes	Goats	Pigs	Fowls	Ducks	Cattle	Buffaloes	Goats	Pigs	Fowls	Ducks	Cattle	Buffaloes	Goats	Pigs	Fowls	Ducks				
1.	Faukkaung	22,925	2,980	192	2,610	72,463	2,757	23,199	3,009	227	2,541	71,620	2,778	30,701	1,342	350	1,441	51,467	6,799	353	1,503	54,913	8,324
2.	Prome	37,972	1,135	146	3,299	72,297	4,573	38,446	1,123	300	3,071	69,120	2,944	24,314	1,716	262	5,209	89,279	8,323	245	5,634	99,834	9,865
3.	Paungde	25,795	2,987	166	3,231	45,113	7,165	27,655	3,035	139	3,525	82,608	9,398	28,179	540	181	1,832	17,659	7,169	185	1,866	18,503	7,473
4.	Sweadaung	34,813	2,152	149	9,186	182,965	24,519	35,484	2,221	213	2,497	187,461	25,816	34,813	1,853	228	4,540	131,095	19,681	240	6,105	133,834	11,133
5.	Nattalin	14,800	546	239	6,186	91,752	16,883	15,353	600	259	4,284	80,171	16,048	28,581	1,003	281	5,906	161,979	15,506	239	5,809	147,414	14,045
6.	Zigon	28,581	1,103	281	4,549	89,017	12,755	30,432	2,801	398	6,157	110,738	18,659	28,015	2,618	353	4,549	89,017	12,755	398	6,157	110,738	18,659
7.	Gyobingauk	27,816	2,290	712	8,700	96,614	15,844	25,416	2,272	572	4,240	105,722	16,973	29,184	1,853	228	4,540	131,095	19,681	240	6,105	133,834	11,133
8.	Minhla	41,952	1,545	340	10,243	166,154	15,619	41,653	1,244	347	10,220	145,675	15,893	41,952	1,545	340	10,243	166,154	15,619	347	10,220	145,675	15,893
9.	Letpagan	22,211	1,420	328	5,432	54,493	7,192	29,767	1,638	318	5,374	90,467	7,301	22,211	1,420	328	5,432	54,493	7,192	318	5,374	90,467	7,301
10.	Tharrawaddy	397,258	24,227	3,927	72,364	1,562,347	155,391	112,725	24,463	4,095	74,317	1,398,300	165,650	45,962	5,718	684	20,636	246,318	18,724	624	14,909	238,072	16,928
11.	Taikkyi	34,697	18,393	767	10,194	154,841	16,414	34,732	18,438	612	9,374	130,137	12,210	34,697	18,393	767	10,194	154,841	16,414	612	9,374	130,137	12,210
12.	Hlegu	21,077	9,202	609	11,520	270,525	26,356	20,567	9,244	931	11,221	260,789	31,241	21,077	9,202	609	11,520	270,525	26,356	931	11,221	260,789	31,241
13.	Hmaabi	101,736	34,313	2,060	42,350	671,694	64,504	100,592	33,911	2,167	35,554	648,999	60,419	101,736	34,313	2,060	42,350	671,694	64,504	2,167	35,554	648,999	60,419
14.	Sub-total	20,429	805	276	3,221	36,055	6,374	20,775	1,117	325	3,543	39,318	6,562	20,429	805	276	3,221	36,055	6,374	325	3,543	39,318	6,562
15.	Kyangin	49,756	1,466	888	8,246	64,190	14,752	22,619	1,190	834	7,637	65,333	14,531	49,756	1,466	888	8,246	64,190	14,752	834	7,637	65,333	14,531
16.	Myanaung	67,481	2,440	798	12,266	131,827	37,295	67,533	2,629	1,209	12,771	173,874	33,334	67,481	2,440	798	12,266	131,827	37,295	1,209	12,771	173,874	33,334
17.	Ingabu	22,596	777	503	8,884	71,024	13,268	22,894	720	530	9,300	70,320	15,362	22,596	777	503	8,884	71,024	13,268	530	9,300	70,320	15,362
18.	Lemethna	37,161	925	414	10,889	117,744	13,131	36,504	787	298	10,286	112,371	12,572	37,161	925	414	10,889	117,744	13,131	298	10,286	112,371	12,572
19.	YeEyi	48,403	146	486	17,732	154,776	21,120	48,496	149	514	17,751	161,496	21,919	48,403	146	486	17,732	154,776	21,120	514	17,751	161,496	21,919
20.	Henzada	31,494	253	1,186	8,758	101,753	13,192	31,212	247	954	8,076	86,509	11,017	31,494	253	1,186	8,758	101,753	13,192	954	8,076	86,509	11,017
21.	Zalun	36,083	1,431	824	11,939	68,845	25,611	36,615	1,175	657	17,724	116,434	28,761	36,083	1,431	824	11,939	68,845	25,611	657	17,724	116,434	28,761
22.	Kyongpyaw	36,972	1,529	284	14,404	150,883	20,315	35,967	1,301	259	12,751	136,668	15,052	36,972	1,529	284	14,404	150,883	20,315	259	12,751	136,668	15,052
23.	Danabyu	350,375	9,772	5,659	96,339	697,149	165,003	532,616	9,515	5,580	95,541	462,223	158,960	350,375	9,772	5,659	96,339	697,149	165,003	5,580	95,541	462,223	158,960
24.	Sub-total	849,369	68,312	11,666	211,043	2,441,146	304,693	1,815,433	67,489	11,842	204,620	2,009,521	345,049	849,369	68,312	11,666	211,043	2,441,146	304,693	11,842	204,620	2,009,521	345,049
25.	Total	849,369	68,312	11,666	211,043	2,441,146	304,693	1,815,433	67,489	11,842	204,620	2,009,521	345,049	849,369	68,312	11,666	211,043	2,441,146	304,693	11,842	204,620	2,009,521	345,049

Source: Veterinary and Animal Husbandry Department

APPENDIX G-1 NUMBER OF LIVESTOCK AND POULTRY BY YEAR (Cont'd.)

(Unit: Head.)

No.	Township	1976-77										1977-78												
		Cattle	Buffaloes	Goats	Pigs	Fowls	Ducks	Cattle	Buffaloes	Goats	Pigs	Fowls	Ducks	Cattle	Buffaloes	Goats	Pigs	Fowls	Ducks					
1.	Paukaung	23,419	3,022	171	2,584	68,399	2,835	26,287	4,192	170	5,334	10,301	32,442	1,554	370	2,608	47,051	10,401	338	3,007	66,501	7,420		
2.	Prone	38,626	991	407	5,926	62,537	6,251	38,737	1,345	337	8,166	8,469	26,158	1,830	290	9,938	115,332	21,551	190	13,254	97,031	17,320		
3.	Padaung	28,583	3,087	153	3,935	63,398	8,396	30,064	3,094	169	4,305	11,115	28,420	578	213	2,018	19,730	8,013	231	2,039	19,832	8,122		
4.	Paungde	36,690	2,401	168	10,431	211,627	31,593	37,668	2,474	173	10,951	33,200	15,395	623	256	4,637	82,230	16,135	366	4,596	79,814	15,657		
5.	Thegon	28,643	959	442	6,083	152,259	24,818	29,120	913	445	6,912	26,339	30,642	2,862	435	6,222	108,039	22,667	426	7,743	126,387	34,416		
6.	Monyo	28,482	2,204	410	9,330	114,630	18,666	30,135	2,453	381	13,086	18,764	30,464	1,872	253	10,435	139,241	16,806	271	10,840	146,021	17,409		
7.	Minhla	42,179	1,650	404	10,373	142,880	19,639	43,244	1,738	445	13,070	20,235	29,961	1,618	321	5,706	99,733	7,784	317	7,385	89,987	10,794		
8.	Letpadan	29,961	1,618	321	5,706	99,733	7,784	30,083	1,587	317	7,385	10,794	420,104	25,251	4,293	90,326	1,437,156	216,055	436,022	1,513,424	239,561			
9.	Tharrawaddy	46,061	6,256	648	16,050	220,020	19,476	16,556	6,530	595	13,809	22,348	33,265	15,613	500	8,909	132,486	9,333	3,945	6,253	132,840	9,653		
10.	Hlegu	4,032	9,443	933	11,673	329,444	34,892	10,922	9,434	871	11,736	36,174	83,358	31,312	2,081	36,632	681,950	63,701	31,423	22,217	700,520	68,175		
11.	Sub-total	21,716	1,106	323	3,630	39,473	7,009	22,275	1,133	333	3,775	7,876	49,332	1,178	870	7,837	66,928	14,560	656	7,960	68,425	13,895		
12.	Kyaugin	57,489	2,657	1,422	15,405	175,121	33,363	67,618	2,729	1,407	15,516	33,352	26,194	982	589	9,578	66,001	21,411	603	9,639	66,001	21,461		
13.	Myanaung	37,422	919	422	10,153	119,110	16,051	43,746	1,268	454	27,492	17,503	50,426	1,75	398	22,050	189,469	22,676	51,772	205	98,928	22,872		
14.	Ingsabu	31,709	253	690	10,314	98,210	10,944	32,521	259	708	10,738	11,552	37,389	1,272	764	18,741	129,444	29,487	40,268	1,481	136,094	29,753		
15.	Lemyethna	38,742	1,374	233	17,937	158,506	18,038	40,336	1,561	365	19,819	20,775	350,419	9,916	5,711	115,645	1,042,262	173,339	375,467	11,070	953,544	179,039		
16.	Yegyi	863,881	66,479	12,085	242,603	3,161,368	453,295	842,912	60,208	11,861	292,050	486,775	Sub-total	863,881	66,479	12,085	242,603	3,161,368	453,295	842,912	60,208	11,861	292,050	486,775
17.	Henzada	37,389	1,272	764	18,741	129,444	29,487	40,268	1,481	136,094	29,753	Total	863,881	66,479	12,085	242,603	3,161,368	453,295	842,912	60,208	11,861	292,050	486,775	
18.	Zalun	38,742	1,374	233	17,937	158,506	18,038	40,336	1,561	365	19,819	20,775	Sub-total	350,419	9,916	5,711	115,645	1,042,262	173,339	375,467	11,070	953,544	179,039	
19.	Kyonyaw	350,419	9,916	5,711	115,645	1,042,262	173,339	375,467	11,070	953,544	179,039	Total	863,881	66,479	12,085	242,603	3,161,368	453,295	842,912	60,208	11,861	292,050	486,775	
20.	Danubyu	350,419	9,916	5,711	115,645	1,042,262	173,339	375,467	11,070	953,544	179,039	Sub-total	350,419	9,916	5,711	115,645	1,042,262	173,339	375,467	11,070	953,544	179,039		
21.	Sub-total	863,881	66,479	12,085	242,603	3,161,368	453,295	842,912	60,208	11,861	292,050	486,775	Total	863,881	66,479	12,085	242,603	3,161,368	453,295	842,912	60,208	11,861	292,050	486,775

Source: Veterinary and Animal Husbandry Department

APPENDIX G-1 NUMBER OF LIVESTOCK AND POULTRY BY YEAR (Cont'd)

No.	Township	1978-79					(Unit: Heads)
		Cattle	Buffaloes	Goats	Pigs	Fowls	Ducks
1.	Paukkaung	26,581	4,215	177	5,363	58,904	10,472
2.	Prome	34,903	1,465	475	3,113	69,707	8,561
3.	Padaung	38,905	1,159	359	6,600	76,438	8,474
4.	Paungde	29,298	1,623	152	10,955	99,525	15,186
5.	Thegon	30,752	3,176	177	4,405	70,336	12,246
6.	Shwedaung	28,332	589	239	1,878	19,663	8,010
7.	Nattalin	38,549	2,526	178	11,287	231,105	34,740
8.	Zigon	16,048	421	80	6,357	106,894	13,355
9.	Gyobingauk	29,340	884	433	8,281	157,932	26,581
10.	Monyo	33,031	3,338	555	10,906	144,331	41,715
11.	Okpo	31,011	2,855	823	17,584	191,853	25,011
12.	Minhla	32,133	1,968	286	17,388	153,036	27,965
13.	Letpadan	44,302	1,796	563	13,515	154,624	20,779
14.	Tharrawaddy	30,196	1,598	242	7,267	87,094	9,948
	<u>Sub-total</u>	<u>443,381</u>	<u>27,613</u>	<u>4,739</u>	<u>124,899</u>	<u>1,621,442</u>	<u>263,043</u>
15.	Taikkyi	45,442	6,287	654	15,288	216,088	17,770
16.	Hlegu	34,617	16,293	680	13,624	135,935	16,268
17.	Hmawbi	20,961	8,333	375	16,276	211,825	69,373
	<u>Sub-total</u>	<u>101,020</u>	<u>30,913</u>	<u>1,709</u>	<u>45,188</u>	<u>563,848</u>	<u>103,411</u>
18.	Kyangin	23,015	1,165	367	4,020	41,575	8,275
19.	Myanaung	50,572	1,444	678	8,067	68,927	14,103
20.	Ingabu	67,805	2,792	1,365	15,812	176,385	33,503
21.	Lemyethna	27,146	1,209	528	9,422	65,866	21,200
22.	Yegyí	46,288	1,318	743	27,085	88,726	19,374
23.	Henzada	51,657	155	344	21,352	174,828	21,776
24.	Zalun	32,498	226	701	11,092	105,524	11,625
25.	Kyonpyaw	39,763	1,490	882	19,588	136,273	29,956
26.	Danubyu	41,473	1,484	386	17,786	150,334	16,998
	<u>Sub-total</u>	<u>380,217</u>	<u>11,283</u>	<u>5,994</u>	<u>134,224</u>	<u>1,008,438</u>	<u>176,810</u>
	<u>Total</u>	<u>924,618</u>	<u>69,809</u>	<u>12,442</u>	<u>304,311</u>	<u>3,193,728</u>	<u>543,264</u>

Source: Veterinary and Animal Husbandry Department

APPENDIX G-2 NUMBER OF DRAUGHT CATTLE

(Unit: Heads)

No. Township	1972-73		1973-74		1974-75		1975-76	
	Cattle	Buffaloes	Cattle	Buffaloes	Cattle	Buffaloes	Cattle	Buffaloes
1. Paukaung	22,136	2,915	22,258	2,938	22,381	2,962	22,531	2,991
2. Prome	25,968	1,196	26,094	1,233	26,220	1,270	26,244	1,317
3. Padaung	36,957	1,003	37,960	1,044	37,125	1,084	37,440	1,060
4. Paungde	23,674	1,739	23,639	1,725	23,605	1,711	24,440	1,776
5. Thegon	25,463	2,900	28,363	2,943	24,908	2,985	26,817	3,029
6. Swedaung	26,761	371	27,132	390	27,076	409	27,139	419
7. Nattalin	31,315	2,084	33,399	2,117	34,564	2,150	35,184	2,219
8. Zigon	13,060	438	13,498	479	14,582	520	14,931	569
9. Gyobingauk	25,914	1,039	26,953	1,054	27,890	1,069	27,788	857
10. Monyo	27,720	2,509	30,229	2,582	27,887	2,615	30,198	2,801
11. Okpo	26,253	2,205	28,458	2,247	27,090	2,290	27,664	2,272
12. Minhia	28,375	1,518	29,893	1,687	28,757	1,816	29,203	1,817
13. Letpadan	38,329	1,243	39,572	1,383	41,289	1,522	40,980	1,216
14. Tharrawaddy	22,721	1,675	24,396	1,543	21,508	1,412	29,100	1,632
Sub-total	374,646	22,835	397,481	23,325	384,880	23,815	399,659	23,975
15. Taikkyi	37,488	6,765	44,253	6,844	37,841	6,524	36,703	6,056
16. Hlegu	32,087	17,506	49,593	17,323	31,602	17,139	31,649	17,179
17. Hmawbi	14,719	7,833	15,619	8,275	16,520	8,718	16,320	8,800
Sub-total	84,294	32,104	116,398	32,242	85,963	32,381	84,678	32,035
18. Kyangin	19,437	733	20,170	925	20,324	1,117	20,324	1,117
19. Myanaung	48,945	1,460	50,405	1,325	21,817	1,190	48,702	1,190
20. Ingabu	67,256	2,675	69,931	2,652	67,167	2,629	67,167	2,629
21. Lemyethna	21,826	738	22,564	729	22,530	720	22,530	720
22. Yegyvi	34,499	706	35,205	738	36,218	769	36,218	769
23. Henzada	48,011	139	48,150	143	48,156	147	48,156	147
24. Zaiun	30,814	159	30,973	197	30,823	235	30,823	235
25. Kyonpyaw	34,502	1,335	35,837	1,255	36,615	1,175	36,615	1,175
26. Danubyu	35,933	1,481	37,414	1,357	35,587	1,234	35,587	1,234
Sub-total	341,223	9,426	350,649	9,321	319,237	9,216	346,122	9,216
Total	801,832	64,365	864,528	64,888	790,080	65,412	830,459	65,226

Source: Veterinary and Animal Husbandry Department

APPENDIX G-2 NUMBER OF DRAUGHT CATTLE (Cont'd)

(Unit: Heads)

No.	Township	1976-77		1977-78		1978-79	
		Cattle	Buffaloes	Total	Cattle	Buffaloes	Total
1.	Paukkaung	22,615	3,016	25,631	25,316	4,185	29,501
2.	Prone	27,874	1,476	29,350	31,311	1,361	32,672
3.	Padaung	37,630	980	38,610	37,743	1,332	39,075
4.	Paungde	25,312	1,812	27,124	26,346	1,592	27,938
5.	Thegon	27,717	3,079	30,796	29,115	3,086	32,201
6.	Swedaung	27,278	432	27,710	27,754	457	28,211
7.	Nattalin	36,322	2,401	38,723	37,311	2,474	39,785
8.	Zigon	15,014	608	15,622	15,288	617	15,905
9.	Gyobingauk	27,942	934	28,876	28,398	886	29,284
10.	Monyo	30,344	2,862	33,206	32,102	3,064	35,166
11.	Okpo	27,776	2,204	29,980	29,336	2,453	31,789
12.	Minhla	29,986	1,835	31,821	30,795	1,881	32,676
13.	Letpadan	41,440	1,619	43,059	42,431	1,688	44,119
14.	Tharrawaddy	29,195	1,610	30,805	29,254	1,574	30,828
	<u>Sub-total</u>	<u>406,445</u>	<u>24,868</u>	<u>431,313</u>	<u>422,500</u>	<u>26,670</u>	<u>449,170</u>
15.	Taikkyi	37,716	6,062	43,778	38,004	6,334	44,338
16.	Hlegu	30,883	14,525	45,408	31,613	15,143	46,756
17.	Hmawbi	16,718	8,975	25,693	16,648	8,937	25,585
	<u>Sub-total</u>	<u>85,317</u>	<u>29,562</u>	<u>114,879</u>	<u>86,265</u>	<u>30,414</u>	<u>116,679</u>
18.	Kyangin	21,272	1,106	22,378	21,645	1,133	22,778
19.	Myanaung	48,511	1,178	49,689	49,377	1,432	50,809
20.	Ingbu	67,112	2,657	69,769	67,225	2,729	69,954
21.	Lemyethna	25,832	982	26,814	26,342	1,002	27,344
22.	Yegyi	37,021	899	37,920	43,248	1,243	44,491
23.	Henzada	49,920	175	50,095	51,251	205	51,456
24.	Zalun	31,495	247	31,742	32,295	252	32,547
25.	Kyanpyaw	37,389	1,272	38,661	40,193	1,464	41,647
26.	Danubyu	38,680	1,359	40,039	40,014	1,471	41,485
	<u>Sub-total</u>	<u>357,232</u>	<u>9,875</u>	<u>367,107</u>	<u>371,580</u>	<u>10,931</u>	<u>382,511</u>
	<u>Total</u>	<u>848,994</u>	<u>64,305</u>	<u>913,299</u>	<u>880,345</u>	<u>68,015</u>	<u>948,360</u>

Source: Veterinary and Animal Husbandry Department

Appendix G-3 COST ESTIMATIONS

COST ESTIMATION OF THE FEED MILL PLANT

<u>Description</u>	<u>Quantity</u>	(Unit: Kyat Thousand)		
		<u>F.C</u>	<u>L.C</u>	<u>Total</u>
Silo Equipments	1 set	4,159	-	4,159
Grinding Equipments	"	2,067	-	2,067
Non-grinding Equipments	"	302	-	302
Pre-mixing Equipments	"	485	-	485
Ingredient Mixing Equipments	"	2,969	-	2,969
Molasses Annexing Equipments	"	571	-	571
Fat Annexing Equipments	"	557	-	557
Product Handing Equipments	"	1,881	-	1,881
Peleting Equipments	"	1,538	-	1,538
Boiler	"	317	-	317
Compressors	"	200	-	200
Electric Equipments	"	5,052	-	5,052
Motors	"	582	-	582
Ducts, Supports, Chutes	"	1,703	-	1,703
Trucks	10	600	-	600
Garage	160 m ²	-	35	35
Manager House	100 m ²	-	20	20
Building for Plant	2,010 m ²	-	804	804
<u>Sub-total (1)</u>		<u>22,983</u>	<u>859</u>	<u>23,842</u>
Engineering Fee etc.	(15% of 1)	3,447	129	3,576
Preparation	(10% of 1)	2,298	86	2,384
Tax and Transportation	(50% of 1)	11,492	-	11,492
<u>Total (2)</u>		<u>40,220</u>	<u>1,074</u>	<u>41,294</u>
Contingency (3)	(15% of 2)	6,033	161	6,194
Price Escalation ^{1/}	(19% of 2+3)	8,788	235	9,023
<u>Grand Total</u>		<u>55,041</u>	<u>1,470</u>	<u>56,511</u>

Note: ^{1/} 8% per annum

COST ESTIMATION OF PASTURE LAND DEVELOPMENT PROJECT

(Unit: Kyat Thousand)

<u>Description</u>	<u>Quantity</u>	<u>F.C</u>	<u>L.C</u>	<u>Total</u>
Pasture Land Development	2,250 ^{acres}	-	1,300	1,300
Trucktor	2	125	-	125
Forage Harvester	2	200	-	200
Mower	2	65	-	65
Broadcaster	3	15	-	15
Hay Conditioner	3	90	-	90
Tedder Rake	4	75	-	75
Wagon	5	250	-	250
Hay Loader	2	60	-	60
Hay Baler	2	100	-	100
Garage	300 m ²	-	60	60
Cattle Shed	1,650 m ²	-	330	330
Manager House	100 m ²	-	20	20
<u>Sub-total (1)</u>		<u>980</u>	<u>1,710</u>	<u>2,690</u>
Engineering Fee etc.	(15% of 1)	147	257	404
Preparation	(10% of 1)	98	171	269
Tax and Transportation	(50% of 1)	490	-	490
<u>Total (2)</u>		<u>1,715</u>	<u>2,138</u>	<u>3,853</u>
Contingency (3)	(15% of 2)	257	321	578
Price Escalation ^{1/}	(17% of 2+3)	335	418	753
<u>Grand Total</u>		<u>2,307</u>	<u>2,877</u>	<u>5,184</u>

Note: 1/ 8% per annum

COST ESTIMATION OF BREEDING CENTER PROEJCT

(Unit: Kyat Thousand)

<u>Description</u>	<u>Quantity</u>	<u>F.C</u>	<u>L.C</u>	<u>Total</u>
Hatchery House	1	-	30	30
Brooding House	3	-	150	150
Grower House	3	-	180	180
Breeder House	3	-	162	162
Breeder	Male 200 Female 1,500	230	-	230
Equipments in Poultry House	1 set	670	-	670
Equipments in Pig Shed	"	660	-	660
Sow	50	150	-	150
Sire	10	30	-	30
<u>Sub-total (1)</u>		<u>1,740</u>	<u>522</u>	<u>2,262</u>
Engineering Fee etc. (15% of 1)		261	78	339
Preparation (10% of 1)		174	52	226
Tax and Transportation (50% of 1)		870	-	870
<u>Total</u>		<u>3,045</u>	<u>652</u>	<u>3,697</u>
Contingency (3)	(15% of 2)	457	98	555
Price Escalation ^{1/}	(13% fo 2+3)	455	98	553
<u>Grand Total</u>		<u>3,957</u>	<u>848</u>	<u>4,805</u>

Note: 1/ 8% per annum

COST ESTIMATION OF CATTLE BREEDING CENTER PROJECT

(Unit: Kyat Thousand)

<u>Description</u>	<u>Quantity</u>	<u>F.C</u>	<u>L.C</u>	<u>Total</u>
Pasture Land Establishment	60 ^{acres}	-	36	36
Cattle Shed	2	-	60	60
Hay Warehouse	1	-	125	125
Treatment House	1	-	60	60
Manager House	3	-	180	180
Tructor	2	125	-	125
Forage Harvester	2	200	-	200
Mower	2	65	-	65
Broadcaster	2	10	-	10
Hay conditioner	1	30	-	30
Tedder Rake	1	19	-	19
Hay Loader	1	30	-	30
Facilities for Making Frozen Semen	2 set	700	-	700
Wagon	2	100	-	100
<u>Sub-total (1)</u>		<u>1,279</u>	<u>461</u>	<u>1,740</u>
Engineering Fee etc.	(15% of 1)	192	69	261
Preparation	(10% of 1)	128	46	174
Tax and Transportation	(50% of 1)	640	-	640
<u>Total (2)</u>		<u>2,239</u>	<u>576</u>	<u>2,815</u>
Contingency (3)	(15% of 2)	336	121	457
Price Escalation ^{1/}	(16% of 2+3)	412	112	524
<u>Grand Total</u>		<u>2,987</u>	<u>809</u>	<u>3,796</u>

Note: ^{1/} 8% per annum

COST ESTIMATION OF SLAUGHTER HOUSE PROJECT

(Unit: Kyat Thousand)

<u>Description</u>	<u>Quantity</u>	<u>F.C</u>	<u>L.C</u>	<u>Total</u>
Equipments	1 set	15,000	-	15,000
Burner	"	2,700	-	2,700
Sewage Clarifi Cation Facility	"	7,400	-	7,400
Building for Plant	15,000 m	-	6,000	6,000
Garage	160 m	-	35	35
Manager House	100	-	20	20
<u>Sub-total (1)</u>		<u>25,100</u>	<u>7,055</u>	<u>31,155</u>
Engineering Fee etc. (15% of 1)		3,765	908	4,673
Preparation (10% of 1)		2,510	606	3,116
Tax and Transportation (50% of 1)		12,550	-	12,550
<u>Total (2)</u>		<u>43,925</u>	<u>7,569</u>	<u>51,494</u>
Contingency (3) (15% of 2)		6,589	1,135	7,724
Price Escalation ^{1/} (20% of 2+3)		10,103	1,741	11,844
<u>Grand Total</u>		<u>60,617</u>	<u>10,445</u>	<u>71,062</u>

Note: 1/ 8% of annum

COST ESTIMATION OF SILO PER VILLAGE

(Unit: Kyat Thousand)

<u>Description</u>	<u>Quantity</u>	<u>F.C</u>	<u>L.C</u>	<u>Total</u>
Digging	1,218 m ³	-	45	45
Concrete	270 m ³	-	20	20
Cieling		-	30	30
<u>Sub-total (1)</u>		<u>-</u>	<u>95</u>	<u>95</u>
Engineering Fee etc. (15% of 1)		-	14	14
Preparation (10% of 1)		-	10	10
<u>Total (2)</u>		<u>-</u>	<u>119</u>	<u>119</u>
Contingency (3)	(15% of 2)	-	18	18
Price Escalation ^{1/}	(20% of 2+3)	-	27	27
<u>Grand Total</u>		<u>-</u>	<u>164</u>	<u>164</u>

Note: 1/ 8% per annum

APPENDIX G-4 PICKLED GRASS

Need to make pickled grass

1. Burma it rains for six months and then for next six months there is no rain.
2. In June it started to rain, the grass start to grow, but it is unsuitable for cattle and buffalo to eat.
3. July to November there are plenty of grass and more than cow and buffalo can eat.
4. In December grass become old and unsuitable for animals to eat.
5. January to May grass are scarce so animals get in trouble and even die of hunger.
6. After rainy season hay and dry grass are collected but they are vitamin-less and danger from fire.
7. Near the ending the rainy season surplus grass and maize stalks are made into pickled grass, it may become enough vitamin food for animals in winter and summer season.

Colleting the grass

8. In september when the grass start budding and flowering it is full of vitamin and is time for collection.
9. Grass or bean stalk or maize stalk should be cut 4 inches or 6 inches.
10. Grass cutters with lever arms which can easily be installed in the village by this mean grass can be cut very quickly.
11. When the grass has to be dryed a little before storage as green grass will not in preservation.
12. When over dryed the grass has to be sprinkled with little water to make preservation easy.

Making of under ground tank

13. Pickling in under ground tank is cheap.
14. To prevent seepage of water into the tank high ground and sandy soil should be selected.
15. Rounding the upper edges of the under ground tank will keep away air lock.
16. The size of tank must be made according the number of animals and the amount of surplus grass.
17. Length 10 ft by breadth 5 ft depth 6 ft, tank can preserve 6 tons of pickled grass.
18. If there is difficulty in constructing under ground tank, then tanks above ground made of wood or concrete can be constructed.

How to make pickled grass

1. The out grass should laid in 6 inches layers and stamped until compact.
2. For tank of 10 ft x 5 ft x 6 ft, every 6 inch layer of grass should to sprinkle with molasses of toddy palm or suger cane molasses, ferment quicks and animal like it betjer.
3. Fill the tank layer after layer compacted until full.
4. The legs should be kept clean throughly otherwise dirty legs can over ferment the grass and odour not good.
5. Cut grass should be spread in layer as far as possible.
6. when the tank is full, it should be covered by plastic sheet and the edges stayed down by bricks or stones. The sheet should be horizontal.
7. On top of the plastic sheet an earth fill of one ft, should be made and small drain dug around the tank to prevent water from getting into the tank.
8. If there is rain when making the pickled grass the tank should have temporary roof over the tank.
9. In making bean stalk pickle, sugar ferment water or toddy palm juice should be increased.

Feeding

1. After two months of pickling, it can be used for feeding.
2. Cattle from middle age to old should be fed 3 viss to 1 viss per day.
3. Pickled grass has about 75% not less vitamin in than the flesh grass, it has much more vitamin than hay.
4. A good pickled grass is very much liked by the cattle.

Help

If you want to make pickled grass ask your rearest Veterinary and Animal Husbandry Department for advice and help will come to your door step.

JICA