Table 5.4.1 QPs' Income (Part I)

QP	Season A			Season B		
	%HHs selling	Sale amount		%HHs selling	Sale amount	
		Range	Average		Range	Average
QP1	67%	450 - 75200	12,571	67%	1200 - 76000	29,017
QP2	50%	1,500 - 310,050	65,092	100%	5,000 - 240,000	38,933
QP3	89%	10,500 - 160,000	50,188	89%	21,000 - 155,000	91,625
QP4	56%	8,000 - 75,000	34,020	89%	8,000 - 75,000	24,106

Source: Interview Results by JICA Study Team, 2006

Table 5.4.2 QPs' Income (Part II)

QP	Season C			Annual seasonal crops		
	%HHs selling	Sale amount		%HHs Selling	Sale amount	
		Range	Average		Range	Average
QP1	0%	-	0	83%	3,000 - 132,200	33,270
QP2	42%	5,500 - 400,000	93,600	100%	6,500 - 550,000	110,479
QP3	11%	-	30,000	89%	48,000 - 315,000	145,563
QP4	22%	-	16,000	89%	12,000 - 165,000	49,369

Source: Interview Results by JICA Study Team, 2006

Table 5.4.3 QPs' Income (Part III)

QP	Permanent crops			Agriculture		
	%HHs selling	Sale amount		%HHs selling	Sale amount	
		Range	Average		Range	Average
QP1	39%	2,400 - 52,000	21,129	39%	5,000 - 204,000	40,434
QP2	33%	7,300 - 18,500	10,450	42%	12,700 - 550,050	120,929
QP3	44%	4,500 - 66,000	32,000	67%	10,000 - 420,000	157,333
QP4	56%	1,500 - 230,000	57,780	67%	13,500 - 395,000	85,481

Source: Interview Results by JICA Study Team, 2006

Table 5.4.4 QPs' Income (Part IV)

QP	Livestock			Off-farm		
	%HHs selling	Sale amount		%HHs earning	Money received	
		Range	Average		Range	Average
QP1	39%	3,000 - 180,000	39%	78%	10,500 - 274,000	54,464
QP2	42%	2,400 - 244,500	42%	83%	5,000 - 96,000	28,200
QP3	67%	2,000 - 109,000	67%	78%	12,000 - 600,000	142,857
QP4	67%	15,000 - 120,000	67%	56%	3,500 - 619,000	147,700

Source: Interview Results by JICA Study Team, 2006

Table 5.4.5 Total Annual Income by QP

QP	Total		
	%HHs selling	Money received	
		Range	Average
QP1	94%	12,000 - 406,200	103,791
QP2	100%	26,700 - 575,870	163,106
QP3	100%	60,000 - 806,100	301,144
QP4	100%	9,000 - 1,032,000	191,928

Source: Interview Results by JICA Study Team, 2006

Table 5.4.6 Expenditure (Part I)

QPs	Agricultural Inputs and Tools							
	Seeds		Fertilizers		Agrochemicals		Tools	
	% HHs buying	Expenditure	% HHs buying	Expenditure	% HHs buying	Expenditure	% HHs buying	Expenditure
QP1	44%	4,725	0%	0	17%	9,333	67%	4,325
QP2	58%	3,371	17%	12,600	42%	40,200	75%	10,489
QP3	56%	9,560	11%	1,600	44%	3,275	67%	6,629
QP4	67%	2,957	0%	0	22%	14,100	67%	3,000

Source: Interview Results by JICA Study Team, 2006

Table 5.4.7 Expenditure (Part II)

QPs	Subtotal inputs			Food		
	% HHs buying	Expenditure		% HHs buying	Expenditure	
		Range	Average		Range	Average
QP1	78%	1,500 – 20,400	7,847	100%	12,570 – 127,500	47,819
QP2	92%	1,200 – 208,300	31,291	100%	10,610 – 73,700	33,931
QP3	100%	2,800 – 28,400	12,100	100%	2,000 – 54,800	38,522
QP4	67%	3,150 – 29,000	10,657	100%	8,850 – 88,480	29,876

Source: Interview Results by JICA Study Team, 2006

Table 5.4.8 Expenditure (Final Part)

QPs	Non food items			TOTAL	
	% HHs buying	Expenditure		Expenditure	
		Range	Average	Range	Average
QP1	100%	5,530 – 377,200	71,677	18,100 - 474,950	126,831
QP2	100%	26,400 – 255,700	79,926	48,510 - 406,900	156,287
QP3	100%	28,500 – 472,650	98,550	51,900 - 520,850	149,261
QP4	100%	3,500 – 389,200	80,508	15,500 - 489,680	117,488

Source: Interview Results by JICA Study Team, 2006

Technical Training Program for Quick Project of the Modern Cow Distribution by RARDA-JICA

1. Training Schedule

(1) 3 days program from August 1st (Tue) to August 3rd (Thu), 2006

(2) Venue: MANDERA WOMAN Association's Building in Ntarama Sector

(3) Time: 8:00 am – 14:00 pm

2. Training Program

	Expert/RARDA	Training Subject	Time	Participation (Check)
August 1 (Tue) 8:00 – 14:00				
1	Dr. Rutagwenda Director General	-Opening Remarks -General Introduction of Modern Cow Program (including revolving mechanism of calf distribution)	30 min	○
2	M. Angelique	-General Introduction of Cow Management -Cowshed Construction -Animal Nutrient (general)	120 Min	○
3	Dr. Abel	-Animal Nutrient (Main)	90 min	○
4	Mr. Kagabo Andrew	-Animal Reproduction	60 min	○
August 2 (Wed) 8:00- 14:00				
5	Dr. Samson or Dr. Tomas or Dr. Christine	Animal Health	120 min	One of them
6	M. Angelique	-Formation of Association including marketing aspect	120 min	○
7	Mr. Kagabo Andrew	Artificial Insemination	60 min	○
August 3 (Thu) 8:00 – 14:00				
8	RARDA Staff	-Practical Training -Evaluation of on-going dairy farmer's management in the selected site	Half days	Select site for training -Either one of recipient house or some advanced dairy farm household

				within Ntarama area.

3. Provision of Training Module

Training program is based on the following modules:

(1) Finalization of Training Module

	Trainer	Subject	Module (Kinyaruwanda)
1	Dr. Rutagwenda	-Opening Remarks -General Introduction of Modern Cow Program (including revolving mechanism of calf distribution)	Verbal only
2	M. Angelique	-General Introduction of Cow Management -Cowshed Construction -Animal Nutrient (general)	By Module
		Formation of Association and Marketing aspect	Verbal only
3	Dr. Abel	-Modern Cow Management(Main)	By Module
4	Mr Kagabo Andrew	-Animal Reproduction -Artificial Insemination	By Module
5	RARDA Staff	Practical Training	Field Class in modern cow farmer's house

4. Study Tour

Site for making a study tour is within Ntarama sector or surrounding of Ntarama Sector because of easy for the recipients to follow up through his/her cow husbandry. Tentative site for study tour is as follows:

1) Mr. Murenzi/Modern Cow Keeper in Kanzenze (Tel: 08536602)
   Site Location: Near Kanzenze Cell Office.
   Total No of Modern Cow: 3 heads (two of them for lactation)
2) Dr. Jacques BIHOZAGARA (08483822)
   Site Location: Kanzenze

Total No of Cattle: 50 (?) for beef cattle fattening

3) Mr. David Rwiyamirira in Gahanga area (large scale of dairy farming) and his surrounding dairy farmers (small scale)

5. Sustainability of Modern Cow Distribution (Guidance to the Recipient)

1) Obligation of the Modern Cow Recipient

a. The recipient (Beneficiary 1st generation: B1) for crossbred cow should give the first female calf to the next recipient (B2). After this distribution, B1 could keep the calf born from the crossbred with B1.

b. B2 should deliver the first female calf born to the next recipient (Beneficiary 3rd generation: B3) and from 2nd calf, B2 could keep it.

c. B1, B2 and B3 and so on should join the concerned Farmer's Association.

2) Contribution of profit generated from sale of milk

a. Partial profit generated from sale of milk should be contributed to the fund managed by the concerned Farmer's Association so as to strengthen the association activity.

3) Responsibility of Sector/Cell Office

a. In order to promote formation of farmer's association, the officers concerned in the Sector and the Cell office should follow up and monitor to support the recipients groups in accordance with the Plan of Operation agreed upon between the Recipients and JICA under witness of Sector and Cell Officer, and the matter discussed during the technical training program about formation of farmer's association and distribution of 1st female calf to the next recipient.

6. Requesting to RARDA side

1) Finalization of Training Subjects to the recipients and assigned RARDA experts as per each training subject.

2) Coordination among RARDA experts assigned to the technical training program in terms of time allocation of each program, meeting point to go to Bugeseara during the training program (Aug 1 – 3, 2006).

3) Site selection of Study Tour within Ntarama and surrounding Ntarama Sector if you have recommending site apart from above section 4.

Technical Training Program for Quick Project of the Modern Cow Distribution by RARDA-JICA

1. Delivery of Construction Materials

(1) Materials provided by JICA for Cowshed

	Materials	Specification	Quantity/Recipient
1	Roofing Sheet	90 cm width x 3.0 m length	4 sheets
2	Sand	Coarse and fine mixed sand	0.83 m^3
3	Cement	50 kg／bag	3 bags
4	Nail	For wood and log	4 kg
5		For roofing sheet	1.5kg
6	Mesh net	Concrete floor (6 m^2 cowshed)	6m^2

(2) Best site to deliver

The materials could not be delivered to each recipient house, thus each group by cell should discuss and finalize the delivery point where is the most convenient and the six recipient could get by him/herself with wheelbarrow.

(3) Select one recipient for demonstration of the model cowshed construction in each cell group

Each recipient group by Cell has to select one recipient for construction of model cowshed assisted by JICA about provision of mason. Demonstration site for model cowshed construction should be good accessibility in group members.

2. Study Tour

Date for study tour should be decided among the recipients. Site for study tour is tentatively planed to visit Dr. Jacque and Dr. Peter's cattle farms within Kanzenze Cell.

3. Formation of Farmer's Association for the QP recipients by Cell

Sector officer (Agronomist) and each cell office should take initiative to support the recipient group by cell for formation of farmer's association.

REPORT ON THE TRAINING FOR THE COW RECIPIENTS

- **Period: From August 1st to August 3rd 2006**
- **Place: Ntarama Sector**

1. Introduction

The intensive training for modern cow recipients is in line with the series of workshops for modern cow recipients that were conducted both at Sector level and each cell level. The previous workshops mainly focused on recipient selection procedures and preconditions and the development of an operational plan. With participatory methods, the operational plan allowed JICA Study team and recipients to agree on the cost sharing as regards materials and work for the proper implementation of the modern cow introduction component. During the same workshops, RARDA experts were introducing to recipients on Cattle Management and Animal Health. As the time provided for was so limited, RARDA in conjunction with JICA Study Team sought to provide recipients, local vet-technicians as well as some supervisory local officers with deep technical training on modern cattle management. Thus, a three day intensive training was envisaged beginning August just prior cow distribution activity as it is reflected in the operational plan.

2. Participants

- 18 modern cow recipients from the three cells of Ntarama Sector
- 2 vet-technicians
- The Bugesera District Agronomist
- Ntarama Sector Agronomist
- Local officers

3.Training proceedings

(1) DAY 1

Kurita: introduced to participants the 3 days programs; participants were explained there would be 2 days of lectures and 1 day of open class at one nearby modern cow husbandry farmer for two or three hours.

Rutagwenda

The RARDA Director General who had come to officially open the training discussed on two issues. First he presented an overview of cattle management basing on participant feedback and explained the one Cow... Government Policy.

I. Introduction on modern husbandry adequacy

Questions / answers
What does mean modern husbandry

1. Care for the livestock
2. Keeping animal in the shed
3. Enough fodder crops

4. Animal health
5. Water

'As regard cattle management, we have many livestock but we don't have enough production. We have to buy powder milk, meaning current milk production is not yet sufficient.'

He observed farmers have to be sensitized on modern cow husbandry to have enough milk production. Modern cow produces at least 10-15liters/day.

Why our cows do not produce as much as a modern cow does? There are two factors:

- Cow breed and cow management

The animal is like a child/ it needs proper shelter, feeding, and veterinary services in order to produce more. Water and salt are also necessary.

II. Introduction to participants of the one Cow, one Household government policy.

'We have more than one million cattle but every Rwandan does not own a cattle.'

The government has to help each Rwandan acquire cattle. Benefits expected from this policy:

1. Milk ⟶ improve nutritional conditions especially for our children and get income
2. Calf ⟶ for revolving mechanisms to allow more cattle owners
3. Bull for sale and get money
4. Manure to fertilize soil and increase production.

The responsibility of the government is to allow the distribution of productive cattle breeds to the rest of the Rwandan population.
To do so, the first calf needs to be given out to the next person. And in the years to come, there will be a multiplication of livestock thanks to that scheme.

Requirements for the policy to succeed. :Dr Rutagwenda noted participants will have enough explanation during the training including formation of cooperatives and associations to allow the revolving mechanisms.

The ultimate goal of the policy : milk production and in the end poverty reduction.

Concluding his presentation, he thanked JICA's initiative to support the policy and noted that any donor's contribution to this policy is welcome to speed up the process. He officially opened the training

Mme Angelique

I. An overview on Modern cattle management

Pillars of modern cow husbandry

1. **Modern cow breed** (100% or 75%) to be in line with the national policy with the objective to increase milk production.

- Fresian :big size: 30- 501
- Jersey (few feeding stuff, middle sized and good milk: 15- 201

The national policy emphasizes on the above two breeds, but there are other breeds.

- Brownswiss, Sahiwal — Milk and meat production
- Bonsmara, Brahaman — Good meat production

Artificial insemination for all those breeds is available at RARDA so it is possible to renew and crossbreed the already existing Ankole breeds.

2. **Animal Health** (further detail cfr day 2 lesson)
3. **Animal feeding and care**: no feeding, no production
   Modern husbandry requires good preparation in terms of feeding stuff.
4. **Associative and cooperative** framework

Modern husbandry is demanding, individual cow keeper can not cope alone, better work within associative or cooperative framework.

Questions/Answers

Q1: Forming association is a good idea; can cow recipients form association with their neighbors who are candidate for the first generation.
A/: It's up to you to organize association with the assistance of the local leaders. You will decide what will be appropriate for you.

Q2: For the moment Jersey lives in Byumba in cold areas, would they resist in hot areas like Bugesera where there are a lot of mosquitoes.
A/: what is important is the management and animal health. Jersey breeds came from South Africa that sometimes gets hotter than Bugesera. Mosquitoes are prevented like flies through regular spraying.

Q3: Will the government get a cow for each citizen?
A/One cow... policy will extend on several years; this is not one year policy. And through the revolving mechanisms, it is expected that each household will get a cow and various donors will intervene as JICA has already done. It is up to the community to sustain the activity by providing new calves to those who do not own cattle yet.

Q4. Artificial insemination: who will pay for the technician?
A/ It is planned to train as many local technicians as possible: at least one per each Sector.

II. Cowshed

2.1. Benefits of the cowshed

-Cowshed contributes to the whole cattle management: disease prevention, feeding, increase of manure, general animal good health.
-Technology: Biogaz

-Animal security

2.2 . Challenges

Lack of construction means. But for the recipients within QP framework, this challenge is over since JICA will contribute to construction materials

2.3. Main parts of the cowshed

Questions/ Discussion

Where to construct the cowshed

Q1. Is it compulsory to construct the cowshed in your household since some of the recipients live in *imidugudu* without enough space?

A/It is not compulsory to construct the cowshed in your household but you have to construct in an area where you will be able to easily follow your cattle, access fodder crop and road for milk market.

Q2: mulching (laying grass on the floor)
It is good since it increases manure but you have not to use grasses that carry ticks.

2.4. Guidelines for cowshed construction

ANIMAL NUTRITION by Dr Abel

While constructing, bear in mind feeding area and water trough

1. Review of the expected production from the modern cow
   - Milk
   - Meat
   - Manure
   - Skins and hides

There are breeds for milk production and for meat production.

2. What is needed in order to achieve good production Cfr Angelique introduction to cattle management?

Two factors will contribute as to get a good production
- The cow keeper himself
- The cow breed but you will all get improved cow breed.

The presenter focuses on feeding, watering and salting.

As regard feeding stuff, they are divided into four categories following their nutritional properties.
Energy providing feeding stuff such as pennisetum and other cereal types,
Protein providing such as leguminous.
Protecting and disease preventing feeding stuff
And concentrates which are cross cutting feeding stuff.
He insisted that cow breeders should give salt to their animals since the salt from the factory contains some vitamins. Moreover, concentrates are very rich since they are a mixture of different types of food

namely maize, rice, wheat, soybean, and bone flour and cotton residues. The concentrates are recommended for pregnant cow, 2 months prior delivery and for lactating cows.

A container for watering cows needs to be availed in the cowshed
Cutting fodder crops before feeding the animal

The presenter observed that milking the newly born calf is very delicate since *Umuhondo*(yellow milk shortly after delivery) can kill the calf. It is recommended to measure the quantity of milk to be given to the calf. There are also some type of plants that can kill the cow such as cassava leaves, banana plant rhizome. Cow keeper should be careful.

Q1. How can the cow get ready to be milked if the calf has not prepared it.
A/ Apply some warm water to soften the cow breast.

REPRODUCTION by Kagabo Andrew

Reproduction process passes through 3 stages of cattle management.

1. The **calf** needs special care: Milking the calf with umuhondo (yellow milk shortly after delivery) since it contains antibodies and continue milking as per measures in accordance with the weight of the calf. After one month, provide fodder crops. After 6-8 months, provide the calf with bone strengthening food stuff.
   Requirement for feeding: fodder crops, water, vitamin and concentrates.
   For good growth of the calf: proper nutrition, disease control and overall cattle management.

2. **Heifer**: it gets fertilized from 2 years to 4 years. This time varies according to the breed and management. For example, *Friesian*: 18 months, *Jersey*: 15 months
   Ankole and *Sahiwal*: 3 yrs
   Towards delivery, the in calf heifer needs flushing by providing concentrate food.

3. **The cow:** The same management as the calf. Two months following delivery, fertilize the cow with artificial insemination, lactating period: 9 months. It is not recommended to fertilize the cow before a two month period as reproduction parts need to rest.

Q1 How to know a cow breed that will have good milk production?

Choosing an improved bull and checking the production capacity of the cow mother. The technician has to check all those aspects before recommending any cow breed.

Q2. When does the calf start to lick the salt block? The calf does it by itself when it needs it. The cow breeder has to avail it.

Q3. When does the calf start drinking water? At least in a two week period. Start using feeding bottle as water can go in the calf lungs.

Q4. Why does a heifer do not get fertilized whereas it has met with a bull or artificial insemination has been applied?

This is due to certain diseases, such as *Amakore*, it has to be treated. Also excessive cow fattening can lead to infertility.

Participants were skeptical as regard artificial insemination saying calves born out of artificial insemination get frequently sick but the trainer explained sickness is a result of poor cattle management and not artificial insemination.

Q5. Will we use the same chemical spraying for tics and flies?

There are chemicals that prevent both tics and flies: Decatix, Deltane and Cypermetrine

(2) DAY 2

I. Artificial Insemination by KAGABO Andrew

Two ways to fertilize the cow:
- A fertilizing bull
- Artificial insemination

Negative points for using an ox

Possible disease transmission
Not easy to get those two animals met
Not easy to keep the ox

Benefits for Artificial Insemination.

Cost effective
Easy to get the type of ox breed you need
Cow security, as meeting a very strong ox can damage the cow. Prevention from disease transmission.

Which type of cow to get fertilized?

Mature cow, ready to get fertilized. (18, 15 or 24 months)

What are the symptoms? Frequent urinations, climbing on the back of other cow
When a cow is ready in the morning, artificial insemination should be applied in the evening. When it is ready at 12:pm, artificial insemination should be applied the following morning.

Q1. When the cow gets ready in the morning and there is no technician around to apply artificial insemination the same day, is that possible to wait until the following morning?

No, do whatever possible to inform the technician on time to come to apply artificial insemination since the following day, the ovulation readiness will have stopped.

Benefits of inducing ovulation of the cow.

Several cows can give birth at the same time and provide enough milk production.

Q2.How can you know the insemination has been applied?
You know it within 21 days.

Q3. What if the first artificial insemination is not applied necessitating the second application? It would be money consuming for the cattle breeder.

When the first round does not apply, you are allowed to a second chance free of charges.

Q4. What to be done when Artificial Insemination does not apply after several trials?

The following are recommended for your cow?
- Proper nutrition
- Disease prevention and treatment
- Should know the proper time it is ready to be fertilized

Q5. Do all the cows have the same menstruation cycle (period) both exotic and Ankole cows?

A/ Yes: between 17-24 days.

Q6. Who is capable of applying artificial insemination?

When you know how to read and write, you can write to RARDA and you are trained and provided with appropriate materials.

Q7. Is there any special artificial insemination to induce giving birth to a female?

In Rwanda we apply artificial insemination, but we can not biologically determine whether the new born animal will be male or female.

Q8. There is a concern of unavailability of the artificial insemination technician; the latter allegedly do not get benefit since transportation to get to cow breeders is very expensive. Can RARDA assist us to get a vet- technician who would be available as often as he is needed by modern cow breeders?
You can write to RARDA chairman and then we would come to assist.

II. Animal health

Disease: Always check the animal to see whether there has been any change in its health conditions.

The presenter listed people involved in disease prevention
- breeders
- Vet-technicians
- Cattle traders
- Leaders (police,)

He presented symptoms and treatment and control of common cattle threatening diseases
Tic caused diseases such as *Urwuma, Karaso, Umusumagiro*
A special emphasis was put on tic control drugs.

Tsetse caused diseases including Trypanasomiasis (*Amashuyo*, congolence)

Virus caused diseases such as *uburenge (*FMD), *Muryamo, ibihara(* LSD), *Ibisazi (* Rabies)
NB. The presenter pointed out there is no treatment for FMD but its vaccination lasts 6 months.

Q1. Cows having been infected with FMD are consumed by people, can not they contaminate human beings. No the disease can not be transmitted through milk consumption.

Bacteria caused diseases such as *Ubutaka* caused by Bacillus anthracis, *Kagarura/* Black quarter (vaccination 2 years).
Amakore/ Brucellosis (not treatment but it can be vaccinated), *Ruhaha/*CBPP), worms, *igituntu/TB*

Nutritional related diseases such as Hypolcoemiax, *Ifumbi (*mastitis or Mammites)

Q2. Can you talk about the disease called *intandara (*Epheneral Fever)
An emphasis was put on severe diseases, *intandaro* disease disappears very quickly (only three days)
Q3. What about the disease called *Karonda.*
Karonda is a kind of worm, it is controlled and treated.

Q4. Before the war, cows used to have a disease called *'ibihushi'* and the medicinal plant called 'Umubirizi' mixed with salt was applied, is that a treatment? Yes.

Q5. Some newly born calves have a swollen navel, what to be done?
Apply penicillin (antibiotic)

Q6. Is it possible to vaccinate a calf under 6 months? Before that period, the bones of the calf are not strong enough, it is better to wait until six month period.

THE ROLE OF LIVESTOCK ASSOCIATIONS by Angelique

1. Benefits of being in associations

Collaboration for a joint activity.
Find together solution to common problems

2. What is the association?

People with common problems get together to find solution to their problems.

Common problems found in livestock

- Access drugs, vet-technicians, vaccination
- Market for the production
- Access feeding stuff
- Limited means
- Materials and equipments
- Less productive breeds

The association helps address all the above problems.

Q1. Who will select association members and recipients B2 for the second generation?
Local leaders (cell, sector and district levels) will give appropriate instructions for recipients B2.
Q2. If the cow gives birth to 2 male cows consecutively, what will be done to give the calf to the next farmer.
As long as you have not given yet the calf to the next farmer, you still owe to your neighbours (the community). Those male cows can be sold to buy the calf to be given to the next beneficiary. Anyway the association can find ways to manage the situation.

Q3. Can we call you (RARDA) so that you can assist us as regard association and artificial insemination?
Whenever you have a problem, let us know we will assist you? Anyway the issue will be handled within the association.

(3) DAY 3

I. Visit to Murenzi Farm

The third day was reserved for the practical session conducted at the modern cattle husbandry farmer Mr MURENZI. After making a round of the cowshed and the fodder crop plantation, RARDA experts namely Angelique and Dr Abel issued comments on Murenzi activities in an effort to help trainees learn the best practices.

I.1. Cowshed

A. Mme Angelique

- Murenzi and other modern cow breeders should clean the cowshed floor whenever the cow throws dung on it. Furthermore, the cowshed should be constructed in a way to allow the flow of urine.
It was observed there was a cow living with her calf in the same cubicle and Angelique advised participants that the calf should have its own cubicle.
The cowshed for Murenzi cows has some wooden feeding containers but it has no watering container. Angelique recommended having a watering container as well and availing water all the time as to get good production. She also said there is a need to let cows walk around and not just keep them in the cowshed only.

Q1. Is it allowed to lay grass on the floor?
It is better to use concrete but laying grass is also good

Q2. During the training, we have seen that cows should live in a small cubicle and here feeding containers are big, will they fit in a cowshed of dimensions you are recommending?

The feeding container should be smaller than those seen at Murenzi's.

Q3. Murenzi was asked whether there were no mosquitoes or flies in his cowshed and responded there was none.
B. Dr Abel

He asked Murenzi how many often he gives tablets to his cow per year and he responded 3 times a year.
He asked Murenzi how often he sprays tic prevention chemicals and the latter said twice per week, Dr Abel reminded participants in the training they should spray chemical as the treatment for a tic caused disease called *ikibagarira* cost 32000RwF and if not applied, the breeder looses his cow.
He further reminded to spray both exotic and Ankole cows in case of coexistence in the same cowshed. If the Ankole cow is not sprayed it contaminates the exotic one.

Dr Abel observed the living place for calves was not exposed to light and let know participants that when cows live in a dark place they become blind.

When the cow has got *Amakore* or *Igituntu* (TB) it should be killed since in case of *Amakore*, the cow gives birth a dead calf and as for TB the cow produces contaminated milk.

Cows should live in closed fence.

I. 2. Murenzi fodder crop field was visited

Pennisetum is like other crop, when not weeded and fertilised it does not grow. Dr Abel gave them instructions on how to plant pennisetum. He reminded both Murenzi and participants to follow government instructions as regard cattle management.

Dr Abel dissuaded participants to cut pennisetum while still very young. It should however not exceed 2 m otherwise it become tasteless for cows.

II. Material Distribution for cowshed Construction

Kanzenze

Sand will be transported up to KAYIRANGA Paul; other materials will be taken from Cell Office.
The model cowshed will be constructed at Mandege Anne Marie.

Kibungo

Sand will be transported up to two places namely Nyarunazi at MUKABISANGWA Marie and Nyamugari at MUGWANEZA Innocent's plot. Other materials will be taken from the cell office
The model cowshed will be constructed at MUKABISANGWA Marie.

Cyugaro

Sand will be transported up to two places namely at MURENZI Sylvestre and NZAMWITA Bosco.
The model cowshed will be constructed at KARAKE Jean Claude.

III. STUDY TOUR FOR COW RECIPIENTS

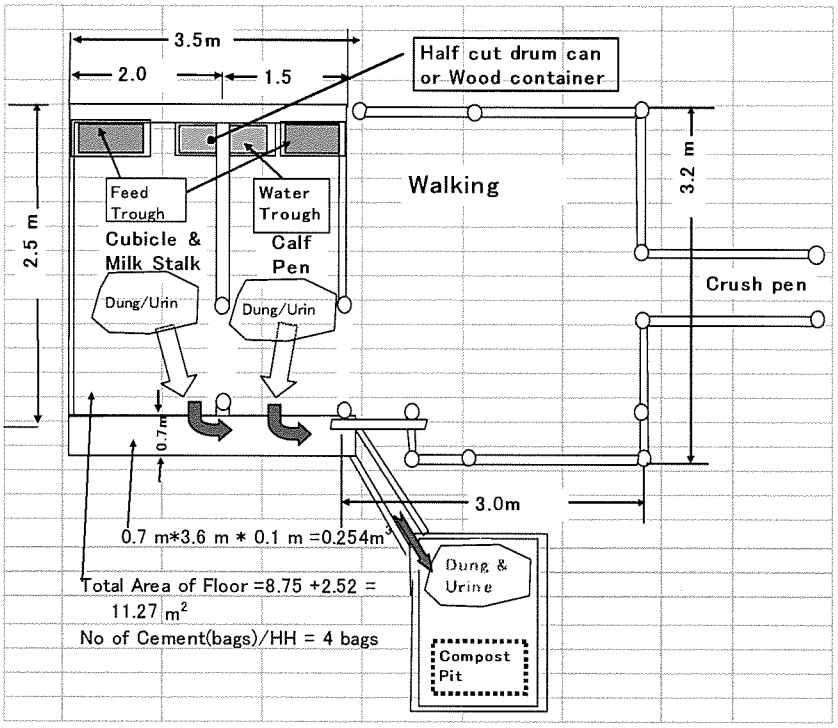
Study tour will be conducted at Dr Jacques BIHOZAGARA and Dr Peter's farms. The study tour is scheduled on Tuesday 08/08/2006. Participants will depart from Mandela Peace Village at 09:00 am

IV. GENERAL CONCLUSION ON THE TRAINING

JICA Team thanked participants for their participation in the 3 day workshop. Recipients were further asked if there was any unaddressed issue they would like to put forward.

Participants thanked JICA and RARDA for the fruitful training. However they raised the concern that roofing sheets are not sufficient. JICA team said they would first consider the model cowshed construction and then address the issue later.
JICA Team were requested to continue their close follow-up to the modern cow recipients.

To conclude, Dr Abel requested recipients to make a self evaluation to see whether they meet all preconditions to get a modern cow, those who are not ready will delay the reception of the modern cow.



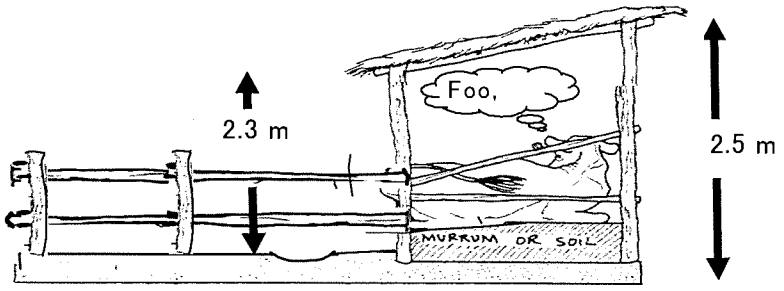


Figure 5.5.1 Prototype Cowshed

Delivery of Construction Materials for Cowshed to Each Household in Ntarama Sector

26-Oct-06

Cell		Beneficiary Name	Age	Sex	Cowshed		Delivery of Materials										Remark	Signature
					Progress	Construction Site	Coarse Sand (Wheelbarrows)		Fine Sand (Wheelbarrows)		Cement (Bags)		Roofing Sheet (3.0 m x 0.9 m)		Nails			
							Q'ty	Offload Site	Q'ty	Offload Sie	Q'ty	Offload Sie	Q'ty	Offload Site	Quantity	Offload Site		
Cyugaro	1	Anhimana Appelinaire (08439265)	57	M	wood, stone(at home) house under cons	different	6	Cowshed site	3	Cowshed site	4	Cowshed site	6	Cowshed site	15 cm 1.5 kg 12 cm 2.5 kg 10 cm 2.0 kg R/Nail 1.0 kg	Cowshed site	President Construction site with house under Cons	
	2	Kandamutsa Florence	47	F	Wood purchased but not carried yet, Stone OK,	different	6	House site	3	House site	4	House site	6	House site	15 cm 1.5 kg 12 cm 2.5 kg 10 cm 2.0 kg R/Nail 1.0 kg	House site	Vice President, with worker	
	3	Karake Jean Claude	25	M	Wood, Stone OK		6	House site	3	House site	4	House site	6	House site	15 cm 1.5 kg 12 cm 2.5 kg 10 cm 2.0 kg R/Nail 1.0 kg	House site	Secretary, poor access road	
	4	Mukasafari Marie	44	F	Wood/cut down in forest , stone OK		6	House site	3	House site	4	House site	6	House site	15 cm 1.5 kg 12 cm 2.5 kg 10 cm 2.0 kg R/Nail 1.0 kg	House site	Member (w/ water trough)	
	5	Nzamwita Jean Bosco	52	M	Wood/Stone OK,		6	House site	3	House site	4	House site	6	House site	15 cm 1.5 kg 12 cm 2.5 kg 10 cm 2.0 kg R/Nail 1.0 kg	House site	Member	
	6	Murenzi Sylvestre	47	M	wood cut down & need to carry out, Stone OK,		6	House site	3	House site	4	House site	6	House site	15 cm 1.5 kg 12 cm 2.5 kg 10 cm 2.0 kg R/Nail 1.0 kg	House site	Treasury (pit far from site)	
Kanzenze	1	Mukakayiru Enotha	42	F	wood, stone OK		6	House site	3	House site	4	House site	6	House site	15 cm 1.5 kg 12 cm 2.5 kg 10 cm 2.0 kg R/Nail 1.0 kg	House site	Treasury	
	2	Kayenamura Marcel (08560552)	36	M	wood OK, 3.5*6.7m	different	6	Cowshed site	3	Cowshed site	4	House site	6	House site	15 cm 1.5 kg 12 cm 2.5 kg 10 cm 2.0 kg R/Nail 1.0 kg	House site	President (with old cowshed)	
	3	Kayitavu Onesphore	49	M	Wood, stone OK		6	House site	3	House site	4	House site	6	House site	15 cm 1.5 kg 12 cm 2.5 kg 10 cm 2.0 kg R/Nail 1.0 kg	House site	Secretary	
	4	Uwantege Leonille	51	F	Under Cos		6	House site	3	House site	4	House site	6	House site	15 cm 1.5 kg 12 cm 2.5 kg 10 cm 2.0 kg R/Nail 1.0 kg	House site	member	
	5	Mandenge Anne Marie	56	F	Under Cos		6	House site	3	House site	4	House site	6	House site	15 cm 1.5 kg 12 cm 2.5 kg 10 cm 2.0 kg R/Nail 1.0 kg	House site	Vice President	
	6	Kayiranga Paul	47	M	Under Cos		6	House site	3	House site	4	House site	6	House site	15 cm 1.5 kg 12 cm 2.5 kg 10 cm 2.0 kg R/Nail 1.0 kg	House site	member	
Kibungo	1	Nyagaza Jean de Dieu	26	M	Wood, stone ok	different	6	Cowshed site	3	Cowshed site	4	House site	6	House site	15 cm 1.5 kg 12 cm 2.5 kg 10 cm 2.0 kg R/Nail 1.0 kg	House site	Vice President	
	2	Muguareza Inocent (08879304)	32	M	Under cons (3 Cub)		6	House site	3	House site	4	House site	6	House site	15 cm 1.5 kg 12 cm 2.5 kg 10 cm 2.0 kg R/Nail 1.0 kg	House site	Secretary	
	3	Rwamalina Ildephonse	46	M	stone-OK, wood in forest & not carried yet	different	6	Road site	3	Road site	4	House site	6	House site	15 cm 1.5 kg 12 cm 2.5 kg 10 cm 2.0 kg R/Nail 1.0 kg	House site	Member has two houses & works daytime in here	
	4	Rwigamba J. Pierre (0852267)	25	M	Wood, stone ok not carried yet	different, step mom house	6	stepmother house site	3	stepmother house site	4	Stepmother House site	6	stepmother house site	15 cm 1.5 kg 12 cm 2.5 kg 10 cm 2.0 kg R/Nail 1.0 kg	stepmother house site	Member(use Employed worker) See the Map	
	5	Mukabisangua Marie (08458080)	54	F	Under cons (2.5 *5.5)		6	House site	3	House site	4	House site	6	House site	15 cm 1.5 kg 12 cm 2.5 kg 10 cm 2.0 kg R/Nail 1.0 kg	House site	Treasury	
	6	Gakwisi Inocent (08461071)	36	M	Constructed (2 cubicls)	108,800 frw	6	House site	3	House site	4	House site	6	House site	15 cm 1.5 kg 12 cm 2.5 kg 10 cm 2.0 kg R/Nail 1.0 kg	House site	President (tomato plot in marshland)	

Note: As of October 26, 2006, BQ of R/sheet and nails has been adjusted based on final distribution of the materials.

Check Results on Progress of Model Farmers Preparation to Receive Modern Cows

1. Introduction

The quick project on modern cow distribution was started by focusing on Ntarama Sector in Bugesera District since late June, 2006 in collaboration with RARDA and JICA in accordance with a national policy "One Cow One Family". Selection of the 18 model farmers was jointly preceded by the Cell and Sector Offices concerned under the preconditions proposed by the RARDA -JICA joint Team. After selection of the candidates from each Cell, JICA-RARDA joint team organized a series of the workshops for the candidate farmers including formulation of plan of operation for this QP, technical training, study tours, and so on. Then construction of the model cowshed was implemented from mid-September to mid October under cost sharing system between the model farmers and JICA Study Team in terms of construction materials and labors. This short note reports on the progress of preparation for reception of modern cows by the model farmers as of beginning of November, 2006.

2. Method

Checking the progress of each model farmer (18 Model Farmers in the three Cells: See the attached map) was made from October 31 to November 3rd through interviewing by the RARDA-JICA joint team in terms of the following three categories based on the check list.

	Check category	Contents
1	Cowshed condition	Cowshed type, site of construction, cowshed, waling area, crush pen, water trough, feed trough, drain ditch and soil pit, compost pits
2	Fodder crop condition	Species, acreage, growth condition, distance to cowshed
3	Care of cow	Distance of fetching water point to cowshed, rainwater storage, key person in charge, numbers of helpers
4	Remark	Special attention if any

3. Results and Discussion

The monitoring results on progress of preparing cow reception as per each model farmer are shown in Table-1.

(1) Cowshed construction

Most of the model farmers have already constructed cowsheds with necessary walking area and crush pen. Further mandatory items like water and feed troughs are also progressing. Only the three model farmers in Cyugaro have already prepared both items at the checking time. The rest of 15 have either one of them or neither of them prepared so far, but by middle of this November, 2006 the remainder has committed to prepare them. As for crush pen, only the 4 model farmers are not equipped, consisting of 2 model farmers per each Kibungo and Kanzenze, respectively, because of

shortage of wood materials at construction time. However, the said 4 model farmers have also committed to prepare it by mid November, 2006.

(2) Fodder plant plot

Most of the information about fodder plant in Table attached is based on interview basis and not directly observed except some model farmers. Planting species among them consist of Pennisetum and Tripsacom, but the latter is cultivated by only one farmer. Thus the rest of 17 cultivate only Pennisetum. The size of fodder plant plot per household ranges from 600 m^2 to 10,000m^2 at average of 0.64 ha per household. No model farmer plants leguminous fodder crops. Distance to the plot from the cowshed varies with household, ranging from 10 m to 2000 m but most of the households have one to three plots in different distances and the majorities could access within 1 km distance.

(3) Rearing of Cow

1) Labor for rearing cow

Most of the model farmers have labor support to keep cross bred cow by employing one to three helpers or by obtaining family's support but only two woman-headed households have neither helper nor support from family, and both of them commit to employ helper when cow is delivered.

2) Water Resources

Fetching water for cow come from swamp and is essential work and distance to water point ranges from 300 m to 3500 m, with an average distance of 1.2 km among the 18 households. The three households in Cyugaro are located at far from the fetching water point like 3.5 km. However an installation of tap water pipeline by SOGER-SATOM is scheduled to be completed on February 2007. Therefore some of the model farmers could get benefit from the tap water pipeline in future.

(4) Other Issues

1) Keeping Ankole Cow together

Among the 18 model farmers, the two households have kept Ankole cows at the same farmyard even though those cattle are not belong to them, i.e, one of the cases in Kanzenze (No. 4) is belong to her son who lives in Kigali and is supposed to take them back so as to keep in other place under request made by his mother; the other case in Kanzenze (No.1) is belong to the Woman Association and shared among the members for benefit and keeping. However, the said model farmer is widow, working as a shop assistant of livestock pharmacy managed by the said woman association in Nyamata center. Sharing of keeping the said cow is not properly managed by the members, thus she has to mostly feed cow but no enough fodder crops. So the monitoring team requests her to discuss the said cow keeping with Association members to shift from her house to other house.
Both cases should be paid attention so as to be carried out smoothly as requested.

2) Unclear responsibility of keeping cow

One case is No. 4 in Kibungo Cell group. The said person works as primary school teacher, thus he could not take care of cow as full time. Moreover, the cowshed site in the field belongs to his stepmother's land and nobody lives beside of the cowshed. Further no neighbor knows the helper name who is supposed to live in the surrounding area of the cowshed area, explained by the said person.

3) Sick Person

Mr. Rwamahina, No.3 in the list of Kibungo Cell Group has suffered from sick (possibly chest pain and malaria) since two months ago and unable to work actively. Meanwhile his cowshed is constructed at his second house where his four kids live together headed by his eldest daughter and he will appoint his daughter as key person to rear cow but she did not join the 3 days intensive technical training. This case is also insecure of keeping cow properly with the above cases.

4. Conclusion

From the results of monitoring the model farmers in terms of their progress on preparation to receive modern cows, delivery of the modern cows to them is preferred to categorize them into two groups as follow.

(1) A group [12 model farmers]

Delivery of modern cow is possible as soon as the cowshed function discussed in 3-(1) is confirmed.

(2) B Group [4 model farmers]

Delivery of modern cow is possible after the concern about insecurity of caring modern cow is cleared enough.

Confirming the above two cases, next monitoring should be done mid-November based on the first filled monitoring results in Table-1.

5. Future Schedule

Figure-1 shows the further schedule of the said QP including other activities during the 2nd field survey in the 2006 FY. In accordance with this tentative schedule, delivery of modern cow is scheduled to be from mid-November to early December over A and B groups.

REPUBLIC OF RWANDA

MINISTRY OF
AGRICULTURE
AND ANIMAL RESOURCES

MINISITERI Y'UBUHINZI
N'UBWOROZI

RWANDA ANIMAL RESOURCES
DEVELOPMENT AUTHORITY
(RARDA)

DEPISTAGE BRUCELLIQUE

EXPEDITEUR : MUSONI PROTAIS

ORIGINE : UMUTARA

DATE D'ANALYSE : 09/11/2006

CODE LAB : 5[illegible]706

Nom de l'animal	Sexe	Age	Race	Brucella test
1. 3812	Femelle	Génisse	Croisé	Négatif
2. 3803	Femelle	Génisse	Croisé	Négatif
3. 3808	Femelle	Génisse	Croisé	Négatif
4. 3804	Femelle	Génisse	Croisé	Négatif
5. 3814	Femelle	Génisse	Croisé	Négatif
6. 3806	Femelle	Génisse	Croise	Négatif
7. 3829	Femelle	Génisse	Croisé	Négatif
8. 3818	Femelle	Génisse	Croisé	Négatif
9. 3905	Femelle	Génisse	Croisé	Négatif
10. 3819	Femelle	Génisse	Croisé	Négatif
11. 3827	Femelle	Génisse	Croisé	Négatif
12. 3817	Femelle	Génisse	Croisé	Négatif
13. 3811	Femelle	Génisse	Croisé	Négatif
14. 3813	Femelle	Génisse	Croisé	Négatif
15. 3810	Femelle	Génisse	Croisé	Négatif
16. 3809	Femelle	Génisse	Croisé	Négatif
17. 3826	Femelle	Génisse	Croisé	Négatif
18. 3807	Femelle	Génisse	Croisé	Négatif
19. 3822	Femelle	Génisse	Croisé	Négatif
20. 3824	Femelle	Génisse	Croisé	Négatif
21. 3820	Femelle	Génisse	Croisé	Négatif

Fait à Rubilizi, le 09/11/2006

Dr Isidore GAFARASI
Head of Veterinary Service Unit
P.O Samson Ntegeyibiza 24

RARDA PHONE 51142 BP 804 KIGALI

LISITE Y'INKA ZATORANYIJWE GUHABWA ABATURAGE
MU KARERE KA BUGESERA

N°	N° IHERENA	SEXE	AGE	UBWOKO	BRUCELLA TEST
1	3803	F	Ishashi yimye	AFri	Negative
2	3804	F	Ishashi yimye	AFri	Negative
3	3805	F	Ishashi nto	AFri	Negative
4	3806	F	Ishashi nto	AFri	Negative
5	3807	F	Ishashi yimye	AFri	Negative
6	3808	F	Ishashi yimye	AFri	Negative
7	3809	F	Ishashi yimye	AFri	Negative
8	3810	F	Ishashi yimye	AFri	Negative
9	3811	F	Ishashi yimye	AFri	Negative
10	3812	F	Ishashi yimye	AFri	Negative
11	3813	F	Ishashi yimye	AFri	Negative
12	3814	F	Ishashi yimye	AFri	Negative
13	3817	F	Ishashi yimye	AFri	Negative
14	3820	F	Ishashi yimye	AFri	Negative
15	3822	F	Ishashi yimye	AFri	Negative
16	3827	F	Ishashi yimye	AFri	Negative
17	3829	F	Ishashi yimye	AFri	Negative

N.B.: N'ubwo nta byimanyi bifite 75%Freisian, turabona hatangwa izi nyana zose zifite amaraso ya Freisian, kuko ubu zose zimye ku mfizi ya Freisian pure.

18 4190

Ishyo ry'inyana ririmo ziriya 17 twahisemo guhabwa abaturage mu karere ka Bugesera

Dr T. RUTAGWENDA

Workshop of Last Briefing for Modern Cow Distribution Quick Project

1. Date: December 5th, 2006 (Tuesday)

2. Place & Time: Woman Promotion Center in Ntarama Sector (8:30 - 13:00)

3. Participants

1) 18 Model Farmers
2) RARDA staff concerned
3) JICA Study Team
4) 3 Vet technicians from the 3 Cells
5) Cell Representative
6) Agronomist/District & Sector Offices
7) Dr. Jacques

4. Objectives

This workshop is aimed at making sure of the quick project of Modern cow distribution to launch smoothly in collaboration with concerned stakeholders consisting of the 18 Model Farmers, District office, Sector office, Cell office, vet-technicians, RARDA, and JICA Study Team.

5. Workshop Program Outline

1) Information of framework for the Cow delivery and overall implementation schedules
   - Heifer Delivery date and delivery ceremony
   - Handover Ceremony
   - Checking of pregnancy by RARDA after delivery
   - Monitoring and Evaluation
2) Delivery of Necessary Items (Sprayer:15 liter cap, acaricide: Decatix 100 ml bottle for 7 months:3.5 ml/each spray)
3) How to use sprayer and chemicals including group regulation for the sprayer about circulation order as per each Cell group
4) Important respects for cow keeping just after delivery
5) Vet-technician's Duty for the contract period (December to March)
   JICA will finance allowance of the vet-technicians for four months from December, 2006 to March, 2007, and after the period, the model farmer shall finance by him/herself if necessary for vet-technician's support.
   i. Cyugaro Cell: Mr. Hatangimbabazi Vedast
   ii. Kanzenze Cell: Mr. Ngarambe Celesitin
   iii. Kibungo Cell: Mr. Nizeyimana Fabien
6) Promotion of legalizing the Livestock Association supported by Sector
7) Selection of next generation to receive heifer by Cell Office concerned

- JICA does not support as from the 2nd generation in terms of materials support.

6. Program Schedule

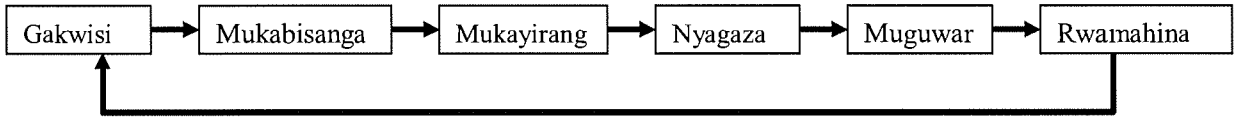
Expert/RARDA-JICA		Briefing Subject	Time	Remark
1	JICA Study Team	1.Information of cow delivery schedule and ceremony concerned 2. Delivery of necessary items 3.Overall implementing schedule of the QP	20 min	-Agenda for WS, -HH location map -Plan of Operation -TOR of Vet-technician & others -Hand sprayer (15 lt) -Acaricide 100 ml bottle
2	RARDA	1. How to use sprayer and chemicals including group regulation for the sprayer*1)	30 min	
3	RARDA	1. Important respects for cow keeping just after delivery	60 min	
Tea Break 15 min (soft drink with snack)				
4	RADA	1. Vet-technician's duty for the contract period (Dec-March)	30 min	
5	RARDA/Sector	Promotion of legalizing the livestock association	30 min	
6	RARDA/Cell	Selection of next generation to receive heifers from the 1st generation	30 min	
7	RARDA/JICA	Closing remark	5 min	

Remark:

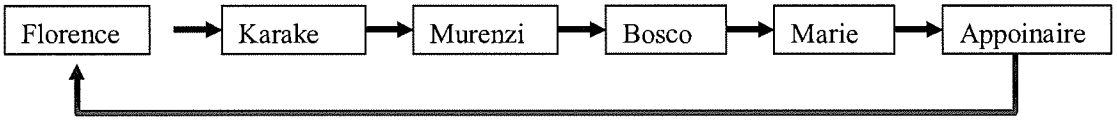
Program 2: Circulation of the sprayer among each Cell Group (Draft)

The circulation order of the sprayer in each Cell group is drafted as below. Discuss and decide the best circulation order among the members based on the draft idea below.

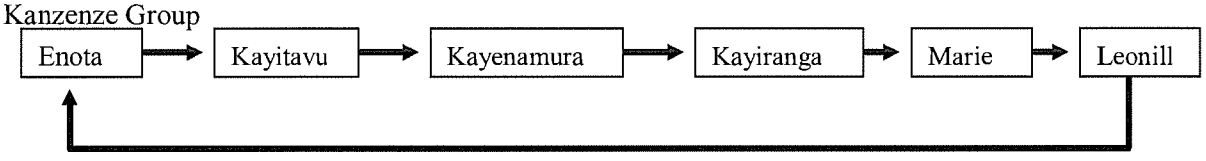
1. Kibungo Group



2. Cyugaro Group



3. Kanzenze Group



7. TOR for Vet-Technicians

Major job for the vet-technicians is as follows:

1) Visit twice a week to each model farmer in the Cell Group in order to keep heifer as good health condition through checking it and interviewing model farmers.
2) Make the fortnight report focusing on cow condition of each model farmer in the Cell group and submit to Sector Office. Contents of the fortnight report should include following subject as below:

   a. Feeding condition (appetite and type of feeding materials)
   b. Watering condition
   c. Cleaning of cowshed (urine and dung)
   d. Overall Health condition of heifer
   e. Any problems related to disease or abnormal symptoms should be immediately informed to RARDA by telephone as follows.
      Dr. Alphone (Mobile Telephone: 08506713) or
      Dr. Abel (Mobile Telephone: 08596253)

8. Responsibility of the Model Farmers

Major responsibilities of the 18 Model Farmers are as follow;

1) Take care of the modern cow properly with maximum effort based on the guideline delivered.
2) Call vet-technicians immediately and consult when abnormal symptom is observed in your cow.
3) Consult with Cell Office with any difficulties raised via rearing cow.
4) Help each other in each Cell Group by exchanging idea about better cow keeping via Farmer's Association.
5) Deliver the first female calf to the next generation model farmer when your cow deliver it in accordance with the Cell Office instruction.

9. Responsibility of the Cell Office

1) Select the next generations model farmer to receive heifer based on pregnant record in collaboration with vet-technician in the command area
2) Guide the model farmers in the problems arisen on rearing the modern cow.

10. Responsibility of the Sector Office

1) Monitoring regularly the progress of Modern Cow QP project and guide the model farmers if necessary.
2) Guide the model farmers in strengthening of the Farmer's Association
3) Guide the next generations model farmers who receive heifers from the previous generations in terms of cow rearing in collaboration with Cell/District offices and RARDA.

LESSON 1

IMPORTANT POINTS JUST AFTER DELIVERY OF COW

I. DESEASE CONTROL

1. Check every morning, daytime and evening cow's appetite, when it has lost appetite, it is symptom of illness.
2. Keep the animal in cowshed or the walking area

Importance of the cowshed: 1o shelter against rain, sun, wind since exposure can lead to respiratory infections (diseases)

2o Feed the cow clean food and avoid wasting away food. You should know when the animal is full, and nutritive elements of your feeding stuff.

3o increase production

4o Reduce the number of manpower

5o Prevent tics and epidemic diseases

3. Apply Akaricide every week in accordance with instructions
4. Provide worm control drugs once every three months in accordance with instructions:

- the cow size
- type of medicine. Ex: Vermitan tablets are not applied to newly fertilized cow; Nilzan tablets are not applied to an incalf cow over 7 months.

5. Vaccination during the epidemic outbreak or per request of RARDA
6. Artificial insemination or fertilizing to a bull checked for Amakore (STD)
7. Allow the cow spacing its births
8. Treatment of diseases: every farmer needs daily follow his/her animal and call for the vet technician, should he/she notice any abnormal symptom he/she is unable to manage. It is not advised to wait until the cow is in critical condition to call the vet technician. To always be equipped with first aid medical tools: Oxytetracyclin, penistrepto, tic control chemicals.
9. Keep the environment clean: hygiene is very important in disease control. Hygiene is needed:
    - In the cowshed: as soon as the cow throws dung, you should remove away dung before the cow spread it in the cowshed or on its body
    - On all materials

- For the cow keeper: While milking, he/she needs to wash first the Icebe wash hands using soap. This keeps the cow away for ifumbi and milk clean.

10. Good and clean food: poor nutrition is one of the major reasons that expose the animal to frequent illness.
11. A notebook to keep record of the animal health condition and production

II. PROPER FEEDING

1. Feeding the cow with 2/3 of cereals and 1/3 of leguminous and provide enough feeding staff
2. Concentrates during the milking period or 2 months prior delivery.
3. Licking blocks
4. Provide clean water at all time

LESSON TWO

HOW TO USE SPRAYER AND ACARICIDE

Demonstration will be made on how to technically use sprayer. As for its use, two people will be using it one day and an other couple of people the following day and so on until the sprayer has circulated among the whole group. The issue will be discussed in the meeting

December 4, 2006
Dr UKUNDIMANA Abel

Report on Workshop of Last Briefing for Modern Cow Distribution Quick Project

- **Venue:** Woman Promotion Center in Ntarama Sector
- **December 5, 2006**
- **Participants in the workshop(33 participants)**
  -18 model farmers
  -Dr Abel from RARDA
  -JICA Study Team (Mr Kurita)
  -Vet-technicians
  -Dr Bihozagara Jacques: Supplier of the cows
  -Musime Enock from JICA Office Rwanda
  -Sector Office/Acting Head, Agronomist
  -Cell Office representatives
  -Agronomist/Ntarama Sector Office
  -Agronomist/Bugesera District Office
  -WS facilitators and assistants

JICA Study Team started thanking model farmers for their participation in the workshop and for having constructed cowsheds.

The workshop was aimed at making sure of the quick project of Modern cow distribution to launch smoothly in collaboration with concerned stakeholders as well as distribution of materials.

1. **General information by Mr Kurita**
   - Cow distribution is due to December 7th, 2005
   - Handover ceremony for quick project of modern cow distribution will take place around between 20/12/-29/12/ 2006 depending on MINAGRI officers' availability.
   - Today (5/12/2006) JICA distributes sprayer and Acaricid, Decatix 100 ml bottle per each model farmer
   - Today we will determine off-loading sites
     Dr Abel asked models farmers to discuss and agree on convenient off-loading sites. He further requested to regularly pay visit as to learn from one another.
   - Today, farmers will randomly choose their heifer through a lottery (tombola) as per tagging number. Some farmers would pick up incalf heifers, others not but RARDA promised to come and check after one week which are not pregnant to apply artificial insemination.
   - Farmers agreed cows would be offloaded at different sites as per cell:

2. **Introduction of assigned Vet-technician per each cell**
   Mr Kurita introduced the following vet-technicians to model farmers:

   i. Cyugaro Cell: Mr. Hatangimbabazi Védaste
   ii. Kanzenze Cell: Mr. Ngarambe Célestin
   iii. Kibungo Cell: Mr. Nizeyimana Fabien

   Mr Kurita explained that those Vet-technicians will be supported by JICA in a four month period and by model farmers themselves after that period.

   Questions

Q1: There are Ankole cows roaming around in the street which are most of the case infected, will not contaminate our cows from the off loading to model farmers'homes?

→ Cows will be sprayed before and after delivery.

Q2: What would happen if an artificial insemination is applied and the heifer is not fertilized?

→ If the heifer becomes infertile, it is taken back to the supplier and replaced.

3. Briefing by Dr Abel

(1) Check every morning, daytime and evening cow's appetite
(2) Keep the animal in the cowshed or walking area

Cowshed benefits: → Possible to estimate food consumed by a cow kept in the cowshed
→Exposure to rain: cow is likely to get respiratory infection diseases
→ Cow kept in the cowshed is much more productive
→ Cow kept in cowshed increases weight, less manpower and labor
→ Against tics and epidemic diseases

(3) Spray chemicals to control tics every week as per indications
Note: Let the animal entirely sprayed and dampened.
(4) Provide worm control drugs once a month as per instruction. Ex: ***Vermitan*** does not apply for a newly fertilized cow. ***Nilzan*** does not apply for a pregnant cow over 7 months.
(5) Get vaccinated the animal in the occurrence of epidemic outbreak or as per RARDA request.
(6) Artificial insemination or get fertilized the cow to an ox without STD (amakore)
(7) Spacing births for the cow
(8) Treatment: regular check up, and immediately call the vet-technician in case of abnormal symptom.
Keep a medical kit including Oxytetracycline, Penistrepto, tic control chemicals.
Dr Abel demonstrated to model farmers NORTRAZ chemical, 250 ml to be diluted in 125 liters of water. The chemical is to be used 16 times and costs 2650 Rwf and can be used in 4 month period.
(9) Hygienic conditions: 1. for the cowshed, 2. for all containers including milk containers, 3. Cow helper; wash hands and cow breasts before milking.
(10) Proper feeding: Poor feeding and nutrition expose the animal to frequent Illnesses
(11) Keep a record on the animal health condition and production.

Note by Dr Abel:
(1) A need to strengthen farmer association to allow easy marketing of their animal products.
(2) Vet-technicians need to regularly visit cows and report on their conditions to Cell office.
(3) He demonstrated how to use the sprayer.

Questions & Answers:

Q1: what about progress of artificial insemination in the country?
→One writes to RARDA and is trained to apply artificial insemination at Sector level

Q2: When the person to apply artificial insemination at sector level is not available, Can we call at Kigali?
→No problem, you can call at Kigali

Q3: Is it possible to buy another cow and keep it with JICA cow?

It is only possible after you have given the first generation to the neighbor.
Cell office will determine the next generation of model farmers

Q4: Can you teach us how to measure the cow?
→ We will show you how to measure cows when cows will be delivered.
Abel accepted to provide a meter to measure the cow?

4. Lottery to assign cows to model farmers

The lottery results are as follows

Tag No	Names	Cell
3805	RWIGAMBA	Kibungo
3810	UWANTEGE Léonille	Kanzenze
3817	AHIMANA Apollinaire	Cyugaro
43814	MANDEGE Anne Marie	Kanzenze
53807	KAYITAVU Onesphore	Kanzenze
63813	MUKAKAYIRU Enatha	Kanzenze
3808	KAYIRANGA	Kanzenze
3822	KARAKAE J. Claude	Cyugaro
3806	MUKASAFARI	Cyugaro
3827	NYAGASAZA	Kibungo
3829	MURENZI Sylvestre	Cyugaro
4190	MUKABISANGWA Marie	Kibungo
3803	RWAMAHINA Ildephonse	Kibungo
3804	KANDAMUTSA Florence	Cyugaro
3812	MUGWANEZA	Kibungo
3820	NZAMWITA Bosco	Cyugaro
3811	GAKWISI Innocent	Kibungo
3809	KAYINAMURA	Kanzenze

5. Delivery sites

1. Kibungo near the Cell office at 4 pm and Nyagasaza will indicate the off loading site.
2. Cyugaro near Murenzi's at 3 pm
3. Kanzenze at Karumuna around 2 pm.

Closing the workshop, participants agreed to meet again during cow delivering activity on December 7th.

Remark:
Recorded by the Workshop Assistants recruited by the JICA Team

Monitoring Sheets for the Quick Project of Modern Cow Distribution

Name of Vet-Technician [ ]

1. General Date [Year_____ Month _____ Day_____]

No	Index	Details	
1	Cell Name		
2	Model Farmer Name		
3	Helper's Name		
4.	Tag Number of Heifer		
5	Pregnancy	1. Yes, 2. No	Month of Pregnancy [ ]
6	No of Deliveries	1. Yes, 2. No	Total No of Deliveries [ ]

2. Monitoring Result

No	Items	Monitoring Results	
1	Feeding Condition	Appetite	1. Normal [ ], 2. Lost [ ]
			If lost, since when [date and time] Date [ ], Time [ ]
		Kind of Feeding	1. Penissetum [ ], 2. Tripsacom [ ] 3. Others: specify [ ]
		Remark	
2	Watering condition	Type of water	1. Swamp water [ ], 2. Tap water [ ] 3. Rainwater storage [ ]
		Amount of water	1. Enough [ ] 2. Not enough [ ] 3. Estimated Amount of water/day: [ ] Lt/day
3	Cleaning of Cowshed	Remark:	
4	Overall Problems on Disease & Health	Symptom	1. Normal [ ] 2. Abnormal [ ]
			If abnormal, since when [date and time] Date[ ], Time[ ]
		Diagnosis	
		Treatment	
		Advice to Model Farmer	
		Action to RARDA	1. Need [ ] 2.Not Need [ ]
			Action taken [1. Telephone, 2. Send message, 3. Others]
5	Others Issues if any		

Monitoring Sheets for the Quick Project of Modern Cow Distribution

Name of Vet-Technician [ ]

Reporting Period[Year_____Month____Date____ ~ Year_____Month____Date_____]

1. General

No	Major Activity	Details
1		
2		
3		
4		
5		
6		

2. Overall Monitoring Results

No	Items	Monitoring Results	
1	Feeding Condition	Appetite	
		Kind of Feeding	
		Any Problem	
		Action Taken	
2	Watering condition	Type of water	
		Amount of water	

3	Cleaning of Cowshed	Condition	
		Any Problem	
		Action Taken	
4	Overall Problems on Disease & Health	Symptom	
		Diagnosis	
		Treatment	
		Advice to Model Farmer	
		Action Taken to RARDA	
5	Others Issues if any		
6	Any Issue to be tackled for next 2weeks		

Study on Sustainable Rural and Agricultural Development in Bugesera District in Republic of Rwanda

Mid Term Monitoring Report of the Quick Project on Modern Cow Distribution in Ntarama Sector in Bugesera District

November, 2007

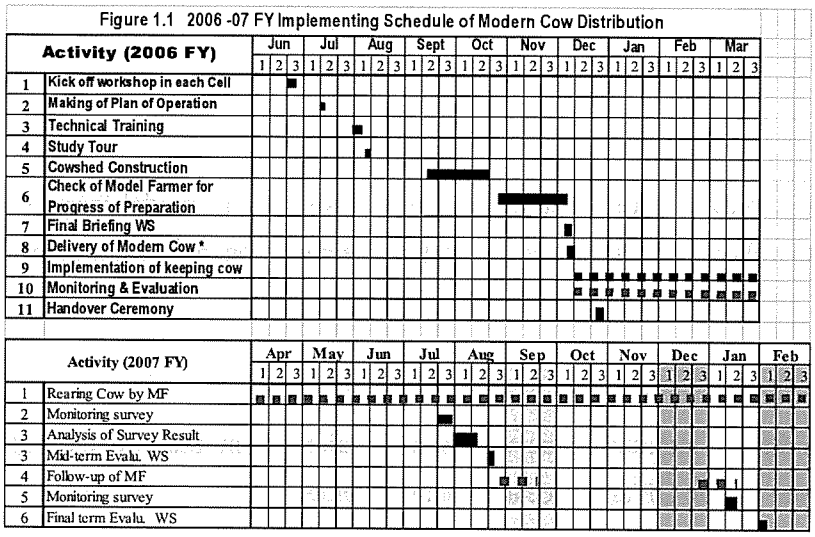
JICA Study Team

CONTENTS

1. Introduction

The quick project on the modern cow distribution in rural and agricultural sectors supported by RARDA-JICA joint team has been commenced under the scope of work in the study on sustainable rural and agricultural development in Bugesera District since June 2006, and the implementation schedule of the quick project has proceeded in accordance with the below figure.

Figure 1.1 2006 -07 FY Implementing Schedule of Modern Cow Distribution



The said projects, benefiting the 18 model farmers (MF) over the three Cells of Ntarama Sector has already passed with the seven months since commencement of rearing crossbred among the MFs in December, 2006. In order to grasp progress and comprehensive problems on the 18 MFs, the JICA Study Team directly via interview firstly did the mid-term monitoring survey in ad hoc basis to MFs since the beginning of the third field survey. Then, a monitoring sheet in both English and Kinyarwanda versions was drafted based on the monitoring results so far obtained and brushed up the questionnaire contents. On July 23, a briefing of the monitoring survey was made on the three enumerators and then questionnaire survey to the 18 MFs was carried out during July 24-26, 2007.
In this monitoring survey, many issues on implementation of "One Cow, One family" project were revealed and subjects of following up the QP project from now were elucidated. Before going to next, process of purchasing the 18 heifers by the RARDA-JICA team was specified as below so as to secure transparency.

Table 1.1 Progress of purchasing crossbred heifers for the QP by RARDA-JICA joint team

	Date	Action taken
1	Oct 26-06	Confirmed that the livestock supplier identified a cattle farm (Rwangingo) where heifers were purchased based on discussion made between livestock supplier and JICA study team.
2	Oct 27-06	Confirmed that two preconditions should be met prior to heifer purchase with RARDA as a. general requirement and b. health condition, and RARDA staff would go with JICA for checking the above two precondition at Rwangingo farm.
3	Oct 30-06	Confirmed the following issues with DG of RARDA 1) Site visit to Rwangingo would be made by a livestock supplier (Dr.Jacques), JICA team and RARDA vet doctor and technician 2) Vet technician of RARDA would take blood samples from the intending heifers for purchase and exam Brucellosis within 12 hours following to sampling. 3) General requirement such as 75 % crossbred could be examined based on visual appearance heifer combined with interviews.

		4) If blood test resulted in negative, RARDA would give a livestock supplier permission to transport from Rwangingo to Ntarama site.
4	Nov-7-06	Confirmed with Dr. Jacques about the following issues. 1) Blood sampling would be made more than 18 heads. 2) FMD (foot and mouth disease) vaccination would be operated at purchasing date.
5	Nov-8-06	-RARDA staff, Dr.Jacques and JICA team visited Rwangingo farm to take 21 blood samples with checking appearance of the 21 heifers. -RARDA staff commented that Rwangingo farm was one of most reliable cattle farm in Rwanda. -In Rwangingo farm, mating is operated by rearing bull of Friesian.

2. Objectives

The mid-term monitoring survey was aimed at grasping progress of the 18 model farmers and extracting the subjects to follow-up activity on project implementation of the modern cow distribution.

3. Method

Enumerators for this mid-term monitoring survey was recruited from the previous JICA employees as vet-technician for the QP and allocated them as below.

Table 3.1Allocation of the Enumerators to Command Cell Group

Vet-Technician		Original Command Area in the Cow QP	Monitoring Cell
1	Celstine	Kanzenze	Kibungo
2	Vedast	Cyugaro	Kanzenze
3	Fabien	Kibungo	Cyugaro

The questionnaire consists of the seven categories comprising of general, rearing condition, animal health, reproduction aspect, benefit generated by modern cow rearing, association activity and performance of vet-technician. Interview survey was carried out by using Kinyarwanda versions questionnaire and translated the filled questionnaires into English prior to analysis process. Apart from the questionnaire, the JICA Study Team asked the vet-technicians to submit any recommendation to RARDA-JICA joint team based on their experiences involved in the quick project.

Table 3.2 Outlines of the Questionnaires for Monitoring Survey

	Monitoring Items	Details
1	General	Profile of Model Farmer including rearing the numbers of cattle
2	Rearing Condition	Feeding condition, watering condition, cowshed structure
3	Animal Health	Prevention of tick-born, overall problems on disease & health
4	Reproduction Aspect	Date of AI and result, time of judging AI
5	Benefit generated by modern cow rearing	Kind of benefits via cow rearing, negative impact, any suggestion to RARDA-JICA,
6	Association activity with Cell and Sector	Status of association, activity of association, support from outside, selection of the 2nd generation, main actor, criteria of selecting the 2nd generation
7	Performance of vet-technician employed by JICA Team	Frequency of visiting MF, expertise of vet-technician, post contract situation
8	Recommendation	From vet-technician to RARDA-JICA

Source: JICA Study Team, July 2007

4. Monitoring Results

4.1 General

In this category, the profile of the model farmer including cow-rearing environment was mainly monitored, and the preconditions on the model farmers rearing crossbred stipulated by MINAGRI was excluded in this chapter. The summary table shows the result of pregnancy test by RARDA, calving progress, presence of helper for the MF, presence of Ankole cow together with crossbred and so on.

(1) Progress of Calving and Rearing Condition

In accordance with a framework of the QP, RARDA-JICA joint team carried out the pregnancy diagnosis (PD) by rectal palpation on mid-December 2006 just after delivery of the crossbred. Based on this PD test result, an operation of artificial insemination (AI) was requested to the livestock supplier on early January 2007. The details on AI related matter is described in **Chap 4.4** later. Table below summarized calving matter so far as of the end of September 2007. In this table, the new calves-born so far were originated from natural mating in Rwangingo Farm prior to purchase on December 7, 2006. So far 10 calves were born including miscarriage, stillbirth and death of calves after born as of September 2007; the newborn ten calves consisted of two stillbirths, death of two male calves after delivery, two female calves and three male calves. Concerning abnormal birth including death after delivery are mentioned later **in Chap 4.3.**

Table 4.1 Midterm Monitoring Results of the QP Model Farmers of the Modern Cow Distribution: I. General

Cell		Name of Model Farmer	Tag Number	PD Test Dec18-06	Calving &Sex as of September, 2007	No of Calves Rearing	Helper		Rearing any Ankole
							Date	Name & Condition	
Cyugaro/Fabien	1	Ahimana Appelinaire (08439265)	3817	3.0	Stillborn on 5/6/07 7 months premature			Rugira Salary + accomodation	No
	2	Kandamutsa Florence	3815	Nil	Stillboran on 12/15/06			Salary+accomodaiton	No
	3	Karake Jean Claude	3819	4.0	Delivered ♀calf on May 24-07	♀ (late May-07)		Murundi Salary+Accomodation	No
	4	Mukasafari Marie	3806	Nil				Gasigwa Salary+accomodaiton	
	5	Nzamwita Jean Bosco	3818	7.0	Delivered ♂calf on Feb-07	♀(Feb/07) born, 6 months		Maniraguiha Salary+accomodation	No
	6	Murenzi Sylvestre	2550	Nil				Habimana: Sakary + Accomodation	No
Kanzenze/Vedast	1	Mukakayiru Enotha	3813	7.0	Delivered male calf on March 15, 2007 ♂, died late May-07		Dec-06	Karangwa (?) Nyandwi(?)	No
	2	Kayenamura Marcel (08560552)	3821	2.0	♂ Born in 8/2/07		Dec-06	Nsanzamahoro(salary+house) Kalisa(?)	Yes, 6heads From
	3	Kayitavu Onesphore	3807	Nil		0		No helper(?)	No
	4	Uwantege Leonille	3810	12/5 Delivered	Delivered male calf ♂ on Dec 5 06. Died May-07			Kamonyo Celsestine Salary+accomodation	No
	5	Mandenge Anne Marie	3814	Nil		0	Dec-06	Akimana Protais Salary+accomodation	No
	6	Kayiranga Paul	3808	Nil			Dec-06 Feb-07	Claude Zakayo	No
Kibungo/Celstin	1	Nyagaza Jean de Dieu	3827	Dout (But 2-3 M pregnant)	Female calf ♀ Early June, 2007	1♀(early June/07)	Jan-07	Harindintwari Salary+accomodaiton	No
	2	Muguareza Inocent (08879304)	3812	Nil			Jan-07	Maliseli Salary+accomodaiton	No
	3	Rwamahina Ildephonse Niyonambaza Lcil (1st daughter)	3803	8.0	Delivered ♂ on late February, 2007	1♂(late Feb/2007)	Dec-07	Nzanywayimana Salary+accomodaiton	No
	4	Rwigamba J. Pierre(Teacher) (0852267)	3805	Nil	Delivered ♂calf on September, 2007	1♂ (Sept/2007)	Dec-07	Mukayiranga Salary+accomodaiton	Yes, One. Mar-07
	5	Mukabisangua Marie (08458080)	4190	Nil		0	Nil	Nil	No
	6	Gakwisi Innocent (08461071)	3811	Nil		0	Jan-07	Gakuba Salary+accomodaiton	one Ankole Jan-07

Source; JICA Study Team, 2007

As of September, 2007

Concerning taking care of the crossbreds, the 16 MFs employed helpers and the remainders were caring by themselves. However, one of the remainders, widow case suggests many lessons on this quick project implementation and mentioned later.

As of rearing crossbred together with Ankole and other cows, only two MFs replied, "Yes", in Kanzenze and Kibungo, respectively, and they built extension to the JICA model cowshed. In this regards, many MFs temporarily practiced to rear Ankole together with crossbred in order to make crossbred calm down. They explained that heifer alone in cowshed sometimes became very aggressive and rearing cow together with Ankole mitigates aggressiveness.

4.2 Rearing Condition

In this category, the condition of rearing livestock was mainly monitored including feeding, watering, and cowshed conditions.

(1) Feeding Condition

Two out of the 18 MFs have practiced grazing system in their grazing land, and one did almost every day and the other replied that grazing was forced to practice due to short of napirgrass. On the other hand, the remainder of the MFs including the above one MF gave comments that "Zero Grazing System" was good for cow rearing. Concerning feeding materials, two MFs have practiced to feed concentrates procured from Kigali and answered that an improvement of lactation performance better than feeding only roughage was observed. Other MF in Kibungo answered that he tried to feed concentrates but his cow never ingested it due to untasted palatability. Concentrate available in Kigali appears to be mixed of hominy and soybean powder, and majority of the MFs could not afford to buy. Meanwhile, common green roughage fed by the MFs consisted of napirgrass dominantly, and then tripsacom, maize, sweet potato leaves, and wild grasses followed as below.

Table 4.2 Number of MFs feeding Roughage by Type and Concentrate

	Roughage	Cyugaro	Kanzenze	Kibungo	Total
1	Napirgrass	6	6	6	18
2	Tripsacom	2	4	2	8
3	Maize stem/leaves	4	2	5	11
4	Sweet potato Leaves	5	4	4	13
5	Inteja*	3	1	0	4
6	Ibigorigori*	0	1	0	1
7	Ibinyamahundo*	0	1	0	1
8	Urwiri*	1	1	0	2
9	Urucaca*	0	1	3	4
10	Ibinyamahundo*	0	0	2	3
11	Sugarcane leaves	0	1	0	1
12	Concentrate	0	1	1	2

Source: Monitoring Results by JICA Study Team, August 2007.
Note: Roughage name with * mark is local name.

From the above table, feeding materials consist of mainly green roughage such as napirgrss, maize, sweet potato stem and leaves, and tripsacom that contain low proteins, and no leguminous grasses for protein sources were fed except for local grass species fed to cattle

above mentioned which were not scientifically identified whether it is leguminous spp or not. But sweet potato leaves and intenja recommended in the training module as protein source were given to cattle by the 18 MFs and the latter for the 4 MFs. Moreover no hay and silage are processed among the 18 MFs due to lack of knowledge. Apart from roughage and concentrate, one MF in Cyugaro reported to feed molasses mixed with roughage like napirgrass. Concerning any problems of feeding practice among the 18 MFs, most of them gave no answer except for the four MFs; one MF reported insufficient of fodder crop while the remainder reported cattle liked local weeds, fodder tree crop like *caliandra* and *mukuna* and rice byproduct (rice bran?). Meanwhile, most of the MFs learnt that feeding cow well increases body weight associated with healthy condition.

As for research information on lactation performance by feeding materials on crossbred cow, ISAR Livestock Research Center, Nyagatare carried out some research under grazing system (leguminous crop 30 %, *graminaceae* crop 60%) but no research outcome about a relation between milk performance and feeding materials including hay, green roughage and concentrate so far. RARDA has no data about this issue. Therefore, the supporting organ on "One cow One Family Project" should demonstrate some ideal feeding diet related to milk performance immediately.

Through the monitoring results mentioned so far, the following issues should be clarified in combined with training program for the beneficiaries.

1. Feeding materials and milk performance on crossbred
2. Proper amount of green roughage, hay and concentrate by cow body weight
3. Supporting system to cultivate fodder crop including leguminous crops

(2) Watering Condition

Table 4.3 shows summary of watering conditions among the 18 MFs, and where scattered in Ntarama Sector usually face difficulties to fetch water via long distance for livestock and 60 % of the MFs are reported to buy tap water as well as swamp/river/rain waters by paying 3,000 Frw/month to 15,000 Frw/month. Here, "buying" means that MFs hire somebody to fetch water. The remainder fetches water from swamp/river/rain water sources.

Table 4.3 Number of MFs fetching water by source and amount/day

Water source and Volume		Cyugaro	Kanzenze	Kibungo	Total
1	Tap water	6	2	4	**12**
2	Swamp/river	0	4	3	**7**
3	Rain water	0	0	2	**2**
4	Buying water	6	1	4	**11**
5	Not buying water	0	4	1	**5**
6	10 Lts/day	1	0	0	**1**
7	15 Lts/day	0	2	0	**2**
8	20 Lts/day	4	2	3	**9**
9	25 Lts/day	0	0	1	**1**
10	30 Lts/day	0	1	0	**1**
11	40 Lts/day	1	0	2	**3**
Total					

Source: Monitoring Results by JICA Study Team, August 2007.

Dominant water source is tap water, and then following to swamp/river water and 50 % of the

MFs consumed around 20 liters of water for livestock per day, ranging from 10 liters to 40 liters per day. Most common problems faced by the MFs are some difficulty to fetch water via long distance and a short of water for livestock due to unaffordable fetching cost.
Through the watering cow work so far, the MFs have learnt "well watering cow shows good appetite with increase of body weight".

(3) Cowshed Structure and Hygiene Condition
Only two MFs in Kibungo and Kanzenze have built extensions to the JICA model cowshed with 10 and 5 cubicles, respectively. The reason for building extension is to rear other cattle including local Ankole and exotic cows. One of them got a support from her relatives living in Kigali for building extension and keeps the said relative's cattle. The other built by his own expense for planning to rear goat as well. In hygienic condition, most of the MFs keep the cowsheds cleaning everyday or usually, and cleaning the compost pit once or twice a week, or when it is full. In this cowshed management, majority of the MFs learnt through cow rearing practice as follow.

- Keeping cowshed clean is to prevent outbreak of mosquito, fly, and disease as well as mitigate a bad smell.
- Cow is in good condition when cowshed is kept clean.

4.3 Animal Health Issue
Animal health issue is the most vital factor among the 18 MFs since the beginning of livestock husbandry in December 2006. Since delivery of the crossbred on December 2006, the MFs faced many animal health problems including miscarriage, stillbirth, injury due to stresses, and disease and so on as follow.

(1) Prevention of Tick-born
In last December 2006, *acaricide* and hand pump sprayer were delivered to each MF and Cell Cow association, respectively. Frequency of spraying *acaricide* to heifer ranges one (11 MFs) to two (7 MFs) times per week. Hand pumps delivered to each Cell Cow QP Association were no more circulated soon after delivered due to dysfunction caused by misuse, thus all MFs managed this practice by borrowing it from acquaintances with some payment. A hand pump sprayer problem was not reported to the JICA Study Team on time till the mid-term monitoring survey.

(2) Health problems faced by MFs
So far reported to JICA team about health problems were summarized as below Table. Major problems about animal health consisted of unknown disease, death of calf, stillbirth, miscarriage, skin injuries, infection of dehorning point, and parasite of eye. Most of the cases were relied on vet-technician's treatment, and livestock supplier's after sale service financed by the MFs in most cases. As for institutional aspect, circulation of the hand pump sprayer in each

Cell group was not properly functioned due to dysfunction of the pump soon after delivery. However, spraying *acaricide* to heifer/cow is not affected and each MF appears to manage it within individual expense.

Table 4.4 Summary Tables of Monitoring Results on Health Issues

No	Cell Group	Problems	Counter measure	Lesson learnt by MF	Suggestion to RARDA-JICA
1	Cyugaro	-Disease -Stillborn -Injury by stress -Infection of dehorning point	-No specific measure -call vet technician -Ditto- -Call RARDA technician for operation to dehorn again	-To call vet-technician any case and get advice	-Regular visiting to MF -Provide materials (drugs) -Renew contract of vet-tech for MF. -Training of MF, -Give 1st ♀ calf to MF & 2nd ♀ calf to the 2nd generation. -Distribution of reliable improved crossbred to MFs.
2	Kanzenze	-Death of calf -Heifer was aggressive -Dysfunction of hand pump -Heifer was stabbed by somebody	- called vet technician. -Bought by MF expense or borrowing -Looked for vet-technician for urgent treatment	- Treatment of calf should be done urgently if problem. -Should know knowledge how to treat cow	-Visiting MF regularly -Support MF to get drugs, -To solve low milk performance for poverty reduction. -Need closed follow-up to improve vet-tech and AI services.
3	Kibungo	-Keeping aggressive heifer -Sick (Eye, leg)	-No comments -the livestock supplier treated	-Delivered heifer is very aggressive and difficult to treat. -Should know how to treat cow.	-Keep following up MF -Train MF to improve milk performance, -Support MF to keep vet tech and drugs -To supply high quality crossbred as promised. -Support MF to organize forum by inviting cow breeder and vet technicians.

Source: Result of Monitoring Survey by JICA Study Team, July 2007.

From the monitoring result on animal health in the above table, presence of vet-technicians to follow up MF is vital factor for "One cow, one family" project. This subject including suggestion to RARDA-JICA is mentioned in the last chapter.

4.4 Reproduction Aspect

(1) Pregnancy Diagnosis

In accordance with a framework of the QP, RARDA-JICA joint team carried out the pregnancy test by rectal palpation on mid-December, 2006 just after delivery of the crossbred. However, it could not diagnose some of the 16 heifers exactly because of the two heifers (Tag No.3827 and 3805) in Kibungo having been diagnosed "Doubt" and "Negative", respectively but which delivered calves in June and September, 2007, respectively without AI. Perhaps, this kind of misdiagnosis might happen because of too early to diagnose just after fertilization. Therefore, the pregnancy test should be done two times by giving an interval (30 days) to doubtful heifers in combined with observation of libido symptom.

AI operation was requested to the livestock supplier on early January, 2007 based on the aforementioned PD test result. At that time, the six heifers of the MFs were listed but final

number of inseminated heifers amounted to eight more than six, due to covering some additional heifers showing libido cycle during AI operation stage. On the other hand, Tag No. 3815 in Cyugaro was omitted from AI list due to no libido symptom observed by AI operation time.

(2) Artificial Insemination

A series of AI operation involved the five stakeholders as below figure.

For implementation of the QP, JICA Study Team employed the three vet-technicians locally as per each Cell group so as to follow up the quick project from December, 2006 to March in 2007. The five stakeholders consist of RARDA-JICA team, livestock supplier, artificial inseminator, the said vet-technicians and the 18 model farmers. The ideal division of duties among the stakeholders is summarized below.

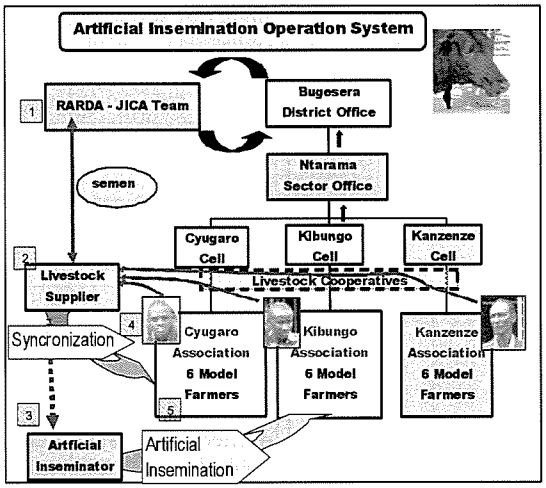


Figure 4.1 AI Operation Frame Work

Table 4.5 Divisions of Duties among the Stakeholders for AI

No	Stakeholders	Division of Duties
1	RARDA-JICA Team	Over all advice and supply of semen/hormone to livestock supplier
2	Livestock supplier	Communication with vet technician and artificial inseminator to execute a series of AI operation.
3	Artificial Inseminator	Do AI operation in collaboration with livestock supplier
4	Vet-Technician	Monitoring the model farmers and communication to livestock supplier.
5	18 Model Farmers	Rearing heifer and reporting any change of heifer in consultation with vet-technician

Implementing AI operation, a shortage of hormone for synchronization of estrous cycle in RARDA hindered AI operation from commencement with slow custom clearance transaction at airport. In addition, poor communication between the livestock supplier and three vet-technicians were outstanding due to many factors; especially lack of communication means like no mobile telephone by the vet-technicians. Thus the livestock supplier did not grasp libido symptom observed by each heifer on time.

Consequently it was initiated from late February and completed to mid-March 2007 by dividing the non-pregnant heifers into the two groups, i.e., a. Cyugaro-Kibungo Cell Groups and b. Kanzenze Cell group. AI operation was implemented via two steps consisting of synchronization of estrus cycle and AI. The livestock supplier made the former and the latter made by a qualified artificial inseminator running a pharmacy shop in Nyamata. The success rate of the said AI was as follow:

Table 4.6 Implementation Schedule of Synchronization of Estrous Cycle and AI Operation

Group	Model Farmers		Synchronization of Estrous Cycle and AI Operation						AI Result
			FSH*	PSMG*	AI	FSH	PSMG	AI	
Cyugaro Kibungo	1	Murenze Sylvestre	Feb 25	Mar 5	Mar7				Success
	2	Mukasafari Marie	Feb 25	Mar 5	Mar 7				Success
	3	Gakuwishi Innocent	Feb 25	Mar 5	Mar 7				Failure
	4	Mugiraneza Innocent	Feb 25	Mar 5	Mar 7				Success
	5	Mukabisangwa Marie	Feb 25	Mar 5	Mar 7				Failure
Kanzenze	6	Kayranga Poul				Mar 3	Mar 15	Mar 17	Success
	7	Mandenge Anne Marie				Mar 3	Mar 15	Mar 17	Success
	8	Kaitavu Onesphora				Mar 3	Mar 15	Mar 17	Failure

Note: FSH refers to follicle hormone, and PSMG refers to pregnant mare serum gonadotrophin.

Success rate on AI over the eight heifers was 62.5 %, more than an average rate of 50 % in Rwanda. Progress of three heifers, which failed AI including the heifers with stillbirth, was reported as below:

Table 4.7 Progress of AI failed Heifers

Group	Model Farmers		AI Result & Abnormal Delivery	Whole Story after AI failed
Cyugaro Kibungo	1	Ahimana Appelinaire	Stillbirth	On May 6th, his heifer was stillbirth of 7 month, and he did AI on late June by his own cost. So far AI appeared to be success.
	2	Kandamutsa Florence	Miscarriage	Her heifer got miscarriage just after delivery in last December and showed libido 4 times since March 2007, but was not included in the AI list by the JICA Study team at the end Feb before leaving for Japan because of no libido symptom at the end of February 2007. On July, the heifer escaped from her cowshed and mated with local Ankole naturally.
	3	Gakuwishi Innocent	Failure	On mid July, his heifer showed libido since AI was operated on mid-March, and he made his heifer mate with Sahiwal bull in the neighboring house.
	4	Mukabisangwa Marie	Failure	Her heifer showed libido once after AI was made. According to the livestock supplier, a registered artificial inseminator shall handle all necessary operation including synchronization and AI financed by the livestock supplier. JICA S/T guided her to access the AI inseminator but no action was taken as of September 14.
Kanzenze	5	Kaitavu Onesphora	Failure	His heifer showed libido twice since AI operation made on March. In May, his heifer escaped from cowshed and mated with a bull of Holstein rearing in neighboring. So far natural fertilization appeared to be successful.

Source: Monitoring results by JICA Study Team, July 2007.

The 2nd AI for the non-pregnant three heifers was supposed to be made by the livestock supplier under the contract framework with the JICA study team. However, communication among the stakeholders became worse after phasing out of the vet-technician contract with the JICA study team since April 2007, and not functioned at all. Further, JICA study team was absent during April-May, 2007 and the cow association in each Cell was not solid enough to help each other. On the other hand, the livestock supplier side made no active follow up to the MFs related to AI operation. Consequently, these circumstances conspired to make it dysfunction. Therefore the following lesson learnt is generated based on the above progress.

1. Establishment of reliable monitoring system
2. Strengthening of solidarity on each cow association

4.5 Benefits by Cow Rearing

(1) Cow dung and Milk

Two benefits by rearing cow have been generated since commencement of crossbred rearing in December 2006, namely milk and cow dung manure. The all MFs answered cow dung manure was used for own field. Concerning milk production, about eight MFs have got calves including cases of death after birth. However, milk performance varies in each cow, ranging from 1 liter to 5 liters per day. Overall result on milk performance is summarized in below Table.

Table 4.8 Result of Milk Performance on Crossbred related to Feeding Materials

Kanzenze	Kaynamra Marcel	Feeding Materials: napirgrass, tripsacom via grazing system and Concentrates
		Lactation: 8 liters per day (Ankole Cow)
		Effect of concentrate was already leant from the livestock supplier Dr. Jacques. Concentrates costs 7,500 Frw/50 kg bag in Kigali and lactation increased followed by feeding one kg of concentrate/day. At present, Ankole lactated 8 liters per day compared to 4 - 6 liters per day before feeding.
	Uwantege Leonil	Feeding Materials: Roughage only (Napirgrass, triposacom, *intenja,ibigorigori,* Sweet potato stem & leaves, etc)
		Lactation: Milk decreased from 4 liters to 1 liter as of July 2007 since delivery (Crossbred).
		As of end January 2007, three liters per day lactated when salt was dissolved in drinking water. Palatable roughage consists of maize leaves, legume vein, leaves & stem of sweet potato and napirgrass.
	Mukakayiru Enotha	Feeding materials: Roughage only (napirgrass, leaves & stem of sweet potato/legume crop, wild weed, etc)
		Lactation: Crossbred 4～5liters per day
		Newborn calf died at the end of May, 2007, two and half months after born. Newborn calf was unable to stand up by himself without support and weakened.
Kibungo	Rwigamba J. Pierre	Feeding materials: Roughage (napiagrass, maize, *urucaca*) and concentrate (maize meal mixed with soybean flour)
		Lactation : 4 liters per day by Ankole cow, and 10 litters per day in pure line cow Crossbred by JICA just delivered a male calf on September and no information.
		Cowshed was expanded under support of her relatives. At present, five cows and four calves are reared with 2 helpers. Walking area by JICA model cowshed was sacrificed for building cowshed extension. Rearing pure line cow lactated 10 liters per day (morning and evening lactation), and meanwhile Ankole lactated 4 liters per day as well.
	Nyagaza Jean de Dieu	Feeding materials: Napirgrass, tripsacom, sweet potato leaves, rice byproduct, local weed-*Kinyamahundo*
		Lactation: After feeding calf, 2 liters per day are used for home consumption.
		Female calf was born on early June, 2007.
	Rwamahina Ildephonse	Feeding materials: Napirgrass, triposacom, maize leaves/stems, concentrate, local weed-*Urucaca*
		Lactation: No monitoring result
		Male calf was just born on September, 2007
Cyugaro	Karake Jean	Feeding Materials: Napirgrass, tripsacom, maize leave/stem, sweet potato leaves, local weed-*Urwiri*
		Milk is fed to calf and no actual home consumption.
		Female calf was born on May, 2007.
	MF:Bosco	Feeding materials : Roughage only (napirgrass, maize, sweet potato leaves)
		Lactation : Only one liter per day (Crossbred) because of his calf still nursing.
		New born-calf is still nursing and is weaned from cow after 9- 12 months for feeding roughage.

Source: Result of Monitoring Survey by JICA Study Team, July 2007.

Here, feeding amount per each cow was difficult to quantify per day. However from the above

table, most of the model farmers appeared to follow the instruction of feeding materials mentioned in the technical module given at the three days technical training on early August 2006. Lactation performance in quantified manner is not mentioned in the said module. That is to say, technical supporting data for "One cow one family" policy seems to be not establishing reliable diet feeding system, especially "zero grazing system" related to lactation performance by degree of crossbred purity.

As for marketing of milk among the MFs, buyer from Kigali visits each MF for collection of milk at farm gate price of 150 Frw/liter.

(2) Calving

Apart from two benefits mentioned above, calving is also one of the benefits by rearing crossbred even MF did not list up it at answer column in the questionnaire. In case of female calf, MF understands to deliver it to the 2nd generation in accordance with the implementation framework of the QP, and male calf belonging to management of MF's discretion. The time to deliver female calf to the 2nd generation is possible to start from six to seven months after born when feeding materials are shifted from milk to roughage, and which actually shall start from this coming November, 2007. However, female-calf delivery to the 2nd generation should be considered carefully in combined with crossbred purity among the MFs who received in the QP. Because many MFs felt that the delivered crossbred was closed to a level of Ankole cow, especially pedigree index based on appearance and milk performance. In this regard, the following passage in the speech made by Minster of MINAGRI is introduced, which was announced on occasion of the handover ceremony of JICA Quick Project in Ntarama Sector on December 28, 2006.

> All participants were impressed with MINAGRI Minister's speech made on the handover ceremony of the QPs held on December 28th, 2006.
>
> Namely, "If Ankole was delivered, the first born heifer was received by the model farmers and the 2nd born heifer should be delivered to the 2nd generation".

4.6 Negative Impact

Monitoring negative impacts by rearing crossbred in the QP was also focused so as to grasp real intension of the MFs. Below table summarized the 18 MFs real intensions on the QP. In this result, some answer mentioned in below table was not corresponded to intension of the question but it was frankly described without modification.

Table 4.9 Negative Impact so far generated

	Cell	Negative Impact

1	Cyugaro	-Cowshed was destroyed by gale. -Disease caused by unknown factor -Stillbirth caused by unknown factor -Leg injury caused by kicking cowshed pole due to stress -Crossbred delivered by RARDA-JICA is low pedigree index. -Disbudding point of horn infection -No vet-technician following up after phasing out of the contract with JICA
2	Kanzenze	-Poor lactation performance due to low purity of crossbred -Crossbred was stuck by wood stick into vagina, which seemed to originate from envy in the community. -Death of two calves caused by unidentified desease
3	Kibungo	-Poor lactation performance even though MF was promised to get milky cow. -Delivered cow was very aggressive and might attack owner. -AI is not succeeded. -No vet-technician following up of AI matter on the MFs after phasing out of the contract with JICA -Unaffordable to buy water in combined with long distance of fetching water.

Source: Result of Monitoring Survey by JICA Study Team, July 2007.

From the above table, most of the MFs apparently frustrated with low degree of crossbred purity including animal health problems and no following up of MF by vet-technicians after phase-out of their contract with JICA. Concerning pedigree index of crossbred issue, the District Office took up that claim based on some complaints via Ntarama Sector office in early this January 2007, and attempted to diagnose pedigree index by recruiting a livestock specialist from Eastern Province. The development of this issue on diagnosis was not grasped yet after that. However in May 2007, JICA study team confirmed officially via the District Mayor that committed to watch the development of the said issue calmly and to focus on rearing condition, which influence milk performance more than pedigree index.

4.7 Suggestion to RARDA-JICA Joint Team from the MFs

In this questionnaire sheet, JICA study team asked the MF to suggest remedy for better QP implementation related to "One cow, one family" policy to RARDA-JICA joint team. Below table summarize the suggestions made by the MFs.

Table 4.10 Suggestions to RARDA-JICA Joint Team by MFs

Cell		Suggestions
1	Cyugaro	-Visit MF regularly for monitoring present situation of the QP -Training of MF for cow husbandry -Select good crossbred via participatory system of MFs -Replace the delivered crossbred with better crossbred heifer -Support AI operation till success -Support materials (hand pump and drugs)
2	Kanzenze	-Support materials (drugs) and vet-technicians -Select good crossbred via participatory system of MF representative -Need to follow up MF closely -Extension service for training of MF

3	Kibungo	-Identify high quality of crossbred prior to purchase -Delivered heifer is poor quality and should be replaced. -To call on heifer supplier for blaming -Feed back this lesson learnt to next time -Support MFs for securing vet-technician on animal health -Follow up MF to cope with poverty reduction but the delivered cow is not suited for this concept. -Establish proper way to select quality crossbred. -Request a proper system to get vet-technicians for following up MFs.

Source: Result of Monitoring Survey by JICA Study Team, July 2007.

From the above table, most common suggestions comprise the following three pillars.

- Select good crossbred under participatory system of MFs prior to purchase
- Support to monitor MFs regularly for extension service including training
- Support MFs for securing materials and vet technicians

4.8 Association Activity

During the technical training period, RARDA-JICA joint team suggested the MFs to form livestock association by each Cell MFs, and gave a lecture about farmer's association. Based on the training program, each Cell MFs formed a livestock association on August 2006, and the progress of each association was summarized as below.

(1) Status of Livestock Association

Below table summarized the progress of livestock association by Cell group.

Table 4.11 Present Status of Livestock Association by Cell

Cell		Present situation
1	Cyugaro	-Not legally registered and registration formality should be handled by President and Cell Office -Documents: bylaw, member list and bank A/C are not provided yet. -Monthly membership fee is free.
2	Kanzenze	-Not legally registered yet. -No legal documents are provided yet. -Monthly membership fee is free.
3	Kibungo	-Not legally registered yet. -Legal document (member list and bylaw except for Bank A/C) is already provided. -Monthly membership fee is free.

Source: Result of Monitoring Survey by JICA Study Team, July 2007.

So far, no livestock association has been registered to District Office. Kibungo Cell group only provided legal document of member list and bylaw except for bank account, but the reminder provides no documents yet.

(2) Association Activity and Necessary Support for Association

Below table summarized the progress of association activity and external support necessary for the association by Cell. The association actually does not work properly except for exchanging some information among the MFs.

Table 4.12 Activity of Livestock Association by Cell Group

Cell		Present situation and Outline of Activity	External support necessary
1	Cyugaro	-Cow/heifer rearing only -3 times of association meeting were held about a. improvement of livestock management, b. improvement of living standard, c. mutual assistance & exchange of idea -Position of board member in the association is well defined	-Farming, cow management and livestock drug sale, -Institutional support to form cooperative -AI operation, vet-technician
2	Kanzenze	-Cow rearing only -Monitoring sheet said no association meeting was held so far. But President said meeting was held 7-8 times so as to discuss many issues including animal husbandry, pedigree index, and etc.	-Selling livestock drug and securing vet-technicians -Establish cooperative for selling drugs and employ vet-technician
3	Kibungo	-So far two times of association meeting were held about a. how to establish a pharmacy store by cooperative, b. how to keep good cow husbandry including disease protection and hygiene condition. -TOR for board member is not clear and not functioned.	-Need financial assistance to establish drug store for MFs and cooperative. -Financial support to form cooperative for income generating activity.

Source: JICA Study Team, August 2007.

With respect to external support, local government such as Cell/Sector Offices do not support association activity for strengthening purpose, meanwhile RARDA is just to keep neutral stance on autonomy of farmer's association activity since the beginning of livestock husbandry. Interviewing to the president of the association by JICA study team resulted in insufficient knowledge about how to establish a cooperative by unifying the three associations.

Meanwhile, one of the presidents gave a question whether formation of cooperative was advantageous or not in spite of poor lactation performance related to low profit at present.

As for official formality of forming cooperative, JICA study team consulted with a key staff in charge of cooperatives in the planning unit of District Office and got the following briefing.

"Association" is not necessary for legal registration formality any more but "cooperative" is necessary as below.

Table 4.13 Necessary Document for Registration of Cooperative

Necessary Documents		Outline
1*	Bylaw	Form is available in the District Office
2*	Application Letter	President should sign on the Form and submit
3	Internal law	Regulation stipulated by the general meeting and 1 - 2 pages volume
4	Member List	List should include No, name, birthday, ID No and signature
5	Subscription (investment)	No limitation of minimum and maximum but all members should contribute an equal amount.
6	The above document should be made with six copies and submit to the Sector Office. Sector office forwards it to District office, and which forwards to Min of Commerce. Registration fee is 3,000 Frw. It takes around one month for official formality to registration.	
7	Merit of cooperative	-Borrowing loan

		-Easy to receive support from external organ

Note: The above document No.1 and 2 are available in the District Office.

(3) Selection of the 2nd Generation

Generally, process of knowledge on selecting the 2nd generation is almost recognized by the MFs. That is to say, selection of the 2nd generation should proceed in Cell Office initiative. However, knowledge of criteria on selection varies from association to association and only the MFs in Cyugaro stated three criteria that candidate should have such as a. integrity, b. enough fodder crop plot, and c. cowshed.

On the other hand, Kanzenze Cell authority has already selected one candidate for the 2nd generation and informed it of the association president on February 2007.

4.9 Performance of Vet-technicians

In the last question, performance of vet-technicians in each Cell MFs was monitored and summarized in below table.

Table 4.14 Performance of Vet-technicians on the QP

Cell		Frequency of visiting/week	Expertise of Vet-Technicians	Situation of post contract
1	Cyugaro	1-2 times	2 MFs: fair due to insufficient of vet-instruments 4 MFs: Satisfaction	No visiting after phasing out of contract
2	Kanzenze	3 MFs: no reply 1 MF: 2 times 2 MFs: 2-3 times	3 MFs: no reply 3 MFs: satisfaction	No visiting after phasing out of contract
3	Kibungo	1-2 times	6 MFs: satisfaction	No visiting after phasing out of contract

Source: JICA Study Team, August 2007.

From the above table, most of the vet-technicians usually visit each MF 1-2 times per week in average. As for expertise of vet-technicians, most of the MFs answered "satisfaction" except for the two MFs in Cyugaro who answered "fair", because of insufficient vet-instruments held by vet-technician. After phasing out of the contract with JICA, all MFs have not contacted the said vet-technicians in accordance with the answer in the monitoring sheets. However, MF appeared to request vet technicians according to their urgent case.

Generally speaking, among the three vet-technicians worked for the QP, one of them has long experience, but other two are still young and do not have much experience compared to the former. In this regard, supporting organ like RARDA should have some regular training program to strength these young vet-technicians from time to time.

4.10 Comments from Vet-Technicians

The comment for the QP was requested to each vet-technician based on working experience in the QP, Modern Cow Distribution, and summarized as below.

Table 4.15 Remedy made by the Three Vet-technicians for the QP

Cell		Subject	Outline
Mr.Vedast	Cyugaro	Health Condition	Lack of follow-up to model farmers. They need Vet technicians and do not find proximity services. Thus, cattle do not get proper vet treatment on time. For ex: Cattle do not receive drugs for worms on regular basis.
		Reproduction	For cows that AI failed, farmers need Vet-technician to follow-up such cows and apply AI. That Vet technician should visit cows monthly and check whether AI has succeeded or not.
		Cooperative	As for establishment of a cooperative, there is a need for someone to mobilize and advise the 18 model farmers. For proper follow-up of the modern cows project, a forum should be held by inviting model farmers and vet technicians.
		Milk Performance	The cows have a poor milk performance since those delivered are not milky cows (A proper identification of cows should have been carried out to assess about pedigree index and their milk performance since there is some Ankole cow lactate high quantity of milk.)
Mr.Celstine	Kanzenze	Cow Distribution	Identification of productive cow in various modern farmers rearing cows was not sufficiently done. A benefit was given to a businessman who supplied unproductive cows but the objective in the QP was poverty reduction among the rural population.
		Animal Health	For good management of modern cows, there is a need to establish a cooperative of cow breeders and vet technicians running a pharmacy store
		Reproduction	For the cows not yet pregnant, there is a need for a vet- technician to ensure follow-up since sometimes a cow shows libido signs and owners do not immediately get the vet technician.
Mr.Fabien	Kibungo	Overall	For improved collaboration with model farmers, RARDA-JICA joint team should: 1) Train the model farmers for cow management, conduct regular visit and provide basic materials 2) If possible, model farmers would like RARDA-JICA to change the delivered heifers to MFs and find improved crossbred that perform better milk production. RARDA should be involved in this process. 3) JICA should approach the model farmers and listen to their wishes. 4) JICA should employ vet-technicians so as to ensure proper follow-up of cows Concluding, I thank JICA for their good will and hope they will take into consideration these suggestions that would significantly help model farmers.

Source: JICA Study Team, August 2007.

5. Follow up Activity from Now

5.1 Subjects to follow up the QP

Up to now, a mid term monitoring survey focused on various aspects in terms of animal nutrition, animal health, selection of high productive crossbred, and institutional aspect including farmer's organization and crossbred market, etc. From the monitoring results, the subjects that should be followed up from now are come to light so as to maximize the project effect. Below table shows outline of the subjects and relevant stakeholders in charge of the subjects in order to follow up from now.

Table 4.16 Subjects of following up Activity on the QP

Subjects		Outline of following up	Main Actor	
			Local Government	MF
1	Animal nutrition	A. Giving information about general nutrients requirement related to lactation cycle and performance of crossbred.	ISAR RARDA	
		B. Feeding roughage by grass type available locally in related to lactation performance by type of crossbred based on research data.	ISAR RARDA	
2	Animal health	A. Giving specific information and solution about major disease, stillbirth, miscarriage, death of calves after born, character of aggressive heifer so far faced by MF via Q & A	RARDA	
		B. Establishment of following up system of the MFs regularly by vet-technicians so as to guide MF for keeping cow in healthy condition.	Cell/Sector Office	Association
3	Selection of high quality crossbred	A. Establishment of definite way to select 75 % of crossbred in present crossbred market in Rwanda.	RARDA	Association
		B. Offering an alternative option instead of replacing the crossbred delivered to MFs by RARDA-JICA. For example, **1st newborn female calf is given to the MFs and from 2nd female calf could be delivered to the 2nd generation.**	RARDA Cell/Sector Office	
4	Institutional Aspect	A. Mobilization of the MF so as to form a livestock cooperative by giving lectures how to form and register cooperatives including division of duty as per each board member.	District Office, Sector office	
		B. Establishment of sustainable monitoring framework to the QP by involving local government level including selection and distribution of the 2nd generation.	Cell/Sector District office RARDA	Association
		C. In relation to the above 2-B, establishment of veterinary drug-supply system to the MFs in combined with cooperative formation	Cell/Sector, District Office	Association
		D. Capacity building of local vet-technicians who have no clinical experience following to completion of vet-school.	RARDA	

		E. Training Module: A training module for the JICA QP was made by RARDA-JICA team in July, 2006, because of no comprehensive training module at the time. The said module should be revised by adding the following subjects. 1) Clear criteria of the model farmers including fodder crop plot not only napirgrass but also leguminous crop. 2) Estimated months to distribute a female calf to the 2nd generation following to delivery by clarifying weaning stage 3) Milk performance related to pedigree index (25 %, 50 %, and 75 %) and type of feeding materials including concentrates, energy and protein source crops.	RARDA	

5.2 Framework of following up activity for the QP

In a view of sustainability on the QP, local government such as Cell/Sector/District level is essential to taking initiatives for following up of the QP in collaboration with RARDA. Because this development study by JICA is phased out in October 2008. In this regard, most vital factor for sustainability of the QP is the MF's initiatives; however, initiatives of the MFs seem to be discouraged with poor milk performance in combined with many animal health problems **(See Table 4.4)** of the delivered crossbred in the QP. As far as this credibility gap is swept away, initiatives of the MF is difficult to be demonstrated positively. One of solutions was already mentioned in the aforementioned subject-"**Selection of high quality crossbred**" in **Table 4.16**. Because "One cow, one family" policy is aimed at eradicating poverty reduction of poor family by generating income via sale of milk, and this is a vital factor to launch this project powerfully.

5.3 Question to "One cow One Family" Policy

The quick project of "Modern cow distribution" along to "One cow one family" policy has been launched since December 2006, and many subjects to be tackled for future improvement were come to light, which was mentioned in **Table 4.16**.

Apart from the subjects, the following points should be necessary for examining carefully in terms of physiological characteristics of crossbred, socio-economic views for criteria of candidate, and exhibition of feasible implementing framework.

Table 4.17 Reconsideration matter of One-cow One Family Project

1	Zero grazing system	-This system has both merit and demerit. So far observed via JICA Quick Project, burden work such as fetching water with feeding materials appeared to be increased. Further one of heifer got leg problem swelled due to lack of physical movement in cowshed. Thus, semi-grazing system should be considered in comparison to zero-grazing system.
2	Selection of candidate farmer for modern cow recipient	-Criteria of candidate are stipulated as poor farmer including one of precondition of holding certain fodder crop plot. A definition of poor is not clear, and real poor farmer could not afford to rear crossbred in zero-grazing system based on JICA QP experience.
3	Selection of high	- In case of JICA QP, high quality of crossbred (75%) could not be

	quality of crossbred heifer	selected with 100 % guaranteed pedigree index because of present domestic crossbred market situation. In this regard, RARDA should list up guaranteed crossbred farms for recommendation to relevant stakeholder who plan to implement cow project along the said policy.
4	Supporting framework	**Guideline for One cow One family Project**: "One cow one family" policy is understood as one of poverty reduction approach. To materialize this policy, one of concrete guideline should be made by RARDA how to launch project including feasible supporting framework to stipulate responsibility of all relevant stakeholders clearly in a view of sustainability, based on the on-going cow project thorough monitoring and evaluation.

Source: JICA Study Team, August 2007.

Annex I: Summary Tables for Food Expenditure (Unit: Rwf)

(1) QP1:Rainwater Storage

Part I

No	Recipient code	Sorghum	Sweet potatoes	Sweet cassava	Cassava flour	Maize flour	Bean	Groundnut
1	Cy-Rj	3,256	2,187	675	6,941	9,615	1,236	888
2	Cy-Ms	NP*	NP	NP	1,600	18,000	NP	NP
3	Cy-Gam	NP	NP	NP	37,500	25,000	15,000	NP
4	Cy-Mb	NP	1,500	NP	220	2,150	NP	650
5	Cy-Nf	NP	8,000	3,000	14,000	45,000	NP	NP
6	Cy-Gal	50,000	NP	NP	13,000	NP	NP	1,750
7	Kz-Bj	NP	10,500	900	4,500	12,000	2,400	600
8	Kz-Nb	NP	NP	NP	440	2,000	NP	NP
9	Kz-Kj	NP	NP	300	NP	17,000	NP	NP
10	Kz-Mv	NP	15,000	NP	4,000	NP	2,400	4,600
11	Kz-Ke	NP	NP	NP	NP	13,500	NP	5,400
12	Kz-M	**	**	**	**	**	**	**
13	Kb-Kj	NP	NP	1,600	2,400	8,000	NP	NP
14	Kb-Mfn	NP	NP	5,000	6,000	5,500	NP	1,200
15	Kb-Ms	NP	NP	NP	NP	NP	NP	NP
16	Kb-Ne	NP	NP	NP	NP	3,000	NP	NP
17	Kb-Kl	NP	NP	NP	24,700	NP	NP	NP
18	Kb-Mfs	2,100	NP	NP	2,700	2,700	NP	NP
Average		18,452	7,437	1,913	9,077	12,574	5,259	2,155

Source: Interview Survey Results by JICA Study Team, 2006 / NP*: No Purchasing / **: No response given by the interviewee

Part II

No	Recipient code	Banana	Irish potatoes	Meat	Rice	Vegetables	Sugar	Cooking oil
1	Cy-Rj	3,050	5,756	2,750	1,919	1,001	4,513	2,525
2	Cy-Ms	NP	700	NP	NP	NP	NP	NP
3	Cy-Gam	NP	NP	NP	6,000	NP	44,000	NP
4	Cy-Mb	NP	4,600	NP	1,250	700	NP	1,000
5	Cy-Nf	8,500	6,500	3,500	6,200	4,500	10,500	6,000
6	Cy-Gal	NP	20,000	NP	2,000	NP	3,000	6,000
7	Kz-Bj	1,500	2,300	2,400	2,400	1,500	3,500	2,000
8	Kz-Nb	NP	500	2,400	NP	820	3,200	3,200
9	Kz-Kj	NP	3,400	2,000	NP	700	NP	5,700
10	Kz-Mv	17,000	5,500	3,100	4,800	600	NP	2,800
11	Kz-Ke	12,000	6,000	8,100	NP	NP	NP	NP
12	Kz-M	**	**	**	**	**	**	**
13	Kb-Kj	3,000	20,000	8,000	NP	NP	2,400	NP
14	Kb-Mfn	NP	6,600	1,800	NP	2,000	600	5,000
15	Kb-Ms	4,600	4,000	8,800	5,400	900	1,400	2,700
16	Kb-Ne	NP	3,500	2,500	200	2,300	NP	3,000
17	Kb-Kl	NP	2,500	NP	2,460	2,000	3,600	3,000
18	Kb-Mfs	2,200	6,000	1,400	NP	NP	NP	NP
Average		6,481	6,116	3,896	3,263	1,547	7,671	3,577

Source: Interview Survey Results by JICA Study Team, 2006 / NP*: No Purchasing / **: No response given by the interviewee

Final part

No	Recipient code	Salt	Milk	Total
1	Cy-Rj	1,186	316	47,814
2	Cy-Ms	2,000	NP	22,300
3	Cy-Gam	NP	NP	127,500
4	Cy-Mb	500	NP	12,570
5	Cy-Nf	900	3,000	119,600
6	Cy-Gal	2,000	NP	97,750
7	Kz-Bj	2,400	NP	48,900
8	Kz-Nb	1,800	450	14,810
9	Kz-Kj	600	NP	29,700
10	Kz-Mv	2,000	450	62,250
11	Kz-Ke	NP	NP	45,000
12	Kz-M	**	**	**
13	Kb-Kj	1,200	NP	46,600
14	Kb-Mfn	2,400	NP	36,100
15	Kb-Ms	600	960	29,360
16	Kb-Ne	1,200	NP	15,700
17	Kb-Kl	600	NP	38,860
18	Kb-Mfs	800	200	18,100
Average		1,346	896	47,818

Source: Interview Survey Results by JICA Study Team, 2006 / NP*: No Purchasing / **: No response given by the interviewee

QP2 :Shallow Well Irrigation

Part I

No	Recipient code	Fish	Sweet potatoes	Sweet cassava	Cassava flour	Maize flour	Soy beans	Groundnut
1	Cy-Na	NP*	1,000	NP	NP	4,800	1,000	NP
2	Cy-Mj	NP	NP	NP	750	1,200	NP	NP
3	Cy-Ng	NP	NP	1,500	6,000	10,000	NP	NP
4	Cy-Gg	NP	1,400	NP	2,500	18,000	NP	NP
5	Kz-Ut	NP	NP	NP	NP	4,700	1,000	NP
6	Kz-Na	NP	NP	NP	NP	3,600	NP	NP
7	Kz-Mj	NP	NP	NP	5,000	2,000	NP	NP
8	Kz-Mv	NP	NP	NP	NP	36,000	NP	NP
9	Kb-Mj	**	**	**	**	**	**	**
10	Kb-Mt	**	**	**	**	**	**	**
11	Kb-Tt	NP	NP	NP	2,000	1,000	NP	1,000
12	Kb-Kd	4,500	6,000	NP	NP	NP	NP	NP
Average		4,500	2,800	1,500	3,250	9,033	1,000	1,000

Source: Interview Survey Results by JICA Study Team, 2006 / NP*: No Purchasing / **: No response given by the interviewee

Part II

No	Recipient code	Cooking banana	Irish potatoes	Meat	Rice	Vegetables	Sugar	Cooking oil
1	Cy-Na	NP*	1,000	1,000	2,000	NP	NP	2,500
2	Cy-Mj	NP	4,000	1,000	860	NP	NP	2,000
3	Cy-Ng	NP	8,000	3,600	NP	NP	NP	5,000
4	Cy-Gg	NP	8,000	2,000	1,250	3,000	4,000	5,250
5	Kz-Ut	NP	20,000	36,000	4,000	NP	NP	6,000
6	Kz-Na	2,000	1,500	1,600	1,100	NP	NP	7,000
7	Kz-Mj	NP	NP	6,000	3,000	NP	2,000	4,000
8	Kz-Mv	NP	NP	7,000	8,400	NP	NP	6,000
9	Kb-Mj	**	**	**	**	**	**	**
10	Kb-Mt	**	**	**	**	**	**	**
11	Kb-Tt	NP	5,000	2,000	NP	3,500	NP	3,000
12	Kb-Kd	NP	NP	2,400	3,000	1,600	NP	4,800
Average		2,000	6,786	6,260	2,951	2,700	3,000	4,555

Source: Interview Survey Results by JICA Study Team, 2006 / NP*: No Purchasing / **: No response given by the interviewee

Final part

No	Recipient code	Salt	Beans	Honey	Tea	Total
1	Cy-Na	1,200	NP	NP	NP	14,500
2	Cy-Mj	800	NP	NP	NP	10,610
3	Cy-Ng	1,600	10,000	NP	NP	45,700
4	Cy-Gg	600	NP	NP	NP	46,000
5	Kz-Ut	2,000	NP	NP	NP	73,700
6	Kz-Na	1,600	NP	NP	NP	18,400
7	Kz-Mj	1,000	NP	6,000	NP	29,000
8	Kz-Mv	NP	NP	NP	NP	57,400
9	Kb-Mj	**	**	**	**	**
10	Kb-Mt	**	**	**	**	**
11	Kb-Tt	1,200	NP	NP	1,000	19,700
12	Kb-Kd	2,000	NP	NP	NP	24,300
Average		1,333	10,000	6,000	1,000	33,931

Source: Interview Survey Results by JICA Study Team, 2006 / NP*: No Purchasing / **: No response given by the interviewee

(3) QP3: Roadside Irrigation

Part I

No	Recipient code	Fish	Sweet potatoes	Sweet cassava	Cassava flour	Maize flour	Groundnut	Cooking banana
1	Cy-Ka	NA*	NA	NA	NA	NA	NA	NA
2	Cy-Mp	NA	NA	NA	NA	NA	1,000	NA
3	Cy-Mn	3,000	NA	NA	6,000	12,000	3,000	NA
4	Kz-Kt	NA	NA	NA	30,000	NA	NA	NA
5	Kz-Mm	NA	NA	NA	NA	NA	NA	NA
6	Kz-Me	NA	NA	1,600	8,000	3,000	NA	3,000
7	Kb-Mj	4,000	NA	NA	NA	6,000	NA	NA
8	Kb-Mc	NA	NA	NA	3,700	NA	NA	9,000
9	Kb-Ma	NA	6,000	2,000	18,000	10,000	NA	
Average		3500	6,000	1,800	13,140	7,750	2,000	6,000

Source: Interview Survey Results by JICA Study Team, 2006 / NA*: Not Applicable

Final part

No	Recipient code	Irish potato	Meat	Rice	Vegetables	Sugar	Cooking oil	Salt	Total
1	Cy-Ka	NA	7,500	8,000	5,000	4,700	7,500	1,200	**33,900**
2	Cy-Mp	NA	NA	NA	NA	NA	NA	1,000	**2,000**
3	Cy-Mn	9,000	6,000	3,000	3,000	3,000	3,000	2,000	**53,000**
4	Kz-Kt	20,000	2,800	NA	NA	NA	NA	2,000	**54,800**
5	Kz-Mm	13,000	8,400	2,400	5,000	NA	3,600	500	**32,900**
6	Kz-Me	2,000	4,800	2,000	2,400	NA	1,000	1,000	**28,800**
7	Kb-Mj	5,000	4,500	6,000	5,500	8,000	4,000	2,400	**45,400**
8	Kb-Mc	17,000	NA	3,300	2,200	NA	6,000	2,200	**43,400**
9	Kb-Ma	2,000	3,600	1,500	2,400	NA	5,000	2,000	**52,500**
Average		9,714	5,371	3,743	3,643	5,233	4,300	1,589	**38,522**

Source: Interview Survey Results by JICA Study Team, 2006 / NA*: Not Applicable

(4) QP4: Modern Cow Distribution

Part I

No	Recipient code	Sweet cassava	Cassava flour	Maize flour	Groundnut	Banana	Irish potatoes	Meat
1	Cy-Kj	**NP***	12,500	920	800	**NP**	2,000	9,000
2	Cy-Ms	**NP**	**NP**	2,400	1,200	**NP**	**NP**	**NP**
3	Cy-Mm	**NP**	10,800	560	**NP**	2,500	800	3,000
4	Kz-Km	**NP**	**NP**	**NP**	**NP**	**NP**	24,000	18,000
5	Kz-Me	**NP**	5,270	6,250	**NP**	**NP**	2,300	**NP**
6	Kz-Ko	**NP**	**NP**	**NP**	**NP**	**NP**	4,800	5,400
7	Kb-Mm	**NP**	**NP**	**NP**	**NP**	**NP**	300	**NP**
8	Kb-Gi	4000	7,500	2,550	1,500	**NP**	3,400	**NP**
9	Kb-Rj	**NP**	**NP**	12,000	**NP**	**NP**	4,000	**NP**
Average		4,000	9,017	4,113	1,166	2,500	5,200	8,850

Source: Interview Survey Results by JICA Study Team, 2006 / **NP: No Purchasing**

Final part

No	Recipient Code	Rice	Vegetables	Sugar	Cooking oil	Salt	Total
1	Cy-Kj	**NP**	6,000	**NP**	7,000	3,000	41,220
2	Cy-Ms	**NP**	2,300	2,200	1,500	750	10,350
3	Cy-Mm	**NP**	1,600	2,200	1,050	600	23,110
4	Kz-Km	5,500	25,000	3,500	9,600	2,880	88,480
5	Kz-Me	5,000	3,500	**NP**	2,400	650	25,370
6	Kz-Ko	1,500	3,600	2,400	3,000	600	21,300
7	Kb-Mm	**NP**	2,400	3,200	700	2,250	8,850
8	Kb-Gi	1,600	2,050	2,200	1,500	650	26,950
9	Kb-Rj	3,250	**NP**	2,100	1,000	900	23,250
Average		3,370	5,806	2,225	3,083	1,364	29,876

Source: Interview Survey Results by JICA Study Team, 2006 / **NP: No Purchasing**

Annex II: Summary Table for Non Food Expenditure (Unit: Rwf)

(1) QP1: Rainwater Storage

Part I

No	Recipient code	Domestic water	Kerosene	Firewood	Clothes	Soap	Lotion	Tooth cream
1	Cy-Rj	**	**	**	**	**	**	**
2	Cy-Ms	NP	NP	NP	NP	4,000	NP	NP
3	Cy-Gam	NP	800	NP	60,000	5,000	NP	NP
4	Cy-Mb	NP	1,200	NP	NP	1,000	1,080	450
5	Cy-Nf	NP	3,000	NP	11,000	4,700	8,000	750
6	Cy-Gal	NP	NP	NP	10,000	1,650	3,000	6,000
7	Kz-Bj	1,200	7,200	NP	30,000	7,000	6,000	NP
8	Kz-Nb	500	6,000	NP	30,000	6,000	7,200	NP
9	Kz-Kj	NP	1,300	NP	7,000	1,200	1,200	NP
10	Kz-Mv	NP	4,200	6,500	8,000	4,800	1,200	450
11	Kz-Ke	**	**	**	**	**	**	**
12	Kz-M	**	**	**	**	**	**	**
13	Kb-Kj	NP	5,000	NP	10,000	7,000	5,000	NP
14	Kb-Mfn	NP	5,000	NP	20,000	3,000	NP	NP
15	Kb-Ms	NP	3,000	14,000	82,000	3,600	3,000	600
16	Kb-Ne	NP	1,500	NP	9,000	2,400	1,500	1,200
17	Kb-Kl	NP	2,100	NP	3,000	2,300	780	NP
18	Kb-Mfs	NP	500	NP	5,000	2,000	1,000	NP
Average		850	3,138	10,250	21,923	3,710	3,247	1,575

Source: Interview Survey Results by JICA Study Team, 2006 / NP*: No Purchasing / **: No response given by the interviewee

Part II

No	Recipient code	Shoe cream	Shoes	Notebook	Radio	Watch	Blanket	Match
1	Cy-Rj	**	**	**	**	**	**	**
2	Cy-Ms	NP	NP	NP	NP	NP	NP	NP
3	Cy-Gam	NP	NP	NP	NP	NP	NP	NP
4	Cy-Mb	NP	NP	NP	NP	NP	NP	NP
5	Cy-Nf	NP	9,000	NP	NP	NP	NP	NP
6	Cy-Gal	1,050	NP	NP	2,500	1,500	NP	NP
7	Kz-Bj	NP	NP	12,000	NP	NP	NP	NP
8	Kz-Nb	NP	NP	NP	NP	NP	NP	2,000
9	Kz-Kj	NP	NP	NP	NP	NP	NP	NP
10	Kz-Mv	NP	NP	NP	NP	NP	NP	NP
11	Kz-Ke	**	**	**	**	**	**	**
12	Kz-M	**	**	**	**	**	**	**
13	Kb-Kj	400	3,600	1,500	NP	NP	NP	NP
14	Kb-Mfn	0	2,500	NP	NP	NP	3,600	NP
15	Kb-Ms	600	NP	NP	NP	NP	NP	NP
16	Kb-Ne	1,500	NP	NP	NP	NP	NP	NP
17	Kb-Kl	300	NP	NP	NP	NP	NP	NP
18	Kb-Mfs	NP	1,200	NP	NP	NP	3,500	NP
Average		770	4,075	6,750	2,500	1,500	3,550	2,000

Source: Interview Survey Results by JICA Study Team, 2006 / NP*: No Purchasing / **: No response given by the interviewee

Part III

No	Recipient code	Cutting hair	HH pots	House Keeper	Radio battery	Imisanzu	Ceremonial occasion	Shool fees
1	Cy-Rj	**	**	**	**	**	**	**
2	Cy-Ms	NP	1,500	NP	NP	NP	NP	400
3	Cy-Gam	NP	1,000	NP	NP	NP	NP	1,000
4	Cy-Mb	NP	NP	NP	NP	300	1,500	NP
5	Cy-Nf	NP	NP	NP	NP	600	1,500	NP
6	Cy-Gal	NP	NP	NP	NP	1,000	500	150,000
7	Kz-Bj	NP	9,800	NP	NP	NP	NP	1,200
8	Kz-Nb	3,600	NP	NP	NP	900	NP	1,200
9	Kz-Kj	2,700	NP	NP	NP	2,700	12,000	NP
10	Kz-Mv	NP	NP	NP	NP	900	2,000	NP
11	Kz-Ke	**	**	**	**	**	**	**
12	Kz-M	**	**	**	**	**	**	**
13	Kb-Kj	NP	NP	2,000	2,000	NP	12,000	300
14	Kb-Mfn	NP	NP	NP	2,000	NP	NP	300
15	Kb-Ms	NP	NP	NP	NP	300	20,000	NP
16	Kb-Ne	NP	NP	NP	NP	300	7,000	1,050
17	Kb-Kl	NP	1,200	NP	NP	800	10,300	NP
18	Kb-Mfs	NP	NP	NP	1,000	NP	NP	100
Average		3,150	3,375	2,000	1,667	867	7,422	17,283

Source: Interview Survey Results by JICA Study Team, 2006 / NP*: No Purchasing / **: No response given by the interviewee

Final part

No	Recipient code	Medical fees	Rental lands	Total
1	Cy-Rj	**	**	**
2	Cy-Ms	11,500	NP	17,400
3	Cy-Gam	NP	NP	67,800
4	Cy-Mb	NP	NP	5,530
5	Cy-Nf	3,000	NP	41,550
6	Cy-Gal	200,000	NP	377,200
7	Kz-Bj	1,800	NP	76,200
8	Kz-Nb	NP	NP	57,400
9	Kz-Kj	34,000	NP	62,100
10	Kz-Mv	12,100	NP	40,150
11	Kz-Ke	**	**	**
12	Kz-M	**	**	**
13	Kb-Kj	NP	10,000	58,800
14	Kb-Mfn	NP	6,000	42,400
15	Kb-Ms	10,000	15,000	152,100
16	Kb-Ne	1,000	NP	26,450
17	Kb-Kl	15,000	NP	35,780
18	Kb-Mfs	NP	NP	14,300
Average		32,044	10,333	71,677

Source: Interview Survey Results by JICA Study Team, 2006 / NP*: No Purchasing / **: No response given by the interviewee

QP2: Shallow Well Irrigation

Part I

No	Recipient code	Kerosene	Firewood	Clothes	Soap	Lotion	Tooth cream	Shoes cream
1	Cy-Na	3,600	NA*	10,000	5,000	NA	NA	NA
2	Cy-Mj	1,000	NA	NA	1,500	NA	NA	NA
3	Cy-Ng	4,000	NA	16,000	6,000	2,000	NA	NA
4	Cy-Gg	6,000	NA	25,300	1,800	7,460	NA	3,000
5	Kz-Ut	5,000	NA	20,000	8,000	6,000	NA	NA
6	Kz-Na	3,000	NA	16,000	3,000	3,000	700	400
7	Kz-Mj	2,400	NA	10,500	3,400	2,200	600	1,000
8	Kz-Mv	3,000	NA	17,000	1,000	NA	1,500	1,200
9	Kb-Mj	4,000	NA	2,000	NA	NA	NA	NA
10	Kb-Mt	300	NA	20,000	2,000	NA	NA	NA
11	Kb-Tt	700	5,000	10,000	1,200	2,400	3,600	3,000
12	Kb-Kd	1,000	NA	2,500	1,000	2,000	NA	8,000
Average		2,833	5,000	13,573	3,082	3,580	1,600	2,767

Source: Interview Survey Results by JICA Study Team, 2006 / NA*: Not Applicable

Part II

No	Recipient code	Shoes	Bicycle	Cow	Matress	Radio	Watch	Belt
1	Cy-Na	1,000	NA	NA	NA	2,500	NA	NA
2	Cy-Mj	NA*	NA	NA	NA	NA	NA	NA
3	Cy-Ng	6,000	NA	NA	NA	NA	NA	NA
4	Cy-Gg	800	NA	NA	NA	NA	700	600
5	Kz-Ut	NA	35,000	30,000	NA	4,700	NA	NA
6	Kz-Na	NA	18,000	NA	NA	4,500	NA	NA
7	Kz-Mj	8,800	20,000	NA	12,000	NA	700	NA
8	Kz-Mv	4,000	NA	NA	NA	NA	NA	NA
9	Kb-Mj	NA	NA	NA	NA	NA	NA	NA
10	Kb-Mt	4,800	NA	NA	NA	NA	NA	NA
11	Kb-Tt	9,000	NA	NA	NA	NA	NA	NA
12	Kb-Kd	8,000	NA	NA	NA	NA	NA	NA
Average		5,300	24,333	30,000	12,000	3,900	700	600

Source: Interview Survey Results by JICA Study Team, 2006 / NA*: Not Applicable

Part III

No	Recipient code	Blanket	Guitare	Cutting hair	HH pots	Radio battery	Tile	Imisanzu
1	Cy-Na	NA*	NA	NA	NA	NA	NA	300
2	Cy-Mj	NA	NA	NA	NA	NA	NA	NA
3	Cy-Ng	12,000	NA	NA	NA	NA	NA	1,300
4	Cy-Gg	NA	NA	NA	NA	NA	NA	600
5	Kz-Ut	2,000	NA	800	NA	NA	NA	1,400
6	Kz-Na	4,200	7,200	2,000	NA	4,000	NA	NA
7	Kz-Mj	2,000	NA	300	NA	1,800	NA	1,000
8	Kz-Mv	NA	NA	NA	NA	NA	NA	3,000
9	Kb-Mj	NA	NA	NA	1,800	NA	NA	NA
10	Kb-Mt	1,500	NA	NA	NA	NA	15,000	400
11	Kb-Tt	4,500	NA	NA	NA	NA	NA	500
12	Kb-Kd	NA	NA	NA	NA	NA	NA	1,200
Average		4,367	7,200	1,033	1,800	2,900	15,000	1,078

Source: Interview Survey Results by JICA Study Team, 2006 / NA*: Not Applicable

Final part

No	Recipient code	Ceremonial occasion	School fees	Medical fees	Rental lands	Total
1	Cy-Na	2,000	NA	20,000	NA	44,400
2	Cy-Mj	NA*	33,300	900	NA	36,700
3	Cy-Ng	8,000	2,100	12,000	NA	69,400
4	Cy-Gg	38,000	NA	1,100	NA	85,360
5	Kz-Ut	NA	NA	NA	12,000	124,900
6	Kz-Na	NA	NA	1,200	NA	67,200
7	Kz-Mj	3,000	NA	4,000	20,000	93,700
8	Kz-Mv	60,000	10,000	150,000	5,000	255,700
9	Kb-Mj	NA	21,000	NA	NA	28,800
10	Kb-Mt	5,000	200	450	NA	49,650
11	Kb-Tt	35,000	NA	2,000	NA	76,900
12	Kb-Kd	2,400	300	NA	NA	26,400
Average		19,175	11,150	21,294	12,333	79,926

Source: Interview Survey Results by JICA Study Team, 2006 / NA*: Not Applicable

(3) QP3 : Roadside Irrigation

Part I

No	**Recipient code**	**Kerosene**	**Clothes**	**Soap**	**Lotion**	**Tooth cream**	**Shoes cream**
1	Cy-Ka	NA	15,000	2,100	3,000	1,500	NA
2	Cy-Mp	NA	NA	1,000	NA	NA	NA
3	Cy-Mn	3,600	15,000	1,200	5,200	2,400	NA
4	Kz-Kt	NA	30,000	1,500	3,000	NA	NA
5	Kz-Mm	6,000	20,000	3,000	1,000	NA	NA
6	Kz-Me	3,200	20,000	3,000	2,000	NA	NA
7	Kb-Mj	7,200	25,000	4,400	3,600	2,500	2,000
8	Kb-Mc	NA	19,000	3,400	4,600	2,700	NA
9	Kb-Ma	5,000	51,000	NA	NA	NA	NA
Average		5,000	24,375	2,450	3,200	2,275	2,000

Source: Interview Survey Results by JICA Study Team, 2006 / NA*: Not Applicable

Part II

No	Recipient code	Construction of house	Mobile phone	Radio	Chairs	Blanket	HH pots
1	Cy-Ka	NA	NA	NA	NA	NA	NA
2	Cy-Mp	NA	NA	NA	NA	NA	NA
3	Cy-Mn	NA	NA	NA	NA	NA	7,200
4	Kz-Kt	NA	NA	NA	NA	NA	NA
5	Kz-Mm	NA	NA	NA	NA	NA	5,000
6	Kz-Me	NA	NA	NA	NA	NA	NA
7	Kb-Mj	350,000	45,000	NA	NA	NA	NA
8	Kb-Mc	NA	NA	NA	8,000	NA	NA
9	Kb-Ma	NA	NA	7,000	NA	10,000	6,000
Average		350,000	45,000	7,000	8,000	10,000	6,067

Source: Interview Survey Results by JICA Study Team, 2006 / NA*: Not Applicable

Final part

No	Recipient code	Imisanzu	Ceremonial occasion	School fees	Medical fees	Rental Lands	Total
1	Cy-Ka	900	NA	NA	6,000	NA	**28,500**
2	Cy-Mp	NA	NA	900	40,000	NA	**41,900**
3	Cy-Mn	NA	NA	NA	NA	NA	**34,600**
4	Kz-Kt	NA	NA	NA	9,000	NA	**43,500**
5	Kz-Mm	900	20,000	NA	NA	NA	**55,900**
6	Kz-Me	1,800	NA	2,000	8,000	2,000	**42,000**
7	Kb-Mj	1,350	6,000	600	10,000	15,000	**472,650**
8	Kb-Mc	NA	NA	NA	9,000	NA	**46,700**
9	Kb-Ma	1,000	40,000	1,200	NA	NA	**121,200**
Average		1,190	22,000	1,175	13,667	8,500	**98,550**

Source: Interview Survey Results by JICA Study Team, 2006 / NA*: Not Applicable

(4) QP4 non food expenditure (Modern Cow Distribution)

Part I:

No	Recipient code	Domestic water	Kerosene	Clothes	Soap	Lotion	Tooth cream	Shoes cream
1	Cy-Kj	**NP***	2,000	13,000	3,000	1,200	1,200	0
2	Cy-Ms	**NP**	1,500	2,700	750	1,500	900	0
3	Cy-Mm	**NP**	**NP**	10,000	900	3,000	600	0
4	Kz-Km	18,000	7,200	60,000	30,000	4,000	1,200	1,200
5	Kz-Me	**NP**	3,240	6,000	850	4,000	720	0
6	Kz-Ko	**NP**	3,000	30,000	1,200	6,000	1,500	1,800
7	Kb-Mm	**NP**	1,800	**NP**	1,000	**NP**	**NP**	**NP**
8	Kb-Gi	**NP**	1,500	**NP**	1,000	800	360	**NP**
9	Kb-Rj	**NP**	**NP**	30,000	4,500	**NP**	300	900
Average		18,000	2,891	21,671	4,800	2,929	848	1,300

Source: Interview Survey Results by JICA Study Team, 2006 / **NP: No Purchasing**

Part II:

No	Recipient code	Shoes	Aid to relatives	Cutting hair	HOUSEHOLD pots	House keeper	Radio battery	Imisanzu
1	Cy-Kj	12,000	NP	NP	NP	NP	2,500	NP
2	Cy-Ms	NP*	NP	NP	NP	NP	NP	600
3	Cy-Mm	NP	NP	NP	NP	NP	NP	300
4	Kz-Km	10,000	45,000	4,800	5,000	72,000	NP	16,400
5	Kz-Me	2,800	NP	2,500	NP	NP	NP	500
6	Kz-Ko	NP	NP	NP	NP	NP	NP	4,550
7	Kb-Mm	400	NP	NP	NP	NP	NP	NP
8	Kb-Gi	NP	NP	NP	NP	NP	NP	600
9	Kb-Rj	NP	NP	NP	NP	NP	NP	1,800
Average		6,300	45,000	3,650	5,000	72,000	2,500	3,094

Source: Interview Survey Results by JICA Study Team, 2006 / **NP*: No Purchasing**

Final part:

No	Recipient code	Ceremonial occasion	Shool fees	Medical fees	Rental lands	Total
1	Cy-Kj	NP	NP	NP	NP	34,900
2	Cy-Ms	NP	NP	4,200	NP	12,150
3	Cy-Mm	NP	NP	1,000	NP	15,800
4	Kz-Km	100,000	2,400	12,000	NP	389,200
5	Kz-Me	10,000	NP	NP	NP	30,610
6	Kz-Ko	NP	30,000	20,000	NP	98,050
7	Kb-Mm	NP	300	NP	NP	3,500
8	Kb-Gi	15,000	15,000	3,600	30,000	67,860
9	Kb-Rj	NP	30,000	5,000	NP	72,500
Average		41,667	15,540	7,633	30,000	80,508

Source: Interview Survey Results by JICA Study Team, 2006 / **NP: No Purchasing**

Annex III : Questionnaire used for the Household Economy Baseline Assessment on the QP Model farmers in Ntarama Sector / District of Bugesera

Household Economy Survey for QP model farmers in Ntarama Sector

Notice:
Period asked in each question: July 2005 – June 2006
Season C: Jul-Sep 2005 → ***Season A: Sep 2005-Jan 2006*** → ***Season B: Feb-Jun 2006***

Relation of Quick Project and Each Questionnaire **Remark: A refers to applicable.**

	Quick Project	Header	Chap1	Chap2	Chap3	Chap4	Chap5	Chap6
1	Rain water Storage	A	A	A	A	A	A	A
2	Shallow well irrigation	A	A	A	A	A	A	A
3	Roadside irrigation	A	A	A	A	A	A	A
4	Modern Cow distribution	A	A	A	A	A	A	A

Header

1	**Applicable Quick Project No. (Check No) : 1._____, 2._____, 3._____, 4._____, If QP2 is checked, go next.**
	FH belongs to which shallow well site: 1. Cell Name_____: 2. Site Name _____:
2	**Name of enumerator: _____; Date:____ day____ month_____ _year**
3	**Name of Household Head: _____(Age: _____ *F /M*) ; Academic background :_____years**
4	**Name of *Umudugudu:* _____;*Cell:* _____;*Sector:*_____ :____**

1. General

About your family					
1.	Year immigrated to : 1. Immigrated on _____month_____year, 2. Born here				
2.	How many members are there in your family (living together including yourself)?				_____
3.	How many are engaged in farming?				_____
4.	No	Member	Age	Sex	Academic Background (Total Years)
	1	Wife / Husband			
	2	1. 2. 3. 4. 5. 6.			
	3	1. 2. 3. 4. 5. 6.			
	4	1. 2. 3. 4. 5. 6.			
	5	1. 2. 3. 4. 5. 6.			
	6	1. 2. 3. 4. 5. 6.			
	7	1. 2. 3. 4. 5. 6.			
	8	1. 2. 3. 4. 5. 6.			

	9	1. 2. 3. 4. 5. 6.			
	10	1. 2. 3. 4. 5. 6.			
	Member : 1. Son, 2.Daughter, 3.Adapted child, 4. Relative, 5. Friend, 6.Other				

5.	Who is a principle decision-maker or manager of house economy?		
	1	Farming practice and its expenditure	1. husband, 2. wife, 3.bothouseholdusband and wife, 4.other (_____)
	2	Family food	1. husband, 2. wife, 3.bothouseholdusband and wife, 4.other (_____)

6.	Meal											
	1	How many times do you usually have meal per day?										
	Month	8	9	10	11	12	1	2	3	4	5	6	7
	Time/ day												
	2	What is your family's staple food? (Chose all choice that is applicable.)											

Season	Season C	Season A	Season B
Staple Food	1. Sorghum, 2.Maize 3. H/Bean 4.Banana, 5.Cassava, 6. S/Potato, 7.Others_____	1. Sorghum, 2.Maize 3. H/Bean 4. Banana, 5.Cassava, 6. S/Potato, 7.Others_____	1. Sorghum, 2.Maize 3. H/Bean 4.Banana, 5.Cassava, 6. S/Potato, 7.Others_____

Land Tenure

7.	1. How many farm lands (including farmyard, crops) do you have?		_____ (ha) ____ (No of parcel sites)
	2 How many cultivated area do you own? (except for the area you lend)		_____ (ha) ____ (No of parcel sites)
	2-1	Hilly side: 1. With irrigation or 2. Rainfed, 3.Both	_____ (ha) ____ (parcel sites) , 1. 2. 3.
	2-2	Marshland (Igishanga): 1. With irrigation or 2. Rainfed, 3. Both	_____ (ha) ____ (parcel sites) , 1. 2. 3.
	2-3	Wetland (Akabande): 1. With irrigation or 2. Rainfed, 3. Both	_____ (ha) ____ (parcel sites) , 1. 2. 3.
	3. How many farm plots do you borrow?		_____ (ha) ____ (No of parcel sites)
	3-1	Hilly side: 1. With irrigation or 2. Rainfed, 3. Both	_____ (ha) ____ (parcel sites) , 1. 2. 3.
	3-2	Marshland (Igishanga): 1. With irrigation or 2. Rainfed, 3. Both	_____ (ha) ____ (parcel sites) , 1. 2. 3.
	3-3	Wetland (Akabande): 1. With irrigation or 2. Rainfed, 3. Both	_____ (ha) ____ (parcel sites) , 1. 2. 3.
	4. How many farm plots do you lend?		_____ (ha) ____ (parcel sites) , 1. 2. 3.
	4-1	Hilly side: 1. With irrigation or 2. Rainfed, 3. Both	_____ (ha) ____ (parcel sites) , 1. 2. 3.

	4-2	Marshland (Igishanga): 1. With irrigation or 2. Rainfed, 3. Both	_____ (ha) ____ (parcel sites) , 1. 2. 3.
	4-3	Wetland (Akabande): 1. With irrigation or 2. Rainfed, 3. Both	_____ (ha) ____ (parcel sites) , 1. 2. 3.

2. Income (July 2005 –June 2006)

Income from Farming (except for Association Activity)

8.	Kind	Plant month	Harvest month	Yield	Sales	Unit Price	Amount
	Season A (September, 2005 to January 2006)						
	Maize	Planting Period: From [_____month] to [_____ month]					_____ frw
		Harvesting period: From [_____ month] to [_____month] = [ ] months					
		Number of times for sale of cobs [_____times]					
		Number of cobs per each sale [_____cobs], Sale price= [_____Frw/cob]					
		Number of bags for sale of maize grains [_____ times] , Sale Price= [_____Frw/bag]					
	Haricot Bean	Planting Period: From [_____month] to [_____ month]					_____ frw
		Harvesting period: From [_____ month] to [_____month] = [ ] months					
		Number of times for sale of **green pods** [_____times]					
		Unit for sale: 1. Basket [ ], 2. Plate [ ], 3. Heap [ ] , 4.Others [ ]					
		Unit Price [_____Frw/unit [ ], Sale Amount [					
		Number of times for sale of **dry beans** [_____ times]					
		Unit for sale: 1. Basket [ ], 2. Plate [ ], 3. Heap [ ] , [					
		Unit Price [_____Frw/unit [ ]、Sale Amount [_____ Frw/each time]					
	Sweet Potato	Planting Period: From [_____month] to [_____ month]					_____ frw
		Harvesting period: From [_____ month] to [_____month] = [					
		Number of times for sale of sweet potato [_____times]					
		Unit for sale: 1. Basket [ ], 2. Plate [ ], 3. Heap [ ] , 4.Others [ ]					
		Sale Amount [_____ Frw/each time]					
	Tomato	Planting Period: From [_____month] to [_____ month]					_____ frw
		Harvesting period: From [month] to [month] =					
		Number of times harvesting / week: [times]					
		Did you sell it or not at each time? 1. [_____yes] ,					
		Sale amount per each time: [_____Frw/time in average]___					
	Other Vegetables-1 [ ]	Planting Period: From [_____month] to [_____ month]					_____ frw
		Harvesting period: From [_____ month] to [_____month] =					
		Number of times harvesting / week: [_____times]					
		Did you sell it or not at each time? 1. [_____yes] ,					

		Sale amount per each time: [_____Frw/time in average]___	
	Other Vegetables-2 [ ]	Planting Period: From [_____month] to [_____ month]	_____ frw
		Harvesting period: From [_____ month] to [_____month] =	
		Number of times harvesting / week: [_____times]	
		Did you sell it or not at each time? 1. [_____yes] ,	
		Sale amount per each time: [_____Frw/time in average]___	
			_____ frw
			_____ frw
		Season B (February –June 2006)	
	Sorghum	Planting Period: From [_____month] to [_____ month]	_____ frw
		Harvesting period: From [_____ month] to [_____month] =	
		Number of times for sale of grain sorghum [_____times]	
		Unit for sale: 1. Bag [ ], 2. kg [ ], 3.Others [ ]	
		Sale Price : [_____Frw/unit [1., 2., 3.,]	
	Maize	Planting Period: From [_____month] to [_____ month]	_____ frw
		Harvesting period: From [_____ month] to [_____month] =	
		Number of times for sale of cobs [_____times]	
		Number of cobs per each sale [_____cobs], Sale price=	
		Number of bags for sale of maize grains [_____ times] , Sale Price=	
	Haricot Bean	Planting Period: From [_____month] to [_____ month]	_____ frw
		Harvesting period: From [_____ month] to [_____month] =	
		Number of times for sale of **green pods** [_____times]	
		Unit for sale: 1. Basket [ ], 2. Plate [ ], 3. Heap [ ] ,	
		Unit Price [_____Frw/unit [ ], Sale Amount	
		Number of times for sale of **dry beans** [_____ times]	
		Unit for sale: 1. Basket [ ], 2. Plate [ ], 3. Heap [ ] ,	
		Unit Price [_____Frw/unit [ ], Sale Amount	
	Sweet Potato	Planting Period: From [_____month] to [_____ month]	_____ frw
		Harvesting period: From [_____ month] to [_____month] =	
		Number of times for sale of sweet potato [_____times]	
		Unit for sale: 1. Basket [ ], 2. Plate [ ], 3. Heap [ ] ,	
		Sale Amount [_____ Frw/each time in average]	
	Cassava	Planting Period: From [_____month] to [_____ month]	_____ frw
		Harvesting period: From [_____ month] to [_____month] =	
		Number of times for sale of Cassava [_____times]	
		Unit for sale: 1. Basket [ ], 2. Plate [ ], 3. Heap [ ] ,	

		Sale Amount [_____ Frw/each time in average]	
	Tomato	Planting Period: From [_____month] to [_____ month]	
		Harvesting period: From [_____ month] to [_____month] =	_____
		Number of times harvesting / week: [_____times]	_frw
		Did you sell it or not at each time? 1. [_____yes] ,	
		Sale amount per each time: [_____Frw/time in average]___	
	Other Vegetables	Planting Period: From [_____month] to [_____ month]	
		Harvesting period: From [_____ month] to [_____month] =	_____
		Number of times harvesting / week: [_____times]	_frw
		Did you sell it or not at each time? 1. [_____yes] ,	
		Sale amount per each time: [_____Frw/time in average]___	
			_____
			_frw
			_____
			_frw
	Season C(July 2005 – March 2006 for Igishanga/ Akabande Only)		
	Sweet Potato	Planting Period: From [_____month] to [_____ month]	
		Harvesting period: From [_____ month] to [_____month] =	_____
		Number of times for sale of sweet potato [_____times]	_frw
		Unit for sale: 1. Basket [ ], 2. Plate [ ], 3. Heap [ ] ,	
		Sale Amount [_____ Frw/each time in average]	
	Tomato	Planting Period: From [_____month] to [_____ month]	
		Harvesting period: From [_____ month] to [_____month] =	_____
		Number of times harvesting / week: [_____times]	_frw
		Did you sell it or not at each time? 1. [_____yes] ,	
		Sale amount per each time: [_____Frw/time in average]___	
	Maize	Planting Period: From [_____month] to [_____ month]	
		Harvesting period: From [_____ month] to [_____month] =	
		Number of times for sale of cobs [_____times]	
		Number of cobs per each sale [_____cobs], Sale price=	
		Number of bags for sale of maize grains [_____ times] , Sale Price= [Frw/bag]	
	Other Vegetables [ ]	Planting Period: From [_____month] to [_____ month]	
		Harvesting period: From [_____ month] to [_____month] =	_____
		Number of times harvesting / week: [_____times]	_frw
		Did you sell it or not at each time? 1. [_____yes] ,	
		Sale amount per each time: [_____Frw/time in average]___	
	Other Vegetables [ ]	Planting Period: From [_____month] to [_____ month]	
		Harvesting period: From [_____ month] to [_____month] = [ ] months	_____
		Number of times harvesting / week: [_____times]	_frw
		Did you sell it or not at each time? 1. [_____yes] , 2 [No]	

		Sale amount per each time: [_____Frw/time in average]___	
			_____ _frw

Permanent Crop												
Banana (1)	**[For Brewing of Banana Beer Variety]** No of Bunches harvested in each month (in average)											
Month	8	9	10	11	12	1	2	3	4	5	6	7
Bunches Harvested No												
Bunches Sold No												
Total Number of Bunches sold [_____Bunches/Year] , Sale Price of Bunch												
Total Income: [_____Frw/Year]												
Banana (2)	**[For Cooking Banana Variety]** No of Bunches harvested in each month (in average)											
Month	8	9	10	11	12	1	2	3	4	5	6	7
Bunches Harvested No												
Bunches Sold No												
Total Number of Bunches sold [_____Bunches/Year] , Sale Price of Bunch												
Total Income: [_____Frw/Year]												
Banana (3)	**[For Fresh Fruit Banana Variety]** No of Bunches harvested in each month (in average)											
Month	8	9	10	11	12	1	2	3	4	5	6	7
Bunches Harvested No												
Bunches Sold No												
Total Number of Bunches sold [_____Bunches/Year] , Sale Price of Bunch												
Total Income: [_____Frw/Year]												
Other Fruit [ ]	**[For Fresh Fruit]** No of Fruits harvested in each month (in average)											
Month	8	9	10	11	12	1	2	3	4	5	6	7
Fruit Harvested No												
Fruits Sold No												
Total Number of Bunches sold [_____Pieces/Year] , Sale Price of Fruit [_____Frw/Piece in average]												
Total Income: [_____Frw/Year]												
Other Fruit [ ]	**[For Fresh Fruit] No of Fruits harvested per each month (in average)**											
Month	8	9	10	11	12	1	2	3	4	5	6	7
Fruit Harvested No												
Fruits Sold No												
Total Number of Bunches sold [_____Pieces/Year] , Sale Price of Fruit [_____Frw/Piece in average]												
Total Income: [_____Frw/Year]												
Trees	**[Timber or Log] No of Timbers or Logs sold per each month in average**											
Species	**Name of Tree Species [_____]**											
Month	8	9	10	11	12	1	2	3	4	5	6	7
Timber Cutting No												

Timber Sold No												
Total Number of Timbers sold [_____ Timbers/Year]												
Total Income: [_____Frw/Year]												
Trees Seedlings	**[Seedlings] No of Seedlings sold per each month in average**											
Species	**Name of Tree Species [_____]**											
Month	8	9	10	11	12	1	2	3	4	5	6	7
No of Seedlings sold												
Total Number of Seedlings sold [_____ seedlings/Year], Sale Price of seedling [_____Frw/tree]												
Total Income: [_____Frw/Year]												

Income from Livestock (except for Association Activity)

9.	Do you have livestock?	1. Yes (answer below), 2. No			
	Kind	Rearing Numbers	Sales	Unit Price	Amount
	Goat		_____head/year	_____frw/head	_____frw/year
	Ankole Cow		_____head/year	_____frw/head	_____frw/year
	Crossbred Cow		_____head/year	_____frw/head	_____frw/year
	Cow Milk	—	_____Lt/Day	_____frw/Lt	_____frw/year
	Other Cattle (Calf)		_____head/year	_____frw/head	_____frw/year
	Chicken		_____head/year	_____frw/head	_____frw/year
	Chicken egg	—	_____pc/year	_____frw/pc	_____frw/year
	Sheep		_____head/year	_____frw/kg	_____frw/year
	Honey	—	_____kg/year	_____frw/kg	_____frw/year
	Fishing	—	_____pc/year	_____pc/year	_____frw/year

Income from Off Farming (except for Association Activity)

10.	Kind of Income source	Qty	Unit Price	Amount
	Casual work	_____day/year	_____frw/day	_____frw/year
	Lending Land	_____ha or parcel	_____frw/ha or parcel /year	_____frw/year
	Banana Beer	_____jerry can/year	_____frw/jerry can	_____frw/year

	Sorghum Beer	_____jerry can/month × _____month	_____frw/jerry can	_____frw/year
	Donation	_____frw /month × _____month		_____frw/year
	Carpentry	_____time/year	_____frw/time (in average)	_____frw/year
	Pension	_____ Month/year	_____ Frw /month	_____frw/year

3. Expenditure

Expenditure for Farming (except for Association Activity)

11.	Items (kind)	Qty	Unit Price	Amount
	Seed (	_____kg or bag/year	_____frw/kg or bag	_____frw/year
	Fertilizer (	_____kg or bag/year	_____frw/kg or bag	_____frw/year
	Pesticide (	_____kg or bag/year	_____frw/kg or bag	_____frw/year
	Tools	_____Pieces/year	_____frw/Piece	_____frw/year
	Transportation cost for Agricultural activity	_____ Times/year	_____ Frw/time	_____frw/year

Expenditure for Hired Labour (except for Association Activity)

12.	Operation	Season (A, B, C)	man-day (No of workers x days)	Unit Price (Frw/man-day)	Amount (Frw/year)
	Ploughing				
	Weeding				
	Harvesting				

Expenditure for Food (Season refers to the1st Page)

13.	Kind	Season A (Frw/month)	Season B (Frw/month)	Season C (Frw/month)
	Sorghum grains			
	Sweet Potato			
	Cassava			

	Cassava flour			
	Maize flour			
	Beans			
	Soybeans			
	Groundnut			
	Banana			
	Irish potato			
	Meat			
	Rice			
	Vegetables			
	Sugar			
	Cooking Oil			
	Salt			
	Milk			
	Honey			

Expenditure for Non food Items (except for Association Activity)

14.	Kind	Season A	Season B	Season C
	Domestic Water	_____Jerry can/day ×_____frw/jerry can	_____Jerry can/day ×_____frw/jerry can	_____Jerry can/day ×_____frw/jerry can
	Kerosene	_____Frw/month	_____Frw/month	_____Frw/month
	Firewood	_____Frw/month	_____Frw/month	_____Frw/month
	Clothes	_____Frw/month	_____Frw/month	_____Frw/month

	Soap	_____Frw/month	_____Frw/month	_____Frw/month
	Lotion	_____Frw/month	_____Frw/month	_____Frw/month
	Tooth cream	_____Frw/month	_____Frw/month	_____Frw/month
	Shoo cream	_____Frw/month	_____Frw/month	_____Frw/month
		_____Frw/month	_____Frw/month	_____Frw/month
		_____Frw/month	_____Frw/month	_____Frw/month
		_____Frw/month	_____Frw/month	_____Frw/month
		_____Frw/month	_____Frw/month	_____Frw/month
	Others			
	Umusanzu	_____time /year	_____frw/time	_____frw/year
	Contribution in community except for Umusanzu	_____time /year	_____frw/time	_____frw/year
	Ceremonial Occasion	_____frw/year		
	School Fee	_____frw/year		
	Medical Fee	_____frw/year		
	Rental Land	_____frw/year		

4. Association Activity (If you belong to Association)

General			
15.	1) Name of Association:_____		
	2) Year, month to be a member: _____		
	3) Number of Members _____		
	5) Main activities of Association (Just check 1 or 2)	1. Farming 2. Non Farming (Specified) _____ _____ _____ _____:	
Land Tenure			
16.	1 How many farm plots does association have?		_____ (ha) ____ (parcel sites)
	1-1	Hilly side: 1. With irrigation, 2. Rainefed, 3 Both	_____ (ha) ____ (parcel sites) 1. 2. 3.

	1-2	Marshland (Igishanga): 1. With irrigation, 2. Rainfed, 3. Both	_____ (ha) ____ (parcel sites) 1. 2. 3
	1-3	Wetland (Akabande): 1. With irrigation, 2. Rainfed, 3. Both	_____ (ha) ____ (parcel sites) 1. 2. 3.

Income/Year

17.	Items (quota /member)	Amount you get from:	Amount you sold to:
		: _____kg or Bags _____	Amount: _____ kg _____ or _____ Frw _____ bags _____
		: _____kg or Bags _____	Amount: _____ kg _____ or _____ Frw _____ bags _____
		: _____kg or Bags _____	Amount: _____ kg _____ or _____ Frw _____ bags _____
		: _____kg or Bags _____	Amount: _____ kg _____ or _____ Frw _____ bags _____
		: _____kg or Bags _____	Amount: _____ kg _____ or _____ Frw _____ bags _____
		: _____kg or Bags _____	Amount: _____ kg _____ or _____ Frw _____ bags _____

Expenditure

18.	Kind of Income Source	Amount
	Entrée Fee	. _____ frw
	Member fee /1. Year or 2. Month	. _____ frw
		. _____ frw
		. _____ frw

5. Traditional Support Systems in Rural Community

19.	Umuganda		
	1	Participation	1.Yes, 2.No (Reason if any _____)
	2	Frequency to participate	1. Once a month, 2. other _____
	3	What kind of activities	1. Repairing road, 2 Repairing house of vulnerable people, 3. Farming in communal land, 4.other _____ _____ _
	Ubudehe		

	1	Participation	1.Yes, 2.No. (Reason if any_____)
	2	Situation	1. We call people to help us. 2.We are called by people to help them 3. We call and also we are called
	3	What kind of activities	1. Ploughing for _____crop, 2. Harvesting of _____ 3. other_____
	3	Frequency	1.Every year, 2.Sometimes3. Rarely 4.other_____
	Ibimina		
	1	Participation	1.Yes, 2.No. (Reason if any_____
	2	Number of members	_____
	3	How much do you pay per month	_____frw /month
	4	How much do you get	_____time per year, _____frw /time
	Kugurizanya		
	1	Participation	1.Yes, 2.No. (Reason if any_____)
	2	What kind of activities	1. Borrowing and lending money (how much_____frw/time) 1. Ploughing for _____crop, 2. Harvesting of _____ 3. other_____
	3	Frequency	1.Every year, 2.Sometimes3. Rarely 4.other_____

6. Others

Fetching water and Collecting firewood				
20.	**Fetching Water**			
	How many water do you need per day by Jerry Can basis? 20 Lt JC x [ ] + 10 Lt JC [ ] + 5 Lt JC [ ]			
	What are your water sources for domestic use? 1. Tap water, 2. River, 3. Lake water, 4 marsh/swamp water			
	Do you have any rain water storage system ? 1. Yes, 2.No			
	If you have, how much rain water could you store per day under normal rain? [ ] Jerry can/day			
	Season	How much jerry can/day does your family fetch (except for purchase)?	How many times /day does it take to fetch water?	How many hours / each time does it take to fetch water
	A			
	B			
	C			
21.	Collecting Firewood			
	Season	How many times /week does it take to collect firewood?	How many hours /time does it take to collect firewood?	
	A			
	B			

	C		

Spare Time

22.	What day of the week do you take rest? [_____Day]
	Regular working hours per day [From _____am to _____pm: Hours/day]
	What do you do in your spare time?
	1. We don't have spare time 2. To take rest 3. To visit friends or relatives 4. To do some group activities (kind of activities_____ 5. To take care or play with our children 6. Others _____ _____ ___

Soil fertility

23.	1	Do you observe any change of your production (Quantity) in a same plot over past 10 years ? **[Normal Year]**	Legume Crops 1. Increase 2. Stable 3. Decrease	Serial Crops 1 Increase 2. Stable 3.Decrease	Tuber Crops 1.Increase 2.Stable 3.Decrease
	2	If answer of Q23-1 is 3, this change is caused by what factor You assume?	1. Decrease of soil fertility 2. Increase of Pest/Disease 3. Both 1 & 2	1. Decrease of soil fertility 2. Increase of Pest/Disease 3. Both 1 & 2	1. Decrease of soil fertility 2. Increase of Pest/Disease 3. Both 1 & 2
	3	Do you use chemical fertilizer?	1.Yes, 2.No If Yes, Go to below. Target Crop:[1._____ 2. _____ 3._____] Quantity: [1._____kg/Crop, 2._____ kg/Crop, 3._____kg/Crop]		
	4	Do you use manure?	1.Yes, 2.No		
	5	How do you get manure?	1. Making from own livestock, 2 Get from neighbours 3. Other (Specified) _____		
	6	What kind of irrigation method have you practiced ?	1. Bucket Irrigation (Watering Can), 2. Roadside Irrigation (trap rainwater), 3. Pump irrigation 2. Target Crop (Specified)_____ _____:		

Health

24.	How many times do you (and your children if you have) suffer from diarrhea?	
	Person	Frequency
	You	1-2/year, 3-4/year, 5-6/year, 1/month, 2/month, 3/month, 1/week, other_____
	Yong child	1-2/year, 3-4/year, 5-6/year, 1/month, 2/month, 3/month, 1/week, other_____
		1-2/year, 3-4/year, 5-6/year, 1/month, 2/month, 3/month, 1/week, other_____
		1-2/year, 3-4/year, 5-6/year, 1/month, 2/month, 3/month, 1/week, other_____
25.	Apart from diarrhea, what health problem do you often get ?	

	Person	Frequency
	You	Problem: _____:_ _____ : times /year
	Your Child	Problem: _____:_ _____ : times /year
		Problem: _____: _____ : times /year
		Problem: _____:_ _____ : times /year
		Problem: _____: _____ : times /year
		Problem: _____:_ _____ : times /year
	How many times do you or your child usually go to nutrition center ? [ ] per 1. Month, or 2. Year	
Draught Coping measures		
27.	How do you cope with severe drought year for survival? (check as much as applicable below)	
	1. Casual Work 2. Sales of Livestock 3. Asking loan to relatives 4. Asking Donation 5. Emigration to other place 6. Sale of Farmland 7. Others_____ _____ _____ :	
	What is your vision to cope with severe draught when you are faced?	
	Your Vision or Plan: _____ _____ _____: _____ _____ _____: _____ _____ _____: _____ _____ _____: _____ _____ _____:	

Workshop for the Final Evaluation on the Modern Cow Distribution Quick Project

1. Date: September 5, 2008 (Friday)

2. Place & Time: Woman Promotion Center/Mandela Village, Ntarama Sector in Bugesera District (8:30 - 11:30)

3. Participants (around 30)

1) 18 Model Farmers
2) RARDA staff concerned (Dr. Rutagwenda, Dr.Alphone, Dr. Garafasi, Mrs. Angelique, and Dr. Samson)
3) Ntarama Sector Representative
4) 3 Cell Representatives (Cyugaro, Kibungo and Kanzenze)
5) Vet Technician/Kanzenze Cell
6) Representative in Bugesera District
7) JICA Study Team

4. Objectives

This workshop is aimed at discussing of how to follow-up the RARDA-JICA Quick Project for the Modern Cow Distribution based on the results of the final monitoring survey after the JICA scheme phased out on October, 2008 and distributing the leguminous fodder crop seeds to the 18 model farmers.

5. WS Program Schedule (8:30 -:00)

	Presentation	Program	Time	Remark
1	Ntarama Sector Representative	Opening Remark	5 min	Agenda for WS
2	All Participants	Self Introduction	10 min	Name and organization
3	JICA Study Team	Outline of Final Monitoring Results on the 18 MFs	20 min	Summary of the monitoring results
3	RARDA (animal nutrition)	Briefing of how to plant leguminous fodder crop	30 min	Briefing of basic know-how of planting leguminous crop seeds and Distribution of *Mucuna* & *Lablab grass* seeds.
				Chaired by Ntarama Sector Representative
4	RARDA Team	Discussion of follow-up Issues between RARDA and Model Farmers	120 min	Free discussion with RARDA based on the follow-up issues
5	RARDA/JICA	Closing remark	5 min	

6. Outline of Final Monitoring Results

Highlight of Final Monitoring Survey Results

No	Monitoring Items	Outline of Survey Results		Cause and Future Issues to be tackled
1	Latest situation of about JICA Cow Keeping by Model Farmers (MF)	Sold out	・The 3 MFs have sold out their cow or heifers by July 2008 due to sterility, frequent abortion, or with aggressive temper.	1. caused by poor breeding and distribution systems.
		Still Keeping	14 MFs have still kept the JICA cow but poor productivity.	2. Most of the MFs have complaints against poor lactation of the delivered cow except for few MFs.
		Moved to other area	1 MF moved to Nyamata Sector on Oct., 2007	3. Institutional Weakness of Cell/Sector Offices
2	Pregnancy and Delivery Conditions	Male calf	10 calves born and 2 of them died few months after delivery.	4.No system to follow up the MFs regularly and MFs could not cope with animal health issue.
		Female calf	5 calves born and one of them died one year later	
		Stillbirth, abortion	4 cows were concerned	5. There is some doubt about infection but similarly no quick action to coop with the problem is taken like above No.4.
		Sterility	4 cows were concerned	
3	AI/Natural Mating and its cycle	-Success rate of AI is around 25 % -Natural mating by Friesian Bull become popular among the MFs. -Cow possible to get pregnancy 3 month after delivery but long dry period is observed.		7. AI implementation properly is difficult due to poor accessibility 8. No bull is available near MFs living area and difficult to do natural mating on time. 9. MF does not understand properly a life cycle of milking cow.
4	Labor force to keep cow	Enough labor	14MFs	11.Checking system of MF's precondition is not sufficient.
		Insufficient labor	3MFs	
5	Feeding materials	Napir grass, wild weed, leaves of sweet potato, skin of banana fruit and others	16MF	12. Protein source for improvement of lactation is essential but most of the MFs are confined to only Napir grass and weeds. Also some MF face lack of fodder crops during the dry season. 13. Cow with low lactation performance is expected to increase <u>one liter more by feeding leguminous fodder crops</u>. 14. Concentrate is expensive and not available locally.
		Leguminous fodder crops	4MF	
		Concentrate	1MF	
6	Benefit: Milk	No lactation	4 MF	16. <u>4 MF have no lactation so far since commencement of the crossbred due to sterility, abortion.</u> 17. <u>Only 2 MF got 8 lits/day and majority of the MF ranged between 2 and 3 lits/day with poor lactation</u>. This is originated form "weakness framework of breeding and distributing system of high quality crossbred" which is pivot of "*One Cow, One Family Project*".
		Range of lactation performance	From 1 to 8 Lits/day Mean=2 - 3 Lits/day	
		Sale of Milk	6MF、1 lit/150 Rwf	
	Manure	16 MFs applied their manure to fields and recognized improvement of soil fertility.		
	Family Health	Improvement of health is recognized by 3 MFs. Improvement of yield contributes to health improvement: 11 MFs		

		Sale of calf	Male calf	2 MF:70,000 ~ 80,000Rwf/head	
		Purchase of heifer	Heifer in-calf	1 MF purchased the 2nd heifer in-calf by bank loan based on benefit of milk sale generated by JICA crossbred(@120,000 Rwf)	
7	Negative Impact or Problems on Cow keeping		Awareness of MF on this QP in negative impact is as follow; (1) It cost too much about animal health treatment with labor intensive work but very low return due to poor lactation. (2) Keeping the heifer for the 2nd generation needs long period with heavy load. (3) It is very difficult to access AI inseminator when it necessary because of no AI inseminator closed to their living area. (4) Diagnosis and treatment on livestock is very difficult and unable to coop with a problem at once. (5) The delivered crossbred cost too much but poor return caused by poor lactation performance. (6) Securing fodder crop is difficult during the dry season. (7) So far no return from the QP for 19 months since distribution of the crossbred.	22. These comments indicated that a big difference between concept of One cow, one family project which contribute to poverty reduction by distributing high productive crossbred and actual observation. <u>An essential review on One cow, one family project should be necessary.</u>

7. Request to RARDA from the 18 Model Farmers for Discussion

No	Issues	Outlines
1	Animal Health	(1) <u>Requesting a public service to station vet-technicians closed to living area of the model farmers for visiting regularly</u>
2	Animal Reproduction	(1)<u>Establishment of efficient AI implementing framework based on accessible allocation of AI inseminator for MF when MF needs AI for his/her cow or heifer libido at any time.</u> (2)Establishment of natural mating system based on accessible allocation of pure breed of Friesian bull.
3	Training program for the Model Farmers	(1) <u>Establishment of regular technical training program for the model farmers about general knowledge of cow keeping until MF could stand by him/herself.</u> (2) Conducting of study tour for the model farmers to the advanced dairy farming area.
4	Selection and Distribution of high quality of crossbred cow	(1) Establishment of a participatory selecting system of crossbred by the candidate recipient of crossbred cow/heifer in-calf. (2) Establishment of breeding system and selecting method of high quality of crossbred cow (3) Establishment of distributing high quality of heifer in-calf to the model farmers

5	Supporting framework to the Model Farmers	(1)Establishment of the MF supporting framework by allocating vet-technicians properly in the project command area. (2) Establishment of supporting MF with animal health drugs and tools (3) Establishment of animal drug pharmacy in the project command area
6	About One cow one family project	(1) Lesson leant via similar project should be incorporated into "One cow, one family project". (2) So far nothing has been materialized although the MF have been questioned with various requests, and this modern cow project imposes burden work with poor benefit, and are weighed down with various expense. (3) Poor productive cow or heifer (sterility, frequency of abortion) should be replaced by putting MF's name on RARDA cow recipient list with high priority.

MF refers to Model Farmer.

QP refers to Quick Project

AI refers to Artificial Insemination

List of the Model Farmers for the Introduction of Modern Cow Distribution in Ntarama Sector/Bugesera supported by RARDA-JICA

September 4, 2008

Cell		Model Farmer Name	Age	Sex	Position	Accad., Years	Mobile Tel No	Fram Land size (ha)	Family size	Fodder Crop Plot (ha)	Fodder Crop Spacies	Remark
Cyugaro	1	Anhimana Appelinaire	57	M	President	3	08439265	0.75	5	0.50	Napir	Sold out of JICA heifer
	2	Kandamutsa Florence	47	F		5		7	8	1.00	Napir	
	3	Karake Jean Claude	25	M		6		2	4	0.50	Napir	Sold out of JICA heifer
	4	Mukasafari Marie	44	F		6		2	1	0.50	Napir	
	5	Nzamwita Jean Bosco	52	M		6		3.2	10	1.00	Napir	
	6	Murenzi Sylvestre	47	M		6		7	9	0.70	Napir	
		Sub total (ha)								4.20		
Kanzenze	1	Mukakayiru Enotha	42	F		9		4	2	2.00	Treps	
	2	Kayenamura Marcel	36	M	President	9	08560552	2	6	1.25	Treps&Napir	
	3	Kayitavu Onesphore	49	M		6		2	6	1.25	Napir	
	4	Uwantege Leonille	51	F		4		1	4	0.25	Napir	
	5	Mandenge Anne Marie	56	F		0		2.5	4	0.50	Napir	
	6	Kayiranga Paul	47	M		5		2	5	1.00	Napir	
		Sub total (ha)								6.25		
Kibungo	1	Nyagaza Jean de Dieu	26	M		4		2.5	4	1.00	Napir	
	2	Muguareza Inocent	32	M		11	08879304	0.8	7	0.80	Napir	
	3	Rwamalina Ildephonse	46	M		3		0.75	8	0.75	Napir	
	4	Rwigamba J. Pierre	25	M		12	0852267	2	6	1.00	Napir	Moved to Nyamata Sector
	5	Mukabisangua Marie	54	F		6	08458080	0.75	4	0.75	Napir	Sold out of JICA heifer
	6	Gakwisi Inocent	36	M	President		08461071	2	5	1.00	Napir	
		Sub total (ha)								5.30		
Grand Total (ha)										15.75	ha	

Workshop Report for the Final Evaluation of Modern Cow Distribution Quick Project

1. Date: September 5, 2008
2. Venue and time: **Woman Promotion Center/ Mandela Village, Ntarama Sector in Bugesera District (8:30-11:30)**
3. Participants:(Model Farmer, Ntarama Acting Director and Agronomist, RARDA staff, JICA Study Team, JOCV)

Opening the workshop, the Ntarama Sector Officer encouraged participants to provide as much ideas as possible

Then the Ntarama Sector agronomist introduced cow recipients on the cultivation of the leguminous fodder crop seeds including Mucuna and Lablab grass seeds, 150 kg per each that JICA Study had just distributed

Self introduction

During self introduction, modern cow recipients at the same time presented an overview of the rearing condition of their cows. Most of the cows produce 2 to 4 L/day. They highlighted problems concerning lack of vet technicians to apply fertilization.

Most farmers assert that they have been distributed 25% crossbred instead of 75% as it was promised

Guests from Gahanga Sector

Two farmers from Gahanga Sector participated in the workshop within the framework of experience sharing with Ntarama model farmers. One gets 12L/day and the other gets 8 L/day. They said that they do not do greater things for their cows than Ntarama farmers do; simply they got good crossbreds of 50% and free from diseases since they were diagnosed and treated by the Vet doctor prior to delivery. One of them says that every month he saves 40.000 Rwf on the account.

Discussion by the representative of RARDA

RARDA: The big issue is that cows do not give enough production in terms of milk
He made a review of what is required for a farmer in order to get production.
Since model farmers have already been trained on animal management the discussion turned around choosing a good breeding variety.

Farmers mostly expressed their complain to the representative of RARDA about the poor quality of distributed cows. According to farmers, the project did not contribute to poverty reduction as it was envisaged, it worsened the situation instead as they invest more than they gain. Below are some of their complain.

- We were promised to produce 20 L per day and now we get 2-4 L per day. We have experienced loss compared to invested resources, time and energy. The cow did not reduce poverty, it instead worsened our poverty.
- The supplier is to be blamed but also RARDA technicians who claimed that the cows were 75% whereas they are almost below 25% are also to be blamed.
- Farmers said that Dr Jacques did it willingly since in addition to being a vet Doctor, he is a

breeder who can differentiate a good cow from a bad cow by simply looking. It is surprising that one recipient received a Sahwal crossbred (meat)

- Farmers are concerned about of how they will give cow to the next generation since they don't have them
- We were given cows of low value compared to the price that JICA offered. Even when we resell the animal we get less money than it should be: 180,000 Rwf.
- We were not associated in choosing our cows, farmers are able to choose a good looking cow
- We have become poor whereas we were supposed to be model farmers
- The conclusion would be that these cows entirely belong to us so that this can compensate the loss
- Experienced a loss of two years

Dr Thomas: it is good to hear about your ideas. They will enable me to make a report that will help us to look into our program in general.

Even at the central level, we have a lot of problem concerning *the One Cow, one Family Program.*

After listening to these complaints from the farmers, the representative of RARDA said that all such problems and those faced by the one cow one family program in general are due to the fact that the program has just started and its implementation was carried out at a high speed which entailed some mistakes.

Further the law on public tender recommends that a market should be given to the supplier of cows and thus, individual farmers can not be allowed to choose by themselves cows.

Concerning health issues, there is now a vet technician who will help is such issues

Many farmers raised issue of lacking proximity vet technician services, they were told to be patient and wait for the newly recruited vet technician to settle down.

Some modern farmers pointed out the Ntarama sector is quite big that the Vet Technician needs a lightweight motorcycle

Introduction of the new vet Technician of Ntarama Sector

The new vet technician urged farmers to contact him whenever there is a problem. He will also try to establish a vet pharmacy store near the Kanzenze junction.

However, farmers were told that diagnosis would be done by the Sector Vet Technician free of charge but farmers have to buy drugs.

Concluding, the JICA Study Team said there was some issues of project implementation but hope RARDA will make some progress to back up the vet technician for effective follow-up of the cow distribution project.

V.5.6.1 Points Revealed through Implementation (Rainwater storage Installation)

Through construction of the household rainwater storage, the following points were pointed out.

(1) Possibility of work (cost) sharing

After selecting the four QP components, the Study Team explained basic idea of work and material sharing with the QP model farmers to the officers of the three Cells since the Team considered that contribution from model farmers and local authorities would be indispensable to give the local ownership and facilitate motivations for the QP in them. At the beginning, the JICA Study Team indicated to the Cell representatives about task sharing for preparing materials and labor among model farmers from both parties and the Study Team, as shown below.

Table 1. Preliminary Demarcation of Responsibilities for Rainwater Storage Installation

Party	Description
Cell/People	Following items should be collected and contributed by a group of recipients: 1) Stone, 2) Sand, 3) Water, and 4) Labor.
Study Team	The Study Team provides following materials. 1) Iron sheets, 2) Wires for gutter, 3) Cement Tools (wheelbarrow, shovel, pick, hoe, etc.) are provided to the Cell Office and recipients should borrow them from the office. Technical training is given to recipients through demonstrations.

According to the agreement between model farmers of both parties and the Study Team, the former had to part to collect some construction materials such as stones and rocks which for foundation of storages. However it was unable to fulfill their commitments in most implementation sites since there exist elder or physically disable model farmers. Another reason is that some local population tends to rely completely on outside supports such as JICA Study Team and Luxemburg project. This implies that it is still difficult to fully draw self-help of the population even if they realize availability of the rainwater storage. In fact, although model farmers of Kanzenze Cell agreed to prepare gutter and cover of the storage by their own, it took very long until its completion. On the other hand, it should be considered that the model farmers were selected according to the above criterion; the priority should be given to the weak such as social, economical, physical, etc. Taking these into account, the rainwater storage will be appropriate more as communal or public facility than individual one.

(2) What the model farmers could afford

On the other hand, all the model farmers afforded to prepare water for mixing mortal to pile up bricks for wall part of the storage. There are two ways to prepare water for the mortal work. One is to fetch water by himself / herself. Another one is to purchase water through asking somebody to transport it from water source to their housing place, with some expenditure about 100 Rwf - 150 Rwf for one jerrican, which can contain about 20 litter. On average, they spent 2,000 Rwf to 3,000 Rwf which is equivalent to roughly water of 20 jerricans for mixing cement. Moreover, it is affordable for model farmers to participate in light works such as helping masonry with digging the foundation, mixing

cement, piling the bricks, transporting materials from off-loading place to his/her place, etc.

(3) Difficulty with organizing the model farmers and establishing their independence

At the beginning, although the project intended to construct a rainwater storage at each household, model farmers were required to collaborate with their neighbors for construction of their storages. Actually the number of participated recipients was extremely low as table below shows.

Under these circumstances, the Study Team requested the Cell officers to improve such situations and then carried out an interview survey among model farmers at Kibungo and Cyugaro Cell on 26th July 2006 and found out the following reasons.

- There had been no information from Cell office when a demonstration was commenced,
- They couldn't participate because of the long distance between the demonstration site and their living places,
- They were much occupied with farming practices,
- Participation period was too long for them because it takes two to three weeks for constructing one storage and it was not sure at all for them when the construction would be commenced at his/her own house, and
- Some model farmers are reluctant to participate as they doubt those who had already received his/her own rainwater storage would really support others or not and he/she might not participate in the demonstration construction work for neighbors.

In these reasons for poor participation of model farmers in construction work, it is noteworthy that there were some model farmers who were reluctant to participate in construction work for neighbor's one. As a main reason of this, personnel proprietary rights of the rainwater storage can be given. If the rainwater storages were for public, more model farmers could have shown interests.

(4) Lack of communication between the cell office and the model farmers

In connection with the issue mentioned above, although some activities like meetings were done with the model farmers, actual implementation works of the storage were scheduled by the Study Team. Some of the works were unnecessarily postponed or suspended several times due to lack of communication between a Cell office and model farmers. Lack of transportation to distribute information, except for bicycle or their own foot, is considered as a main reason but lack of Cell officers' motivation to carry out the QP may be too, unfortunately. Under the present condition lacking of actually-working counterparts for the Study Team, it is obvious that not only the QP but also the Pilot Project to be started on the next stage of the Study, can not be well progressed, without understanding and cooperation of the Cell offices as the front line of rural development.

Interviewing from the model farmers

(5) Way of mutual aid

Rainwater storages were constructed for individual households. When scheduling construction period, both parties of model farmers and the Study Team held a meeting to discuss ways for progressing the further stage of construction works, as mid-term workshop. During the workshop, model farmers expressed that they will support one another to do something, especially for physically disables and aged people or those with less capacities, etc. Nevertheless, their intention was not fulfilled during construction works unlike expected. With reference to difficulty with organizing model farmers, this may be due to the characteristics of the storage as private property. It could be considered that the rainwater storage could be constructed more as communal or public property.

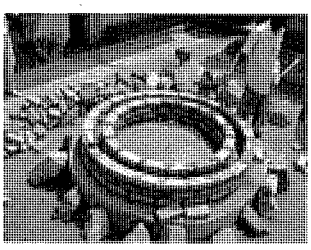
(6) Hope to establish good relationship with neighbors through water sharing

On the other hand, the monitoring survey heard voices of model farmers who expect to establish good relationship with neighbors through sharing water in their storages. Some of those who expressed such hope have actually shared their water with his/her neighbors. As mentioned above, water issues are occupying daily life for the population in rural area. In this sense, it seems that the population is tying to support one another by sharing "water".

(7) Appropriate design of the rainwater storage considered sustainability in local population

At first, a conventional structure of storage was designed, which is extensively used at public facilities such as schools and Cell offices, etc (Cylinder type, Stone masonry, Storage capacity in 3 m^3 class, see the picture below on the left). The structure is quite familiar to the local population. After that, the Study Team introduced an alternative structure design and a supervisor was employed and recipients involving construction activities were undertaken. The picture below on the right shows the improved one using burnt bricks instead of stones. During the demonstration carried out at the end of July 2006, the following issues for the conventional method were pointed out.

- Conveyance of stones from Cell office to the site is quite difficult for women and aged,
- It takes long time and hard work for smashing and trimming the stones,
- Certain techniques are required to load stones /bricks and to fabricate reinforcing bar,
- Design of structure is over estimated and design stress is too strong for the rainwater storage planed by the Study team,
- Construction period of approximately 15 days seems unrealistic for every household, and
- High construction cost, US$350/facility, is not affordable and sustainable for local population



Trial to find out appropriate way for construction of the rainwater storage
Left: Conventional method Right: Improved model

In this respect, the Study Team proposed 2 types of structure design namely a) Box type (a rectangular parallelepiped) rainwater storage using burnt bricks and b) Wooden box with vinyl sheets in it, wit the storage capacity of about 1.2m^3 for each. The former was introduced in Kanzenze Cell at first to solve the above-mentioned problems of the conventional method. Merits of using the box type rainwater storage using burnt bricks are as below:

Improved model proposed by JICA Study Team

- It is technically appropriate for local population to construct,
- It is easy to handle and convey construction materials for women and aged households,
- Construction would be done in a shorter time,
- Construction cost is expected to be lower, and
- From the viewpoint of extension, the design can be easily imitated.

At the demonstration of brick box model in Kanzenze Cell, it took only two hours to excavate and place concrete for construction of foundation and it took shorter working time compared with the conventional type in Kibungo and Cyugaro Cell, with one day taken for foundation construction. Wall construction work was simpler and took a shorter time as well than that of conventional methods. Construction cost including labor fee is estimated at about US$245, which is about one and a half times as cheap as the conventional method. Table 5.6.14 shows the comparison for dimension, storage capacity, materials, etc. between conventional, improved conventional and JICA proposing methods of the rainwater storage.

Table 2 Comparison between Conventional and JICA proposal method of Rainwater Storage

Dimension, materials	Conventional Method	Improved Convent. Method	JICA Proposing Methods	
	Stones	Stones/Brick	Type A (Brick)	Type B(Wood)
Dimension	ϕ 1.2m,H=1.5m	ϕ 1.2m,H=1.5m	□1.15x1.15 m	1.2 x 1.2m H= 1.0m
Storage Capacity m^3	1.70 m^3	1.41 m^3	1.32 m^3	1.44 m^3
Working Period	19 days	13 days	6 days	-
Cost (US$)	370	350	245	150

Apart from merits of box type rainwater storage using brick, extra attention should be paid to transportation conditions of materials for rainwater storage from the aspect of extension in the future not only for the QP but also for other projects because rural residents are divided into two categories, namely, a) people living in Umidugudu located from flatland to inclined plane with relatively gentle slope, and b) residents scattering on steep slope of the hilly area. It is quite difficult to convey heavy construction materials to the latter residential area.

According to the survey carried out by both parties of each Cell officers and the Study Team about the location of model farmers, it was found that there are some model farmers in Cyugaro and Kibungo

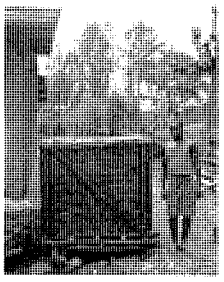
Cell who have difficulties with accessing by lorry or wheelbarrow to convey construction materials such as brick, cement, gravels, etc. due to their topographical condition. Wooden type box water storages were provided for those who are living in such places under selection of recipients by the Cell office at last.

(8) Reluctance to unfamiliarity

Although the rainwater storage was designed as box type using burnt brick instead of conventional design, one Cell officer expressed his anxiety that the new design might be structurally defective because a design with cylinder shape, which is extensively applied at public place such as schools, clinic, etc. in Bugesera, is made through stone masonry. This structure is quite familiar to the local population. For model farmers, the design proposed by the Study Team was the first one to see and then looked unusual. This can be considered as reluctance to unfamiliar things. In order to cope with this issue, the Study Team has been verifying safety of the brick storage against structural and waterproof problems by conducting a functional test. The Cell officer who expressed his anxiety and model farmers at last understood the function of rainwater storage constructed through using brick.

(9) Equal opportunity among model farmers

Furthermore, another type of rainwater storage was additionally introduced, namely, wooden box type during the implementation of the project. The wooden box type was placed at far place, from where it is difficult to transport heavy materials such as brick, cement, sand, etc. The model farmers to receive the wooden box type were selected by the Cell leaders. After conducting a demonstration to show what the wooden box is for the model farmers in Kibungo Cell, the wooden boxes were provided to the selected households. However, some of the model farmers refused to receive the wooden box because they had expected to get the brick type storage. Moreover, they had anxiety that the design of wooden box type equipped with plastic sheet to tap rainwater has only short durability. This could be said that the model farmers had had unfairness or kind of jealousy to others who had got brick type storage. In order to cope with the issue, the Study Team took effort with making the box stronger and explained the reasons why the wooden box type was introduced. As a result, some of them who refused at the beginning accepted it at last. This seems that equal opportunity for the model farmers should be considered more carefully even if the things are just available or useful for the population.



Wooden type storage

(10) Management capacity of cell offices

When the construction works of the storages were completed, the tools like wheelbarrow, shovel, trowel etc. provided to Cell offices for the project implementation were brought away here and there and finally lost. Some of them are still kept by model farmers but some are missing. It is regarded that Cell offices take responsibility for managing the tools as their own property. For better implementation

of the study at next stage, the current system of tool management should be improved.

(11) Way to select model farmers (decision-making system and holding information in common)

Cell officers called Umudugudu leaders to ask them to select model farmers at the planning stage of the QP. Then Cell officers explained the leaders preconditions for selecting the model farmers, which were proposed by the Study Team in advance. In this way, model farmers for the rainwater storage project were selected based on the decision-making system as a rule. However, there are complaints among the population who were left out of the list of recipients. Some of them are saying that they were not given any information about the storage at all. Needless to say, the number of the rainwater storage planned does not meet actual needs of the population, but it is important to at least evenly and widely share information among the population.

V.5.7.1 Points Revealed through Implementation (Shallow well irrigation)

Through construction of the household rainwater storage, the following points were pointed out.

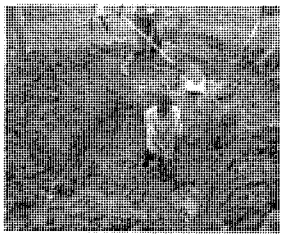
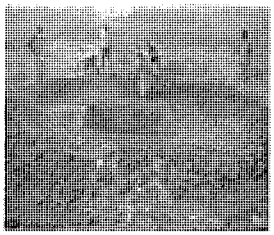
(1) Type of Shallow Well

During implementation of the project, three different type of shallow well were introduced based on the site condition.

1) Type I: Shallow well type

First demonstration of this type, at Muzi-Cyeru site, Kanzenze Cell, was carried out with 9 recipients on 25 July 2006. During 2.5 hours working about 1.5 m with 2.0 m of square was dug and groundwater level was only 8cm from the bottom of well but next day on 26 July groundwater level found at 0.60m in depth. Construction of embankment work around the well was done on 7 August 2006. Currently vegetables such as tomato, green onion, etc. are planted and farmers want pesticides and sprayers. Final finishing of well is summarized as below.

Type I : Shallow well type
Dimension:
Size: 2m*2m
Depth: 1.8m
Height of embankment: 0.5m

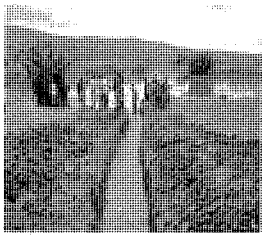
Left: 9 Participants digging well for 2.5 hours
Right: Embankment work around well mouth

Shallow Well Construction at Muzi-cheru Site in Kanzenze Cell

2) Type II : Small scale canal type

Demonstration for type II was carried out on 4 August 2006 at Gashyamagariro marshland, Kagoma Village, Kibungo Cell. During three-hours operation about 20m from marshland to farmland, 1.0-1.5 m in depth was excavated with nine participants. Then digging 0.5m-1.0m at bottom was completed on 9 August 2006. 17 farmers practice vegetable farming such as sweat potato, tomato, etc at site. After completion of the work, farmers are quite satisfied with the performance of the well. They now have a strong desire to have watering cans. Through the discussion between the Study Team and participants, next demonstration site and construction schedule were determined as Rujabagwe marshland site on 18th August 2006. Through the working and interacting with the participants, any aggressive farmer to lead his association was not found and this is an issue for strengthening a farmers' organization in the future. Final finishing is summarized as follows:

Type II: Small-Scale Canal Type
Dimension of canal:
Width : 1.5m
Depth : 1.3-1.5m
Length : 20m

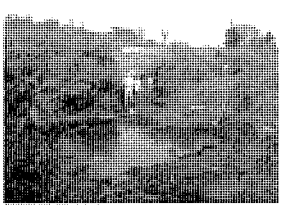
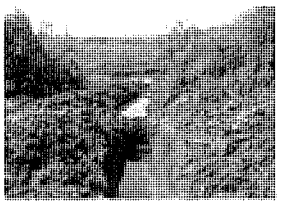
Left: 9 farmers participated
Right: Completion of digging work, Marshland water is lead to plots

Construction of small-scale canal (Gashagamariro, Kibungo Cell)

3) Type III : Small scale pond with canal type

Demonstration Type III was carried out on 16th August 2006 at Rutovu marshland in Cyugaro Cell. In this area Rengera Ibidukikije Association (Protection of Environment) was established with 55 households and about 10ha of farmland has been reclaimed since 2003. Contract for tomato farming with a factory in Kigali has been concluded. Currently hilly area of farmland is irrigated using mobile pump (rental fee 3,000Rwf/day) and near marshland using watering cans. The pond has been already constructed but farmers are having difficulty with irrigation using watering cans due to the muddy condition of the road to the pond. In addition, they are required to go watering quite often. Thus, the Study Team recommended constructing conveyance canal from the pond to farmland and the president of the association agreed to start the work. Within a couple of days construction of canal can be completed. Final finishing is summarized as box bellow.

Type III: Combined type with Small-Scale Farm pond and Canal
Dimension:
Pond: Size 3m*4m, Depth 3m
Canal: Width 3m,
depth 1.5m, Length 15m

Left: Existing pond

Right: Under construction of canal

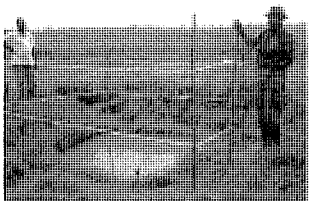
Combined type with Small-Scale Farm pond and Canal(Rutovu, Cyugaro Cell)

(2) Simple Construction with Zero-Cost

Compared with rainwater storage construction, the shallow well can be constructed at a lower cost. During the workshop for making consensus to implement the QP between both parties of the Cell representatives and the Study Team, it was agreed that the Study Team provides tools necessary for digging the well like shovels, buckets, etc. to the Cell office. Through this system, model farmers can borrow the tools from a Cell office whenever they need. Regarding to construction works of the well, it can be done by only manpower of participants with tools provided by the Study Team and hoes as their own belongings. This means that construction works of the shallow well costs almost "zero". This is the remarkable point to extend the shallow well to other places and farmers taking account of sustainability.

(3) Domestic Consumption of the Shallow Well Water

There is a site which is domestically consuming water of shallow well for after using water for irrigation. In case of Muzi-Cheru site, the population of Cheru Umudugudu has started to fetch well water to their Umudugudu place from the well because they regard it as clean water. This well was dug by some particular persons who are cultivating that marshland site under instruction by the Study Team as the first demonstration. However, the model



The well water is also used for domestic consumption

farmers who participated in construction work have no objection to share the shallow well water for home consumption of their neighbors. There is a possibility to use the shallow well water for multi-purposes like for domestic, livestock, etc. as well as irrigation.

(4) Gap between Intention and Practice

Now in February 2007, the number of shallow well dug by the model farmers is 10 in 8 farming sites. Among them, the participants of Gashamagariro, Kibungo Cell, constructed another wells (Type-II: Small scale canal in this case) with their own initiative after the demonstration, without any instruction from the Study Team. Moreover the Muzi-Cheru farmers, Kanzenze Cell, have planned to dig other shallow wells in their marshland plots next season. In these cases, it seems that the farmers of both sites realize utility of the shallow well and are planning to bring programs into action. On the other hand, in most cases more or less farmers will not put into place any more due to their conservative way, even if they recognize availability of the well. As is often the case with farmers in this area, such behaviors of theirs can keep them isolated from information of advanced farming techniques. In order to leave those farmers free from their conventional ideas or farming way, it is essential to provide them applicable information of farming techniques as part of administrative supports like agricultural extension activity.

(5) Fruitful results by a little input

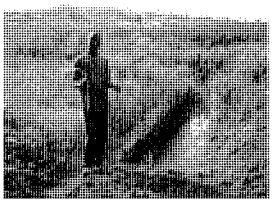
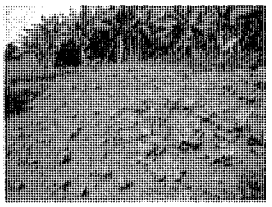
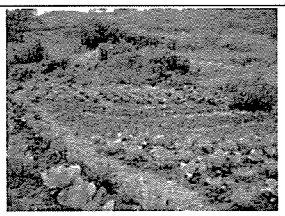
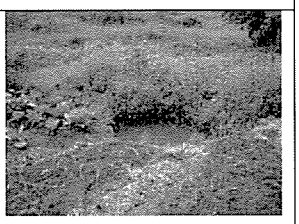
The follow up project tried to verify a possibility to cultivate cashable crop in dry season (aseason C) by introducing shallow well irrigation. The Study team procured a small quantity of farming input such as vegetable seeds, pesticide, sprayer pump and so on. The seeds cost about 1,500 Rwf in total per site. A model farmer estimated that gross income from these input could be 450 - 750 Rwf per m^2. Minimum level of cultivation area participated in the follow up project is estimated around 140 m^2. It would be expected to get 84,000 Rwf of income per site, which is equivalent to 7,400 Rwf per person. It could be said that the shallow well irrigation has a potential to bring fruitful benefit to farmers with a little investigation for dry season farming.

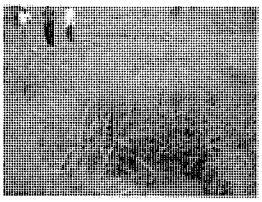
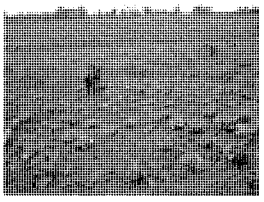
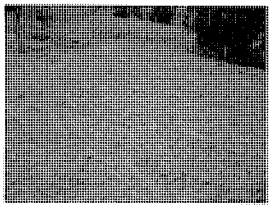
Results on the Follow-up Project (December 2007)

The follow-up project has been implemented since September 2007 at 10 sites in total. In order to study possibility of cultivation of cashable crops in the dry season (Season-C) by using shallow well water, the follow-up project provided some kinds of vegetable seeds the sites. Results and findings of the follow-up project are summarized as follows:

Table 1 Summary of the Follow-up project

Name of Site (Cell, Umudugudu)	Results of FU project (Mid-term)

Name of Site (Cell, Umudugudu)	Results of FU project (Mid-term)
Kurugenge (Kanzenze, Kurugenge) Outline of the Site ▪ The participant is forming a vegetable farmers association ▪ President of Association: Hatagimana Leodomile ▪ 14 members	▪ They have started vegetable cultivation from September 2007 as a part of FU project.   ▪ As of December 2007, some of vegetable have already matured for harvesting, especially carrot. ▪ Area for vegetable cultivation is approximately 90m² (for cabbage: 50 m², for onion: 30 m², for carrot: 10 m²). ▪ According to president of association, shallow well is quite useful for not only irrigation of vegetables but also reduction of labor to fetch water from marshland. ▪ The shallow well water has been available since they started vegetable cultivation up to now (= middle of December). ▪ The production will be shared among the association members anyway, and then the remains will be for selling to prepare some budget for the association's activities such as buying seeds for next season. ▪ President of association estimates that the productions of FU project could give the members 89,000 Rwf if they sell all at Kicukiro market in Kigali (from cabbage: 51,000Rwf, from carrot: 18,000Rwf, from onion: 20,000Rwf). ▪ Apart from above, what he strongly expressed was "Balance Diet" through taking in various nourish from vegetables. ▪ During FU project, the members contributed some cash money to perchance pesticide which was different one from JICA Study Team provided.
Byimana (Kanzenze, Ruwangara) Outline of the Site ▪ The participant is forming a farmers association. ▪ Leader of association: Nbonigaba Jean Pierre ▪ 5 members	▪ They have started vegetable cultivation from September 2007 as a part of FU project.   ▪ As of December 2007, some of vegetable have already matured for harvesting, especially Cabbage. ▪ Onions have also been transplanted but some seedlings remain in the nursery beds. ▪ Carrots are also in good condition. ▪ Area for vegetable cultivation is approximately 300m² . ▪ As of middle of December, the shallow well has water enough for cultivation. ▪ A farmer of association members said that the shallow well is useful to irrigate veritable even in dry season so that the production could be expected well. ▪ Moreover, labor to fetch the water for irrigation can be reduced because the shallow well is located at close to vegetable plots. ▪ The production will be shared among the association members, after that the remains will be transported to Nyamata market as a part of association activity. ▪ She estimated the production to be 180,000 Rwf if all of them will be for selling. ▪ The association members contributed cash money of 120 Rwf each to buy pesticide with liquid type.
Kinyana	▪ This is a site where introduced the shallow well irrigation system in last season.

Name of Site (Cell, Umudugudu)	Results of FU project (Mid-term)
(Kanzenze, Kabeza) Outline of the Site ▪ The participant has formed a farmers association mainly for tomato cultivation. ▪ Leader of association: Ruwatambuga ▪ 12 members	▪ Farmers have constructed two shallow wells so far. ▪ They have started vegetable cultivation from September 2007 as a part of FU project.   ▪ Area for vegetable cultivation is approximately 380m². ▪ As of December 2007, condition of cabbage growth is not good because of disease unfortunately. ▪ Regarding carrot, they are in good condition except the problem of spacing while planting. They are too squeezed. But a agronomist of JICA Study Team gave them instructions on how to carry out weeding by removing extra seedlings. ▪ The members have been using the shallow well water for mainly tomato cultivation. ▪ A member says that the shallow well is available for avoiding decreasing irrigation water even in dry season because the well exists close to plots.
Kirera (Cyugaro, Kayenzi) Outline of the Site ▪ The participant is forming a farmers group. ▪ 12 members	▪ Area for vegetable cultivation is approximately 150m². ▪ The members uses the shallow well water every day for not only vegetable cultivation but also home use.   ▪ Condition of cabbage growth leaves a little to be desired so that the farmers want to be trained technical support (=necessity of extension services).
Gakurazo (Cyugaro, Kingabo) Outline of the Site ▪ The participant is forming a farmers group. ▪ Leader of group: Emile Twagiramunga ▪ 14 members	▪ Area for vegetable cultivation is approximately 460m². ▪ The water of shallow well is still there. ▪ The farmers intends to share all product among the members for home consumption.   ▪ Among the vegetables cultivated since September, growth of carrot is extremely not good comparing with other kinds. ▪ The farmers requests to hold a training for vegetable cultivation (=necessity of extension services).
Gashamagariro (Kibungo, Kagoma II) Outline of the Site ▪ The participant is forming a farmers group. ▪ Leader of group: Jean Baptist Nsengiyumba ▪ 12 members	▪ Although the farmers have been struggling to grow vegetables, condition of growth of them is not good condition due to poor soil fertility.   ▪ The shallow well water also is dried up as of middle of December. ▪ The farmers know on how to apply local manure to make soil fertile, but they don't have any way to get things such as cow dung. ▪ They strongly desire to be trained to get knowledge for cultivation.

Name of Site (Cell, Umudugudu)	Results of FU project (Mid-term)
Kagoma II (Kibungo, Kagoma II) Outline of the Site ▪ The participant is forming a farmers group. ▪ Leader of group: Jean Cloude ▪ 7 members	▪ Condition of cabbage cultivation is not good, meanwhile carrot and onion seems to be well. ▪ A farmer estimates his income from onion to be 25,000 – 30,000 Rwf. ▪ The water of shallow well is still there.  

V.5.8.1 Points Revealed through Implementation (Shallow well irrigation)

Through construction of the household rainwater storage, the following points were pointed out.

Same as other water related components, some tangible facts have been found out through implementation of the roadside irrigation construction.

(1) Simple construction with zero-cost same as shallow well

As same as the shallow well construction, implementation of the roadside side irrigation system has been done only through manpower of the participants without any expenditure. Furthermore, unlike the rainwater storage construction the participants work together to construct the facilities as a group because the works are too heavy for an individual. These are issues to increase the number of executing site of the system.

(2) Leadership as a driving force

Implementation progress of this project is different from the other two water-related components because at the beginning of the QP, priorities were given to installation of household rainwater storage and introduction of shallow well irrigation system. Therefore actual construction works of this component have been started at the beginning of September 2006, one and half months after the other two components. After that, the project tried to promote itself in the three Cells. Consequently, introduction of the road side irrigation system has not been disseminated as good as it had been expected. Under such situation, the project was intensively carried out in Kibungo Cell area because the executive secretary of the Cell instructed the farmers with zeal what the roadside irrigation system is. Consequently, five constructed sites, all banana plantations, established the irrigation system in total before execution of the study tour which was carried out as a part of the project in the beginning of December 2006, meanwhile the other Cells had no implemented sites at that time. In comparison with the other Cells, the stronger leadership of executive secretary brought about good results in Kibungo Cell. The leadership over the population must be essential to development / improvement of life standard in rural area as a driving force of the population and / or the projects.

Kibungo Cell Executive explains the system

(3) Eagerness for getting knowledge of advanced farming technique (Efficacy of Study Tour)

As mentioned already, the road side irrigation is the system which aims to more effectively and efficiently utilize runoff as supplemental irrigation by leading rainwater into the farm plots from side ditch of rural road. Same as other components of the QP, activities of the component aimed to introduce as many roadside irritation systems as possible in several places in Ntarama sector. However the degree of extension of this irrigation system has not been very high except Kibungo Cell. On the other hand, through the activities for promoting

The participants are delivered a lecture

the system demands of farmers for acquiring advanced farming techniques have become visible. They wanted to have learnt before construction of the system facilities. Taking into account further dissemination of the roadside irrigation system with appropriate farming techniques, the Study Team conducted a study tour with 28 participants from three Cells including agronomists of Ntarama and Mwogo sector on 12th December 2006. As a result, in the larger number of sites, participants of the tour suddenly introduced the road side irrigation system. This fact may be highly suggestive about possibility of the way for agricultural extension service, namely, "Farmer to Farmer" extension.

(4) Gap between intention and practice

Even at this successful project component, one of the issues is a gap between intention and practice. Actually, farmers in the area have opportunities to see farming techniques which have been practicing by some advanced farmers and are likely to realize its utilities. However, more or less farmers will not put into practice what they saw because it seems that agricultural extension services have left them uninformed about appropriate farm techniques. The population will need to have more contact with adequate information in terms of farming to motivate themselves to cultivate with better understanding of farming.