2.5 Communal Resource Management: Livestock Improvement (Sandai)

2.5.1 Background

The Study Area is the second largest goat rearing area in the Rift Valley province. The value of goat meat is greater as it is the preferred meat than beef. Goats have been the domestic companions of man since primitive times but the species as a whole has been neglected. As a result of uncontrolled breeding and inbreeding, the size of the goats has become small and is getting smaller and smaller if this situation remained same as the practiced to date. Therefore, the critical areas of development should include the genetic improvement of the goats accompanied with adequate health control measures, suitable feed resources development, and proper management practices for the animals.

One of the important areas to be considered is adequate health control measure because tick-borne diseases are taking a great toll of livestock population. Dipping system can be seen at many places over the Study Area, serving the livestock's health control and improvement. However, very often observed are just dormant or already abandoned dipping systems. Therefore, two activities, namely buck scheme and dip improvement were chosen as the verification projects in Sandai area.

1) Subject to Verify

The Sandai area is a mixed farming one that is known more for maize production than livestock production. Due to its proximity to Marigat, good road communication and relatively high density of population, development projects are not new. In fact, so many projects have been tried that the community has developed a dependency on outside assistance. Under such circumstances, the subjects to verify were:

- To find out if farmers, given minimum start-up inputs from donors, can carry out goat genetic improvement by cross breeding with an improved buck.
- To examine if farmers can manage a dip system sustainably after receiving very minimal start-up inputs and training from donors.

2) Strategy/Approaches and Project Purpose

Sandai people, through PRAs and PCM workshops identified their main need as "production of enough food for their families". Therefore, the project in Sandai area was formulated together with agricultural components. The project that was formulated for livestock improvement had its purpose as:

- Facilitating the acquisition of improved bucks by farmer's groups,
- Educating groups on herd management,
- Facilitating the re-activation of dips through subsidize inputs,

- Training in dip management and leadership, and
- Organizing visit to breeding station e.g. Naivasha also Kimose.

And were underpinned by the following assumptions that:

- Small size of goats was due to inbreeding and uncontrolled breeding,
- Tick-borne disease take a great toll of livestock production,
- Drought is not a significant killer of livestock,
- Area resident can afford dipping fees, and
- The value of the livestock is high enough to warrant dipping.

3) Community Situations

Sandai, a location owing its existence to the presence of a long but seasonal Weseges, is located at the floor of the Rift Valley. Except for the rainy season and the periods when Weseges has water for irrigation, Sandai is a dry area. It, however, has swamps that are used for all season grazing. The swamps are however, communally grazed and generally overstocked. The area is inhabited by the Tugen, whose political connection have been able to draw much foreign assistance, to the extent of conferring a deep seated dependency syndrome.

Droughts are the order of the day and some of the past ones have been quite devastating. Although livestock production is second to irrigated crop agriculture, it has clear opportunities that can be taken advantage of, and this is the reason for the verification project.

4) Existing Livestock Resources

Sandai livestock resources include abundant browse on the hills. This browse consists of both annual plants and evergreen trees and shrubs. Some significant trees i.e. *Ficus spp, Balanites spp* are used for lopping to provide dry season feed while *Acacia tortilis* provides pods that are used for dry season feeding. Water for livestock is seasonally available. Followings are the general conditions concerning livestock.

- Large flocks of goats.
- Average sized herds of cattle.
- A functional dip sited next to River Weseges. Water is however not always available.
- An age tested livestock husbandry knowledge that has been faithfully passed from one generation to the next.

- Abundant maize leaves and by-products that can be used as a basis for stall feeding dairy goats.

The totality of the above resources made Sandai a medium potential livestock producing area that had some possibilities for improvement.

2.5.2 Project Design

1) Project Design

During the course of project design by the community, two expected main outputs – *Goats become fatter and Animal healthy is improved*, were identified by implementing the verification projects. As a result of them, it was anticipated to achieve the project purpose of "Selected farmers get enough food", and finally the overall goal of "People of Sandai are well nourished" could be achieved.

Table 2.5.1 Narrative Summary and Indicators for the Verification Project in Sandai (abstraction)

Narrative Summary	Objectively Verifiable Indicators (Planned)
Overall Goal People of Sandai are well nourished	
Project Purpose Selected farmers get enough food	Price of goats increases to Ksh3,000 from Ksh1,500
Results/Outputs 1. Goats become fatter 2. Animal health is improved 3. Sandai Villagers lean from verification project	1. Increase of goats weight from 15 to 25kg 2. Reduction of ticks from present 100% to 75%
Inputs 1. 5 bucks (7,750Ksh) 2. Transportation of the Bucks (2,000Ksh) 3. 2 castrators (total 12,600Ksh)	4. 5 choppers (total 32,400Ksh) 5. Training (improved breeding + record keeping)

Important underlying assumptions for the two areas of intervention were:

- Community participation in contributing cash for cost sharing of improved bucks and livestock equipment.
- Using their flocks for testing the various hypotheses.
- Contributing labor (communal and family) for dip repair as well as herding and care of introduced bucks.

2) Project Design Changes

No major changes in design were effected during the tenure of the verification project. Some accommodation had, however, to be made in view of the drought impoverished situation prevailing at the start-up phase of the project. These accommodations were:

- Delivery of bucks before community cash contributions had been completed.
- A delivery of equipment before the community cash contributions had been completed.

Initially, the Study Team assumed that the failure to pay the community contribution on time was due to drought but was due to the other reasons, and details are discussed in 2.5.5.

2.5.3 Record of Implementation

Implementation of the verification projects started in April 2000 and the activities shown in Table 2.5.2 were either attempted or completed.

Table 2.5.2 Record of Implementation

Activity	Planned schedule	Dates implementation done/completed	Comments
Goats become fatter			
Committee is established	June 2000	26/7/2000	A forum rather than a committee was formed. 5 breeding groups were formed. They contributed cash for bucks.
Introduction of by laws	21/4/2000	Not enforced	The laws were not enforced because breeding turned out to be an individual family affair rather than group.
Introduction of bucks	12/6/2000	June 13, 2000	This could have been done earlier, but drought could not permit.
Distribution of bucks to farmers	12/6/2000	June 13, 2000	Done on the same day the bucks arrived from Kimose.
Make breeding boma	Jan 2001	Not yet done	No good reason given for not constructing the breeding bomas
Make breeding records	Jan 2001	Nov. 21, 2000	This was done well by the ladies. Not so for men
Fee contribution for bucks	Sept 2001	Not done	The buck custodians did not charge fees because their customs would not have allowed it. At any rate breeding turned out to be an individual family affair rather than group.
Treatment of bucks	From Jun. 14, 2000	Apr. 2001	This, with the exception of the two ladies, was not properly taken of.
Animal health is improved			
Electing committee	April 2000	April,2000	There was a poorly performing dip committee in place before the present verification project started. The community was asked to elect a new one. But this took very long as – due to power politics in the community, the chief kept on postponing the elections.
Collection of funds	May 2000		No individual collections were made. The dip committee obtained funds from the dipping kitty and paid for livestock equipment.
Repair of cattle dip (crash) using local materials	Every 3 months	Not yet done	A half-hearted effort was made to replace some rafters. The latter never served the purpose because they were quickly destroyed by termites.

Purchasing acaricides	After 2 months	7/4/2000	This was done on time.
Replacement loss of water	After 2 months	April,2000	This was done even before the verification project started implementing in earnest. The community hired a water bowzer that ferried water from Marigat at the cost of Kshs 9250.
Dipping animals	Every 2 weeks	Started 20/4/2000	Done fortnightly, but the dipping were not accurately recorded. Moreover, the cattle were not well counted as the calves were being dipped freely.
Buying of roof gutters	yearly	Not done	This was never done and possibly was never meant to be done.
Construction of storage tanks	1st week of Oct 2000	Not done	This is hardly needed now as there is a spare storage tank near the canal that needs only a cover to prevent people from drawing water from it.
Tsetse traps	June and Dec Yearly	Not yet acquired	Sandai community was not keen to contribute towards tsetse traps as they argued that it should be done by the communities that felt the need (Mbichut and Kessupo areas).
Vaccinations	June,2000	June 2000	This was done by 19 farmers only that expected to use the improved bucks. Other pleaded lack of cash due to famine and drought
Castration	June, 2000	Started July,2000	The work started after the vets demonstrated how to do it with the newly acquired castrators. 120 he goats were castrated in the following few months. Later the castrators were used but there were no authentic records of the funds collected and he-goats castrated.
De-worming	Sept-Oct 2000	Not done	Hardly done except by the buck custodians
Training of dipping and leadership	-	Jan 2001	Done in January and it resulted in the election of the current dip committee.
Visit to Naivasha	-	21/11/2000	This was found an important educative event as the farmers saw improved management of dips and goats.

1) Fattening of Livestock

1.1) Crossbreeding in Goats

Genetic improvement of goats in Sandai was identified as a viable short term solution to the known problem of raising small size goats that fetch low price at the markets and auctions. These low price contribute to low standards of living – a situation the community targeted to change.

The processes used for crossbreeding involved the following steps:

Identifying a suitable source of improved bucks

This was mainly done by the Team and it settled on bucks from Kimose.

Facilitation of the formation of breeding groups

This was done through the encouragement of the counterpart and the Study Team. First the community was asked to select farmers who distinguish themselves as good man/woman and have fairly healthy goats. They were supposed to be responsible to look after the bucks in healthy condition, feed properly and keep them securely. The community selected the five people as shown in the following table. The breeding groups were then formed in the village where the selected custodians live. Respective group size is shown in the same table.

Table 2.5.3 Breeding Groups Formed and Their Results

Buck No.	Name of custodians	Village	No. of members	Start mating	No. of Kids born *	No. of Kids ** expected	Remarks
S-1	D. Chepkuto	Cheploch	10	August	2	0	Died (worm infection)
S-2	C. Rotich	Kapchepkendi	8	-do-	0	0	-do-
S-3	D. Kibon	Kokchande	10	-do-	0	0	No libido
S-4	E. Katero (Mrs)	Kamaech	12	-do-	1	12	
S-5	I. Kiploman (Mrs)	Mbichut	10	-do-	21	10	
	TOTAL		50		24	22	46 kids

Source. JICA study team, 2001. * up to date. ** within 2001.

Contribution for acquiring a group buck

The breeding groups were informed of the prices of the bucks as well as the respective group contributions. They then divided the amount among themselves and set their own deadlines. It was initially planned to collect due money from the community when they went to Kimose to purchase the bucks. However the groups' due, 2,925Ksh, was not settled on time and finally they paid at the end of August 2000 or three month after the due, after more than 10 times of negotiation, while Arabal people had brought required amount on the agreed day.

Selection of the bucks by the buck custodians

This involved a trip from Sandai to Kimose and the team funded for the transportation fee. In Kimose, the farmers were shown the bucks on offer and they selected the five bucks for the Sandai area.

Buck immunizations, transport and distribution

The selected bucks were checked by the Marigat veterinary office and passed as suitable. They were then immunized against CCPP and FMD. On reaching Sandai, the Team was welcomed by the chief and the members of the breeding groups. The bucks were then distributed and handed over to the custodians.

Mating

The bucks were distributed at a time when they were physically small and could thus not compete with the local bigger bucks. Thus they took time to acclimate, grow and claim territory. They started mating in August 2000, and to date the bucks have mated 46 does.

Kidding

This was in January 2001. It was comforting to note that none of the goats that were mated by the bucks had aborted.

As of September 2001, 24 offspring were born and 22 were expected. In addition to that, the birth weight increased from 1.8kg to 3.0kg on an average. However, 2 improved-buck died and death number of offspring is unknown due to no proper record keeping by the community.

1.2) Introduction of Choppers

During the workshop, improvement of animal feeding was discussed to fatten livestock. Twelve farmers out of 20 answered that they are practicing semi-zero grazing. However in the field observation, they cut the branches of trees and feed cattle with the leaves during drought season; it is rather an emergency relief for animals.

The Japanese traditional tools such as grass-cutting sickles and choppers were demonstrated showing people how to harvest grass and chop napier grass, maize stalks, millet stalks and other animal feeds. Since the area has resources especially maize by-products that can be used to support improvement of livestock production. The participants who tried to use the chopper found that it was easy and fast in chopping the grass. Some interested and affordable individuals decided to introduce grass-cutting choppers to improve feed production. As a result, five people in total purchased it with the cost of about 1,900Ksh (30% of 6,480Ksh) per one.

The farmers were also trained in fodder conservation and use. One farmer had built a separate store for maize stover. Thus the farmers have gathered much knowledge since the commencement of the verification project.

2) Animal Health

2.1) Renovation of Dip Fence and Foot Bath

In terms of animal health, the activities include to revive the dormant dip and some other routine management practices like de-worming and salt/mineral feeding. However, salt was not fed due to shortage of funds to purchase it. As for the dip, the following table shows the progress that was achieved to date.

Table 2.5.4 Dip Progress in Sandai

At the start of this project phase	At the end of this project phase
The dip was not in use.	The dip was in use.
The dip did not have enough water for replenishment.	The dip had sufficient water and there was a water pump for replenishing.
The roof had one badly rusted corrugated iron sheets that leaked water into the dip tank.	The roof was still the same.
The crushes had a few broken rafters and a few missing poles.	No change.
The draining race needed repairs.	No change occurred.
Rainwater drained into the dip tank.	No change.
There was a dip committee.	There was an elected new dip committee that was not operating transparently.
No dipping was being done.	Dipping was taking place twice a month but no reliable dipping figures could be obtained.
The bank account had some Kshs. 32,000.	No record.
The account was inaccessible to the Sandai community.	The new committee is not operating the bank account.

The GOK staff and the team carried out for fortnightly on spot training in general livestock management and health care at Sandai. The numbers of attendants were in the range of 3-6 farmers. There were other training done for the secretary and treasurer of the dip committee. These dwelt on bookkeeping and dip replenishment. However, the knowledge had not been put into practice. On the late November, the Sandai farmers participated in a study tour to Naivasha during which they were exposed to new breeding and livestock husbandry techniques. They also saw Mogotio dip and a separate boma for shorts.

2.2) Castrating

All buck kids or calves, not intended for breeding, should be castrated to improve meat quality. The animal will fatten faster than an entire animal, as it will not waste energy chasing females. The castration should be done soon after birth, best about two to four weeks old, since older animals are more shock prone to castration. Nineteen farmers out of 20 interviewed were practicing castration both to cattle and goats. The method taken is, however, unhygienic open castration, which just excise the testicles of animals.

To provide castration in hygienic way, two castrators were provided to the dip committee with the cost of about 1,900Ksh (30% of 6,300Ksh), and as of September 2001, at least 120 goats were castrated by using them.

In summary, the project has registered slow overall progress, compared with Arabal in where same kind of activities were carried out.

2.5.4 Encountered Difficulties

There were difficulties faced during the implementation stage. Some were connected with the drought that affected the whole Study Area. Drought had been blamed for the poor cash contributions in dipping, bucks, and other equipments. They also failed to de-worm the whole herds, and they were associated with community's lack of awareness on the damage of tick borne diseases and worms.

Difficulties are summarized as below:

- The community was in general a difficult one to work with. This was shown by poor attendance of convened meetings, and slow contribution towards the acquisition of equipment and bucks. In fact this community had to be given the bucks before it had completed its payment. This situation was brought about by a deep-seated dependency syndrome. Besides the above the team had considerable difficulties getting mating data. Even though the team requested to the custodians to keep record, there were only two out of five kept it, and both of them were female.
- During the early stage of the project, the whole area was experienced a very sever drought and there was not enough feed for bucks. This delayed the implementation of the crossbreeding aspects as the bucks could not be delivered before the rains.
- At the beginning, the area was under FMD quarantine. This interfered with marketing of livestock and reduced the incomes that could have been used for project implementation.
- The project's insistence on 30% contribution took time to be appreciated by the community and some areas missed out on bucks expecting the project to relent and give free bucks.
- The bucks acquired from Kimose were brought when they were relatively small. Most custodians have not taken good care of the bucks. Only the two ladies were an exception to this and their bucks have grown considerably. The goats have shown they have the right characteristics to grow to be heavy goats in the hilly sides.
- The project over relied on the dip committee to handle dip as well as other matters little connected with dip. It might have been better to have a general project committee that could steer the project at the locational level.
- Low percentage of livestock dipped – possibly due to lack of appreciation of the importance of dipping and the feeling that dipping fees were too high.
- The death of two introduced bucks and other one became ineffective (low libido) due to poor management; especially no de-worming was done in the area. In addition to that, the swampy areas in lowland Sandai that are traditionally used as all-season grazing area for both cattle and goats have often negatively affected the animal health.
- Poor price of livestock as low as Kshs. 600 per goat during drought.
- Sandai area, including Loboi and Kapkuikui locations have no auction yard and have to depend on middlemen who take large profits.

- Sandai is mainly an irrigated crop based agricultural area. Thus livestock takes a second priority to crops, and yet the farmers do not use the crop by-products (residues) to improve the livestock production.
- Lowland Sandai farmers graze their goats mixed with cattle in swampy areas. No particular care in herding is given. One cannot have high production from such a system.

2.5.5 Lessons Learned

The followings are the lessons learned through implementation of the verification project:

- The community showed little interest in participating in the livestock improvement project in general, and this is a clear contrast with Arabal. The fact that Sandai farmers are more or less agriculture-oriented giving first priority to crop has hindered their breed management. It can be said that the Sandai farmers can carry out goat genetic improvement by cross breeding, but the output depends very much on the area's situation.
- In a component like introducing bucks, a scheme with individual ownership rather than group ownership need to be considered as well, so that more intensive care could be expected.
- At least 100 cattle and 300 shorts per week have to be dipped to maintain dip operation. In Sandai, the livestock is not moving so much because there are nearby swampy areas where animal are grazed. It seems that the dip system has been operating better than the one in Arabal. However, record keeping including dipping fee collection had not been transparent, thus the opaque management of the dip committee would greatly hinder the sustainable operation. Also estimated dipping number of about 300 cattle with probably same or little more number of shoat is still not enough to financially sustain the dip.
- Bucks in the hilly areas have less worm infestation. Swampy area, though it is a nice grazing land, would raise the animal mortality due to the contagious situation unless animal health care should be well taken.
- Sandai area had been blessed with development opportunities in the histry, so that people apparently showed dependency syndrome on the course of the program. Cost sharing of bucks is just one example; Arabal custodians settled their due (30%) before the delivery of the bucks while the Sandai custodians were so reluctant to pay that the Team had to negotiate more than 10 times even if they are much wealthier than the ones in Arabal. The people's attitude greatly influences the result.
- Team had difficulties to communicate with Sandai community. For example, there was a poorly performing dip committee in place before the verification project started. The community was asked to elect a new one. However, this took very long time due to power politics in the community; the Chief kept on postponing the elections. The gap between old generation to which elders belong and younger generation to which the Chief belongs might be one of the problems. More detail study on social structure should have been made before the project planning.

- In Sandai, there is an abundance of crop by-products which can be used to improve livestock production.

2.5.6 Evaluation

1) Output

As of September 2001, 24 offspring were born and 22 were expected. In addition to that, the birth weight increased from 1.8kg to 3.0kg on an average, and growth rate of improved goats herds were increased. At least 120 goats were provided castration.

Since there was no record keeping done by the dip committee despite periodical advice by the Team and there is no accurate number, but it is estimated at about 300 cattle and almost same or little more number of shoats were dipped per month. As a result, ticks and tick borne diseases were reduced.

Since the start of the project farmers have acquired skills in general herd health activities. In addition to that, some farmers in the groups have now recognized that they have improver bucks that they will use in future. Thus the project has been able to show that farmers in the area can rear improved goats.

2) Outcomes for the Stakeholders

The project was implemented for too short a period for one to make definite conclusions on whether the area residents will continue drawing benefits from the project for long or not. There were, however, some clear indication that:

The two ladies buck custodians will bow to the pressure of their villages to sell their crossbred bucks to them. These will help train the neighbors on management and prepare them for the next step – to buy or introduce purebred Galla or Boer goats. When the above sales take place, the custodians will generate income – the final goal of the project.

There were two female custodians out of the five in Sandai. Their performance was very good as compared to male custorians as shown below; thereby they became very pround as well as self-confident.

Table 2.5.5 Performance of Custodians in Sandai

Sex	*Name*	*Start Mating*	*No of kids*	*Expecting kid*	*No of kids dead*
Female	***I. Kiploman***	***August***	***21***	***10***	***0***
Female	***E. Katero***	***-do-***	***1***	***12***	***0***
Male	*D. Chepkuto*	*-do-*	*2*	*0*	*Buck died*
Male	*C. Rotich*	*-do-*	*0*	*0*	*Buck died*
Male	*D. Kibon*	*-do-*	*0*	*0*	*No libido*

3) Impact for the Surrounding Communities

The progress of the project in Sandai was not impressive to the farmers. Thus there will be little benefits if any that will spill to the surrounding communities.

2.5.7 Way Forward

It is difficult to see way forward for the project in Sandai. This is because the progress was at best lackluster. Until the significant attitude change for the better is observed, Sandai area will not develop as the breeding area. Taking into the buck price, 1,500 to 2,200Ksh per head which is about two to three local goats selling price, many farmers seem to be affordable to buy individually. Therefore, the group based scheme tried in this verification might be preferable as a pilot and also for poor people who cannot afford to buy the buck individually. However, even if individual basis prevailed, technical advice of selecting bucks and its transportation of the back should be assisted by the program.

The community is expected to continue having regular meetings, enforcing by-laws, proper dip management, purchase more buck on their own, sell improved crossbred bucks, carry out buck rotation, and others. The Location Development Committee, supreme committee in the Location, should work as the advisory committee to the existing dip committee in order to improve the opaque management. The dip committee should basically function as the executing committee but not as the decision making body. Cross breeding program could be extended to other similar areas like ASAL areas, but except for the swampy areas.

On the other hand, the GOK staffs suppose to continue with veterinary services and extension, train committees, carry out more vaccination, increase production capacity of improved bucks, have wide range disease surveillance and disease forecast, promote dairy goats husbandry.

Use of similar approach in future livestock development program can give good results. It would be useful if follow-up programs are funded in future in order to establish the long-term value of the project.

Table 2.5.6 Evaluation of the Verification Projects : Livestock Improvement (Sandai)

1. Subject to Verify

Subject to Verify	*1. To find out if farmers, given minimum start-up inputs from donors, can carry out goat genetic improvement by cross breeding with an improved buck.* *2. To examine if farmers can manage a dip system sustainably after receiving very minimal start-up inputs and training from donors.*
Result	*1. The fact that Sandai farmers are more or less agriculture-oriented giving first priority to crop has hindered their breed management. Also, the swamp areas in lowland Sandai that are used traditionally as all-season grazing area for both cattle and goats have often negatively affected the animal health.* *2. In summary, it can be said that the farmers can carry out goat genetic improvement by cross breeding. However, the output depends very much on the area's situation. In general, the more pastoral area would have better result and the more agricultural oriented area would have less performance. Also, swampy area, though it is a nice grazing land, would raise the animal mortality due to the contagious situation unless animal health care should be well taken.* *3. People's attitude toward development is also one of the keys to success. Sandai area is blessed with donor assisting projects in the history. Sandai people apparently showed dependency syndrome on the course of the program. Thus, the people's attitude greatly influences the result.* *4. The livestock is not moving so much because there are nearby swampy areas where animal are grazed. It seems that the dip system has been operating better than the one in Arabal. However, record keeping including dipping fee collection has not been transparent, thus the opaque management of the dip committee would greatly hinder the sustainable operation. Also, estimated dipping number of about 300 cattle with probably same or little more number of shoat is still not enough to financially sustain the dip.* *5. Why they do not bring many livestock to the dip, despite the large number in those areas and despite the fact that they are mostly aware of the animal health, may be very much related to the less cash availability in the rural areas. Literally and actually, they regard their livestock as their savings rather than practicing actual cash saving in a bank account. Commercial bank is not acceptable for rural people due to the distance and the minimum depositing system (3,000-5,000Ksh for commercial bank). Therefore, cash flowing and also the availability in rural areas are very much limited, thus making it difficult to avail dipping fee at any time. This must be contributing to the less sustainability of the dipping system.*

2. Evaluation of Planning Stage

	Original	*Change on the course of implementation*
2.1 Situation Analysis of the Project Area	*1. Small size of goats was due to inbreeding and uncontrolled breeding.* *2. Tick-borne diseases take a great toll of livestock population.* *3. Drought is not a significant killer of livestock.* *4. Area residents can afford dipping fees.* *5. The value of the livestock is high enough to warrant dipping.*	*1. Tick-borne diseases are not perceived as great killers, rather drought was.* *2. Area residents feel they cannot afford normal dipping fees of Ksh 10.00 per head of cattle.*

2.2 Strategies / Approaches	1. *Facilitating the acquisition of improved bucks by farmer groups.* 2. *Educating groups on herd management.* 3. *Facilitating the re-activation of dips through subsidize inputs.* 4. *Training in dip management and leadership.* 5. *Organizing visit to breeding stations e.g. Naivasha also Kimose.*	1. *Breed improvement tended to be an individual family affair* 2. *For best results, the visit to Naivasha, part of learning from best practices should be made early in the program. Other farmers should have visited KARI-Perkerra and Kimose to familiarize themselves with crossbreeding.*
2.3 Project Purpose	*Enough food through improvement livestock husbandry and income generation*	
2.4 Project Design	*Introduce improved bucks, suitable modernized equipment and strengthening dip management*	
2.5 Input	*5 bucks* *2 castrators* *2 knapsack sprayers* *5 ear notchers* *5 choppers* *2 sickles* *1 water pump* *1 Weighing scale supplied by the vet office* *10 tsetse nets/traps* *Training* *Breeding Record Books* *Visit to breeding stations* *Transport of dip committee to Kabarnet to activate Bank account.*	1. *Water pump became necessary in removal of used dip wash and reduce labor in replacing new water form nearby river. It also in pumping water from a low level river flow for irrigating farms. .* 2. *Choppers were appreciated by the community and toward the end some were bought.* 3. *Sandai farmers could not agree to contribute communally towards the purchase of tsetse traps. Only hilly areas (Mbichut) wanted to buy tsetse traps.* 4. *Ear notchers are good for identifying that new breed. However the custodians and clan identification is done by using knife for clan design mark.*

3. Monitoring & Evaluation of Implementation Stage

<table>
<tr><td>3.1 Encountered Difficulties</td><td colspan="3">1. First stages, FMD outbreaks and area was quarantined so that bucks introduction was delayed.
2. Drought in early phases of the project delayed the procurement of bucks and made farmers move livestock to as far as Laikipia. This caused livestock deaths that impoverished the community.
3. Low percentage of livestock dipped- possibly due to lack of appreciation of the importance of dipping and the feeling that dipping fees were too high.
4. The death of two(2)improved bucks.
5. The death of two(2) crossbred kids.
6. Dipping fee considered too high by some farmers. Yet if lowered dip fee, there would be no funds to replenish the dip wash.
7. Sandai people have a serious dependency syndrome that prevents them from contributing towards development projects including livestock improvement and management.
8. Poor prices for livestock, as low as Kshs 600.00 per goats during drought. Less money for dipping and other herd management expenses.
9. Sandai area has no auction yards and have to depend on middlemen who fleece them very badly
10. Sandai is mainly an irrigated crop-based agricultural area. Thus livestock takes a second priority to crops, and yet the farmers do not use the crop by products (residues) to improve the livestock production.
11. Sanadi farmers graze their goats mixed with cattle in swampy areas. No particular care in herding is given. One cannot expect high production from such a system/.</td></tr>
<tr><td>3.2 Countermeasures</td><td colspan="3">5. Improve livestock production skills of the farmers through lectures, particular training and education tours.
6. Close interaction with the farmers is very important.</td></tr>
<tr><td>3.3 Lessons Learned</td><td>Community
1. Implementation reduced ticks and tick borne diseases.
2. Birth weights increased
3. Growth rates increased</td><td>GOK
1. Bucks on hilly areas did better that those in swamp areas.
2. Bucks in the hilly areas have less worm infestation.
3. Record keeping was not fully appreciated by farmers and the dip committee
4. Ladies, however, kept good breeding records</td><td>JICA Study Team
1. Sustainable dipping is severely constrained by opaque dip management..
2. Sandai community is not development conscious. It has a deep seated dependency syndrome that prevents it from contributing towards development projects including livestock development
3. In Sandai there is abundant crop by products which can be used to improve livestock production.
4. Sandai area is an agricultural oriented. Crops take the first priority. And livestock is not given the right attention.
5. Lowland Sandai has swamp areas that are used traditionally as all-season grazing area for both cattle and shoats.
6. .This verification project was not the first attempt to improve goats. BSAAP tried it a decade ago and failed.</td></tr>
</table>

4. Evaluation of Output and Outcome

4.1 Outputs (Indicators)	*1. No. of bucks bought (cost sharing) and surviving – **3.*** *2. No. of farmers using improved bucks – **36** members.* *3.No. of crossbred offspring born **24** and **26** expected.* *4.No. of livestock dipped per week –**300** cattle and **50-100** shoats.* *5.Increase in birth weight when improved bucks are used – from **1.8 kg to 3.0 kg***
4.2 Vertical Outcome (Outcome for the Stakeholders)	*Expected outcomes are* *1. More cash through sales of bucks to other farmers.* *2. More livestock survive through dipping and routine vaccination, and de-worming.*
4.3 Horizontal Outcome (Impact for the Surrounding Communities)	*1.*
4.4 Negative Impact	*None*

5. Way Forward

5.1 Way Forward	**Community** 1. *Regular meetings.* 2. *Continue enforcing by laws* 3. *Continue proper dip management* 4. *Repair dip* 5. *Farmers to purchase more bucks on their own* 6. *Custodians to carry out buck rotation* 7. *Custodians to sell crossbred bucks* 8. *Establish a public auction yard for Sandai Loboi and Kapkuikui locations.*	**GOK** 1. *Vet. extension* 2. *Training committees* 3. *Carry out more vaccination* 4. *Increase production capacity of improved bucks.* 5. *Wide range disease surveillance and disease forecast needs to be organized* 6. *Proper management of livestock should include good selection practice* 7. *Dairy goat breeds may also be introduced*	**JICA Study Team** 1. *Extend crossbreeding to other similar areas like ASAL areas.* 2. *Use similar approach in future livestock development programs* 3. *Follow-up programs needed in future in order to establish the long-term value of the project.*

Note: Way Forward are based on the result of the workshop held in September 2001.

2.6 Food Security: Livestock Improvement (Arabal)

2.6.1 Background

As seen in the semi arid area in Kenya as well as in African Savanna, the crisis will occur when the number of people depending on a particular area became too large for carrying capacity of the land with traditional land use technology. This seems to be true in Arabal.

However, the Arabal area showed all indications of a suitable area where livestock development could be effected. This development had not take place before, possibly because of its remoteness. It however had a dip that was not functional. It also had large herds of cattle and shorts that could be the basis of a short-term trial on goat improvement and communal dip management.

1) Subject to Verify

Comparison with Sandai area where the same kinds of verification projects were implemented, subjects to verify were:

- To find out if farmer can carry out breed improvement with minimum start-up inputs from donors.
- To examine if farmers can manage a dip system sustainably after receiving very minimal start-up inputs and training from donors.
- To find out the applicability and sustainability of the program through carrying out the program in two different locations, Arabal and Sandai, the former being pastral hilly area an the latter being more or less agricultural oriented area.

2) Strategy/Approaches and Project Purpose

The single desire of the Arabal community, as indicated in PRAs and PCM workshops was to obtain enough food for their families. And the chosen path was to improve livestock husbandry and income generation. The project purpose was fashioned along this desire. The strategies applied to effect the needed changes were:

- Facilitating the acquisition of improved bucks by farmers groups,
- Education groups on herd management,
- Facilitating the re-activation of dips through subsidize inputs,
- Training in dip management and leadership, and
- Organizing visit to breeding stations e.g. KARI-Naivasha also Kimose Sheep and Goats Multiplication Center.

And were underpinned by the following assumptions that:

- Small size of goats was due to inbreeding and uncontrolled breeding,
- Tick-borne diseases take a great toll of livestock production,
- Drought is not a significant killer of livestock,
- Area residents can afford dipping fees, and
- The value of the livestock is high enough to warrant dipping.

3) Community Situation

Arabal, a location owning its name to the perennial watercourse of the same name is located on the hilly Eastern fringes of Baringo District where it borders Laikipia. It is generally a dry area but has a distinct advantage of abundance of browse. This browse confers the location important advantage of goat husbandry – a thing the residents have been quick to capitalize on. The location is inhabited by Tugen – and is quite far from either the Mukutani divisional headquarters or the District headquarters.

Drought or even dry spells are common to the area. And farmers respond by making opportunistic livestock movements either to the Njemps area where they have traditional friends or even to Laikipia. This aspect of nomadism has been the weakest link in the chain of dip sustainability.

The community, spread over 10 villages, has little good agricultural land is relatively materially poor and has had to depend on famine relief at the height of drought. Thus the significant elements of the project environment indicated a good prospect of carrying out a goat improvement program. The same, however, could not be said about dipping as the only hope lay on community unity of purpose.

4) Existing Livestock Resources

Arabal livestock resources include abundant browse of both annual plants and evergreen trees and shrubs. These included the important tree *Ngoswe (Balanite agegypatiaca*) used for loping for livestock during drought. Sufficient drinking water for livestock is obtained throughout the year. Followings are the general conditions concerning livestock.

- Large flocks of goats some of which have large mature body weight.
- Average sized herds of cattle.
- A non-functional dip sited next to the perennial Arabal River that could be re-activated with minimum inputs.
- An age tested livestock husbandry knowledge that has been faithfully passed from one to the next.

The sum of the above resources made Arabal a medium potential livestock producing area that had clear possibilities for improvement.

2.6.2 Project design

1) Project design

During project designing, a single main output – Livestock is improved.

- Three main areas of intervention within the field of Livestock Improvement. These were *Animal Feeding, Genetic Improvement of Goats and Animal Health.*
- Several activities to be carried out in order to achieve the output.

The result/output was assumed to lead to the realization of project purpose of *enough food through improvement of livestock husbandry and income generation* and then the overall goal of *living standards of people of Arabal improved.*

Table 2.6.1 Narrative Summary and Indicators for the Verification Project in Arabal (abstraction)

Narrative Summary	Objectively Verifiable Indicators (Planned)
Overall Goal Living standards of people of Arabal improve	
Project Purpose Selected farmers of Arabal get enough food	Price of goats increases to Ksh3,000 from Ksh1,500
Results/Outputs 1. Livestock is improved 1.1 Animal feeding is improved 1.2 New breeding system is introduced 1.3 Animal health is improved 2. People of Arabal learn from selected farmers	1.1-1 Farmers' livestock fat in September 1.1-2 Enough pasture in August 1.1-3 Worms reduced by 50% in April 1.2-1 60% of livestock increased mild production by 2001 1.2-2 New breeds of goats 50-150 1.3-1 80% of livestock farmers dip their livestock every two weeks. 1.3-2 Livestock farmers report reduced tickborne diseases 2.1 80% of farmers coordinate with selected farmers 2.2 80% of farmers cooperate with farmers with new breed.
Inputs 1. 5 bucks (7,750Ksh) 2. Transportation of the Bucks (2,500Ksh) 3. 2 castrators (total 12,600Ksh)	4. 2 choppers (total12,960Ksh) 5. Training (improved breeding + record keeping)

An important underlying assumption for the three areas of intervention was community participation in:

- Contributing cash for cost sharing of improved bucks and livestock equipment.
- Using their flocks for testing the various hypotheses.

- Contributing labor (communal and family) for dip repair as well as herding and care of introduced bucks.

2) Project Design Changes

No major changes in design were effected during the tenure of the verification project. However, in view of the drought-impoverished situation prevailing at the start-up phase of the project, the implementers made the following consideration:

- A private loan for acaricides.
- A delivery of equipment before the community cash contributions had been completed.

In retrospect, these considerations appear fully justified for they were fully reciprocated by Arabal people.

2.6.3 Record of Implementation

The verification project started implementation in April 2000 and the activities shown in the table below were either attempted or completed.

Table 2.6.2 Record of Implementation - Arabal

Activity	Planned schedule	Dates implementation done/completed	Comments
Animal feeding is improved			
Fencing pasture land	August 2000	October 2000	10 farmers fenced own plots that were not large.
Plant enough pasture	When seed are available	August 2000	This was done in Ngelecha only where it is wetter 3 farmers did the planting.
Plant Ngoswe	Rainy season start	Not done	The activity was included without adequate thought
Reserve pasture	First week of August 2000	August 2000	10 farmers reserved pasture but ran into land ownership problems (no title deeds) when other community members claimed right to graze in the same. Also a group of many stray donkeys grazed on reserved pasture and yet the community did not havea method of stopping the menace.
Salt feeding	September 2000	November 2000 using natural salt lick	Not much done as only a few farmers take their livestock to Embosos where their is a natural salt lick
2.2 New breeding system is introduced			
Make groups for breeding goats	June 13, 2000	June 2000	5 Groups with a total 36 members were formed.
Breeding system	June 14, 2000	Apr. 2001	Well done and has produced 43 kids born and 72 are expected

Stop local breeding of goats	Dec. 2000	Jan. 2001	Done only by buck custodians and neighbours
Culling unproductive goats	June 15, 2000	Going on up to date	This was done continuously not for reason of increasing productivity but to generate cash for food purchase and medical expenses
Castrating he-goats	Sep. 2000	Started October 2000	to date 317 goats, 9 bulls done
Animal health improved			
Election of dip committee	Apr. 22, 2000	May 2000	A very active dip committee elected.
Inspection of dip	May 2000	May 14, 2000	-
Removal of spent dip wash	May 14, 2000	May 14, 2000	This was quite an exercise as the dip had been out of use for a long time. The spent was pumped out using the new water pump. Community participated in removing soil, stones and wood in the dip tank
Buy acarcide	July 13, 2000	July 13, 2000	Since July 2000, the committee has bought 50 litres of acaricide
Dipping livestock	July 15 – 16, 2000	July 15 – 16, 2000	Since July 2000, 2747 cattle and 2964 shoats have been dipped.
Dip committee meeting	July 15, 2000	July 15, 2000	Done regularly and monthly
Visit to Naivasha	Nov. 21, 2000	Nov. 21, 2000	Very educative and the dip secretary learnt about goats boma in Mogotio cattle dip.

1) Livestock Improvement

1.1) Animal Feeding (Introduction of choppers)

Eleven out of interviewed 17 farmers answered that they are practicing semi-zero grazing. However, they call the practices semi-zero grazing with cutting branches of trees and feed cattle with the leaves during drought season. Among them only one farmer answered that he uses by-product of crops for animal feeding.

Therefore, the demonstration of the grass-cutting sickles and choppers was carried out at the workshop with dry hay available in the verification project site. Cutting of the grass by using chopping tool gave the participants a lot of interest on how efficient it is. As a result, two farmers purchased it with the cost of about 1,900Ksh (30% of 6,480Ksh) per one.

1.2) Crossbreeding in Goats

Genetic improvement of goats in the Arabal area was identified as a viable short-term solution to the known problem of raising small sized goats that fetch low prices at the markets and auctions. These low prices contribute to low standards of living – a situation the community targeted to change.

The process that was used to effect crossbreeding involved the following steps:

Identify a suitable source of improved bucks

This was done by the team mainly and it settled on bucks from Kimose Sheep and Goats Multiplication center.

Facilitation of the formation of breeding groups

This was done through the team's persuasion. First the community was asked to select farmers who have distinguished themselves as good men/women, had fairly healthy goats, were responsible and who could be relied on to look after the buck's health, feed and keep them securely. The community selected the five (5) people in the following table. The breeding groups were then formed in the villages where the custodians were selected and the respective group sizes are shown in the same table.

Table 2.6.3 Custodians, Breeding Groups and Their Results

Buck No.	Name of custodians	Village	No. of members	Start mating	No. of Kids *	No. of Kids expected**	Total kids
A-1	W. Chweutich	Chemorongion	12	August, 2000	2	27	29
A-2	R. Keitany	Embosos	6	-do-	15	7	22
A-3	J. Chesaina	Kapindasin	7	-do-	9	10	19
A-4	L. Mursoi	Karma	6	-do-	15	10	25
A-5	J. Kirkok	Ngelecha	5	-do-	2	18	20
Total	5	5	36	-do-	43	72	115

Source. JICA study team, 2001. * up to date. ** within 2001.

Contributions for acquiring a group bucks

The breeding groups were informed of the price of the bucks and their respective group contributions. They then divided the amount among themselves and set their own deadlines. The group's due, 3,075Ksh was paid on the same day as agreed with the Study Team.

Selection of the bucks by the buck custodians

This involved a trip from Arabal to Kimose and the team funded for the transportation fee. In Kimose, the farmers were shown the bucks on offer and they selected five (5) bucks for the Arabal area.

Buck immunizations, transport and distribution

The selected bucks were checked by the Marigat Veterinary Office and passed as suitable. They were then immunized against CCPP and FMD. On the day of transport, the team fuelled a GOK pick up that transported the bucks to Kapindasum. On reaching Kapindasum,

the team was welcomed by the chief and the members of the breeding groups. The buck were then distributed and handed over by a member of the team.

Mating

The bucks were distributed at a time when they were physically small and could thus not compete with the local bigger bucks. Thus they took time to acclimatize and grow and claim territory. They started mating in August 2000, and to date the bucks have mated a total of 115 does.

Kidding

Kidding started in April 2001. As of September 2001, 43 kids have been born and 72 are expected. All the five bucks are very well, however death of five crossbred kids had taken place.

1.3) Animal Health

a) Dipping

The activities in this group concerned revive the dormant dip and some other routine management practices like de-worming and salt feeding. Farmers practiced selective de-worming whereby only the animals most affected were given de-wormers. This of course was not the best way to do it, but the farmers argued they could not afford to de-worm whole herds. Salt was not fed due to shortage of funds to purchase it. Those near Embosos village took their livestock to the salt licks there.

A very active dip committee was elected in May 2000, facilitated by the Team. Committee meeting have been held regularly and it strengthened their leadership and built capacity. Removal of dip spent was done on May 14th 2000 which was a heavy exercise as the dip had been out of use for a long time. The spent was pumped out using the new water pump. Community participated in removing the soil, stones and wood in the dip sump. Acaricides was purchased purchased on July 13th 2000 with a loan of 30,000 by the Team (total cost 42,000Ksh). The issue of encouraging farmers to dip their livestock lingered for some time.

As for the dip, the following table shows the progress that was achieved during this phase of the project.

Table 2.6.4 Progress Achieved in Dipping

At the start of this project phase	At the end of this project phase
The dip was out of use for a long time	The dip was in use.
The dip tank was full of mud, stones and pieces of wood and had dirty water.	The dip tank was clean used by water pump and had the correct dip wash.
The roof had four badly rusted corrugated iron sheets that leaked rainwater into the dip tank.	The roof was repaired fully.
The crushes had many broken rafters and a few missing poles.	The crushes had been repaired using local tree species that are more easily attacked by termites.
The drain channel for draining away rainwater from a nearby hill was badly silted.	The drain channel had been desilted.
The soak pit was clogged.	The soak pit had been cleaned.
No shorts boma.	New circle type shorts boma was established.
There was not a functional dip committee.	There was an elected new dip committee that was active and that was operating transparerently.
No dipping was being done.	Dipping was taking place twice a month and to date 2,474 cattle and 2,964 shoats had been dipped.
The bank account had some Kshs. 30,000	The bank account had Kshs. 23,000
The account was inaccessible to the Arabal community.	The new dip committee now operating the bank account.

The team, especially the counterparts carried out fortnightly on spot training in general livestock management and health care in Arabal. The numbers that attended such training were in the range 20 – 30 farmers every time. There were other training done for the secretary and the treasurer of the dip committee. These dwelt on bookkeeping and the results of it were two office bearers have kept very good records in the use of the dip and the livestock equipment acquired through cash community contribution. Very late in the program, the Arabal farmers participated in a study tour to Naivasha during which they were exposed to new breeding and livestock husbandry techniques. They also saw Mogotio dip with a separate boma for shorts. Thus farmers have gathered much knowledge since the start of the project.

Since July 2000, dipping has been done weekly and until September 2001, 2,747 cattle and 2,964 shoats have been dipped.

b) Castration

All the interviewed 17 farmers were practicing castration both to cattle and goats. Most of them, however, take the method of unhygienic open castration, which just excise the testicles of animals. Only one farmer uses a castrator.

To provide castration in hygienic way, two castrators were provided to the dip committee with the cost of about 1,900Ksh (30% of 6,300Ksh). Castration started in October 2000, and as of September 2001, 317 head of goats and 9 bulls were castrated by using them. The record including the fee collection was kept well by the committee members. The project made castrators available through the 30% cash community contribution and the

farmers have been renting from the dip committee.

In summary, the project has registered considerable progress in contributing towards the acquisition of livestock equipment, dipping, crossbreeding and castrations of excess males. The community has changed dramatically and is now seriously de-worming.

2.6.4 Encountered Difficulties

There were many difficulties that were faced during the implementation stage. Some were connected with the drought that affected the whole Arabal area. Drought has been blamed for the poor cash contributions in dipping and the failure to de-worm the whole herds. However, the community's lack of awareness of the damage the tick borne diseases and worms do to livestock could be one of the reasons.

Followings are the difficulties we have experienced:

- During the early stages of the project the whole area was experienced a very severe drought, and there were no feeds that could be used by the bucks. This delayed the implementation of the crossbreeding aspects, as the bucks could not be delivered before the rain.
- At the beginning, the area was under FMD quarantine. This interfered with marketing of livestock and reduced the incomes that could have been need for project implementation.
- The project's insistence on 30% cash contribution took time to be appreciated and some areas missed out on bucks expecting the project to relent and give free bucks.
- The bucks were distributed when they were rather small. It took time for farmers to be convinced that they could mate. When the bucks reached mating stage, they mated enough does to show their virility.
- Though the counterparts would have liked to visit Arabal quite often, they could not do so because of poor transport facilitation.
- The project over relied on the dip committee to handle dip and other matters little connected with dip. It would have been better to have a general project committee that could steer the project at the locational level.
- The livestock aspects were grossly under funded as there were hardly any funds to carry out demonstrations e.g. de-worming, good foot care (trimming) etc.
- Though Arabal dip committee has been operating very transparently with their utmost effort, they have received only about 200 cattle and 50 to 100 shoats during dry season. This is because the villagers have to take their herd to farer places during dry season, sometimes to as far as Laikipia, to seek for animal food. This situation makes it very difficult to sustain the dip system, and they have already failed to pay back the loan (30,000Ksh) provided by the Team.

2.6.5 The Lessons Learned

- Chief of Arabal introduced "transect approach" to allocate the bucks. The location was divided into five areas by its natural and social conditions, and then each area got one buck. This approach is useful for doing similar project.
- For sustainable operations at least, 100 cattle are needed to be dipped per week. Why they do not bring many livestock to the dip, despite the large number in those areas are despite the fact that they are mostly aware of the animal health, may be very much related to the less cash availability in the rural areas. Literally and actually, they regard their livestock as their savings rather than practicing actual cash saving in a bank account. Commercial bank is not acceptable for rural people due to the distance and the minimum depositing system (3,000 – 5,000Ksh for commercial bank). Therefore, cash flowing and also the availability in rural areas are very much limited, thus making it difficult to avail dipping fee at any time. This must be contributing to the less sustainability of the dipping system.
- A livestock improvement study requires a longer time than allowed for this study. For better results, farmers should acquire young bucks as the same acclimatize better and the bucks serve the farmers for long time.
- Provision of acaricides on loan to the Arabal community helped start dipping at a time when the community was reeling from drought effects and tick borne diseases.
- Bucks on hilly areas did better than those in swamp area and have less worm infestation.
- Arabal is a good goat country that can be further developed for improved goat production.
- Arabal showed a much better result than Sandai despite greater poverty in Arabal (no good agricultural land). It might be the cause that the area has been less blessed with development opportunities and people in the area were very keen to fully utilize the limited chance.

2.6.6 Evaluation

1) Output

As of September 2001, 43 offspring were born and 72 were expected. Birth weight increased from 1.8Kg to 3.0kg on an average, and growth rate improved goats herds were increased. There was no buck died while two died in Sandai, though five offspring died.

Because of the good record keeping done by the dip committee, there is an accurate number of castration and dip service; 317 head of goats and 9 bulls were provided castration, and 2,747 cattle and 2,964 shoats from July 2000 to September 2001 (about 230 cattle and 250 shoats per month) were dipped. As a result, ticks and tick borne diseases were reduced.

2) Outcomes for the Stakeholders

The project was implemented for short a period for one to make definite conclusion on whether the area residents will continue drawing benefits from the project for longer or not. There were, however, some clear indications that:

- The current custodians will bow to the pressure of their villages to sell their crossbred bucks to them. These will help train the neighbors on management and prepare them for the next step – to introduce purebred Galla or Boer goats. When the above sales take place, the custodians will generate income that is the final goal of the project.
- The improved dip and dip management will continue to serve the farmers with an effective demand for the dip service. So far the stakeholders have reported benefits as more livestock are surviving when dipped than otherwise.
- The buck custodians have also started routine de-worming and this has increased survival and growth rates of which lead to increased incomes when the goats are sold.

3) Impact for the Surrounding Communities

The Arabal community is large and is spread over 10 villages. Only 5 villages benefited from the input on bucks. The bucks have shown to be large bodied and gained large birth weight kids. The success story of improved bucks has spread far and wide and as a result many other farmers in other areas wanted to buy and introduce such improved goats. And as a result as many as 11 other farmers (led by the area chief and counselor) have asked and obtained technical assistance for the Study Team to locate good breeding bucks in Kimose. They purchased total 13 improved goats mostly at their own expense at the end of September 2000. The price was 2,200Ksh per head, which is much higher than the originally purchased one of 1,550Ksh, but the farmers raised almost all the fund by their own initiatives.

2.6.7 Way Forward

- Arabal can be expected to be developed as an important improved goat breeding area.
- The Chief of Arabal introduced “transect approach” to allocate the five bucks. The Arabal location was divided into five areas by its natural and social conditions, and then each area got one improved buck. This approach is very useful and should be applied in cases of doing similar project.
- As Arabal farmers bought additional bucks individually, the program may tend to be individual basis in its nature. Taking into the buck price, 1,500 to 2,200Ksh per head which is about 2 to 3 local goats selling price, many farmers seem to be affordable to buy individually. Therefore, the group based scheme tried in this verification may be preferable as a pilot and also for poor people who cannot afford to buy the buck individually. However, even if individual basis prevailed, technical

advice of selecting bucks and its transportation of the buck should be assisted by the program.

- The program indicated that the dipping system is very difficult to be sustainably operated. Thought generalization cannot be done, it could be at least said that the dipping system located at a place where livestock moves in a wide range seeking for fodder is very difficult to be sustained. Therefore, handspray rather than dipping system, which moves together with the livestock, may well be adopted in that situation.
- Crossbreeding could be extended to other similar areas like ASAL areas.
- Follow-up programs are useful in order to establish the long-term value of the project.
- Community is expected to continue having regular meetings, enforcing by-laws, proper dip management and purchasing more buck on their own. In addition to that, custodians are preferred to carry out buck rotation and sell crossbred bucks. As a result, they should have confidence their goats' quality.
- Regular meat goat sale program is effective to improve cash income of the people.
- GOK staff are expected to continue with veterinary extension, train committees, carry out more vaccination, increase production capacity of improved bucks, have wide range disease surveillance and disease forecast and promote dual-purpose (milk and meat) high producing breeds.

Table 2.6.5 Evaluation of the Verification Projects : Livestock Improvement (Arabal)

1. Subject to Verify

Subject to Verify	*1. To find out if farmers, given minimum start-up inputs from donors, can carry out goat genetic improvement by cross breeding with an improved buck.* *2. To examine if farmers can manage a dip system sustainably after receiving very minimal start-up inputs and training from donors.*
Result	*1. Arabal showed a much better result than Sandai. In Arabal, no bucks died, while in Sandai two bucks died and one other became ineffective (low libido) due to poor management (no de-worming done in Sandai). Despite greater poverty in Arabal (no good agricultural land), they made very effort including de-worming to fully utilize the development opportunity – buck improvement by cross breeding. The hilly area, preferable for goat rearing, also helped the buck improvement program in Arabal.* *2. In general, the more pastoral area would have better result and the more agricultural oriented area would have less performance.* *3. People's attitude toward development is also one of the keys to success. Arabal area has been less blessed with development opportunities, so that Arabal people were very keen to fully utilize the development opportunities.* *4. Though Arabal dip committee has been operating very transparently with their utmost effort, they have received only about 200 cattle and 50 to 100 shoats during dry season. This is because the villagers have to take their herd to farer places during dry season, sometimes to as far as Laikipia, to seek for animal food. This situation makes it very difficult to sustain the dip system, and they have already failed to pay back the loan (30,000 Ksh) provided by the Team.* *5. Estimated dipping number of about 300 cattle with probably same or little more number of shoat is still not enough to financially sustain the dip.* *6. Why they do not bring many livestock to the dip, despite the large number in those areas and despite the fact that they are mostly aware of the animal health, may be very much related to the less cash availability in the rural areas. Literally and actually, they regard their livestock as their savings rather than practicing actual cash saving in a bank account. Commercial bank is not acceptable for rural people due to the distance and the minimum depositing system(3,000-5,000Ksh for commercial bank). Therefore, cash flowing and also the availability in rural areas are very much limited, thus making it difficult to avail dipping fee at any time. This must be contributing to the less sustainability of the dipping system.*

2. Evaluation of Planning Stage

	Original	*Change on the course of implementation*
2.1 Situation Analysis of the Project Area	*1. Small size of goats was due to inbreeding and uncontrolled breeding.* *2. Tick-borne diseases take a great toll of livestock population.* *3. Drought is not a significant killer of livestock.* *4. Area residents can afford dipping fees.* *5. The value of the livestock is high enough to warrant dipping.*	*1. Tick-borne diseases are not perceived as great killers, rather drought was.* *2. Area residents feel they cannot afford normal dipping fees of Ksh 10.00 per head of cattle.*

2.2 Strategies / Approaches	*1. Facilitating the acquisition of improved bucks by farmer groups.* *2. Educating groups on herd management.* *3. Facilitating the re-activation of dips through subsidize inputs.* *4. Training in dip management and leadership.* *5. Organizing visit to breeding stations e.g. Naivasha also Kimose.*	*1. Breed improvement tended to be an individual family affair* *2. For best results, the visit to Naivasha, part of learning from best practices should be made early in the program. Other farmers should have visited KARI-Perkerra and Kimose to familiarize themselves with crossbreeding.*
2.3 Project Purpose	*1. Enough food through improvement livestock husbandry and income generation*	
2.4 Project Design	*1.Introduce improved bucks, suitable modernized equipment and strengthening dip management*	
2.5 Input	*5 bucks* *2 castrators* *2 knapsack sprayers* *5 ear notchers* *5 choppers* *2 sickles* *1 water pump* *1 Weighing scale supplied by the vet office* *10 tsetse nets/traps* *Training* *Breeding Record Books* *Dip maintenance materials* *Visit to breeding stations* *Transport of dip committee to Kabarnet to activate Bank account.*	*1. Water pump became necessary in removal of used dip wash and reduce labor in replacing new water form nearby river. It also in pumping water from a low level river flow for irrigating farms. .* *2. Choppers were appreciated by the some communities and toward the end some were bought* *3. Arabal farmers agreed to contribute communally toward the purchase of tsetse traps. However their incomes are very low still they are considering.* *4. Ear notchers are good for identifying that new breed. However the custodians and clan identification is done by using knife for clan design mark.* *5.* The use of castrator was 90% appreciated. Now most of the farmers are using.

3. Monitoring & Evaluation of Implementation Stage

3.1 Encountered Difficulties	*1. Drought in early phases of the project delayed the procurement of bucks and made farmers move livestock to as far as Laikipia. This caused livestock deaths that impoverished the community.* *2. Low dipping figures due to seasonal migration of livestock.* *3. Inadequate sensitization of communities – poor appreciation of value of dipping by communities.* *4. Some death of crossbred kids.* *5. Long distances to dip e.g. Embosos to Kapindasim much further that to Kasiela.* *6. Dipping fee considered too high by some farmers. Yet if lowered dip fee, there would be no funds to replenish the dip wash.* *7. Arabal people were contributing cash for too many other projects .e,g. water projects, dispensary and maternity, while the area is generally poor.* *8. Poor prices for livestock, as low as Ksh 400.00 per goats during drought. Less money for dipping and other herd management expenses.* *9. First stages, FMD outbreaks and area was quarantined so that bucks introduction was delayed*

3.2 Countermeasures	*6. Improve livestock production skills of the farmers through lectures, particular training and education tours.* *7. Close interaction with the farmers is very important*		
3.3 Lessons Learned	**Community** *1. Implementation reduced ticks and tick borne diseases.* *2. Ease of dipping goats when there is a shoats boma.*	**GOK** *1. Bucks on hilly areas did better that those in swamp areas.* *2. Bucks in the hilly areas have less worm infestation.*	**JICA Study Team** *1. Sustainable dipping is severely constrained by livestock migration to the extent of making it impossible.* *2. Arabal community is development conscious.* *3. Arabal is good goat country, and can be further developed for improved goats husbandry.*

4. Evaluation of Output and Outcome

4.1 Outputs (Indicators)	*1. No. of bucks bought (cost sharing) and surviving – **5.*** *2. No. of farmers using improved bucks – **36** members.* *3. No. of crossbred offspring born **43** and **72** expected.* *4. No. of livestock dipped per week – **62** cattle and **67** shoats.* *5. No. of farmers regularly dipping – **87**.* *6. Farmers wanting to buy own bucks from Kimose – **8** within this month.* *7. No. of livestock castrated – **9** bulls and **317** local bucks.* *8. No. of times knapsack sprayers are used – **30** times.* *9. No. of time water pump is used – **9** times.* *10. Increase in birth weight when improved bucks are used – from **1.8 kg to 3.0 kg*** *11. Improvement in dip infrastructure – shoats " boma", roof repair, crush repair (using local materials), rain water draining channels.*
4.2 Vertical Outcome (Outcome for the Stakeholders)	*Expected outcomes are* *1. More cash through sales of bucks to other farmers.* *2. More livestock survive through dipping and routine vaccination, and de-worming.*
4.3 Horizontal Outcome (Impact for the Surrounding Communities)	*1. Villages that did not get bucks, now want to purchase some bucks on their own – needing only advice from vets.* *2. Some villagers wants to buy offspring bucks from neighboring villages that have project superior bucks.* *3. Neighboring villagers have learned good goats husbandry.*
4.4 Negative Impact	*None*

5. Way Forward

5.1 Way Forward	Community	GOK	JICA Study Team
	1. *Regular meetings.* 2. *Continue enforcing by laws* 3. *Continue proper dip management* 4. *Farmers to purchase more bucks on their own* 5. *Custodians to carry out buck rotation* 6. *Custodians to sell crossbred bucks* 7. *Regular meat goat sale program available* 8. *Villagers confidence their goats quality.*	1. *Vet. extension* 2. *Training committees* 3. *Carry out more vaccination* 4. *Iincrease production capacity of improved bucks.* 5. *Wide range disease surveillance and disease forecast needs to be organized* 6. *Proper management of livestock should include good selection practice* 7. *Dairy goat beeds may also be introduced* 8.	1. *Extend crossbreeding to other similar areas like ASAL areas.* 2. *Use similar approach in future livestock development programs* 3. *Follow-up programs needed in future in order to establish the long-term value of the project.*

Note: Way Forward are based on the result of the workshop held in September 2001.

2.7 Food Security: Rainfed Agriculture (Arabal)

2.7.1 Background

1) Subject to Verify

1.1) Current Situation in Verification Site

It was found that all 72 participants of the workshop (August to October in 1999) are depending upon pastoralism for their livelihood, but they also cultivate land with food crops like maize, millets, sorghum and beans every year. Their cultivation land under rainfed conditions is prevailing in the Arabal area because the irrigation water source is far from the villages except for one or two villages.

During the workshop three potential sites of the verification projects were identified. Then Partalo village was selected on the stabilization of rainfed agriculture among the three, applying the selection criteria prepared by the Study Team. There are about 40 acres of cultivated land in Partalo village, where maize is a major crop. The crop failure happens frequently as shown in the table below;

Table 2.7.1 Crop Failure in Partalo Area

Year	Harvest
1990	Poorly harvested
1991	Maize were harvested with unit yield of five to eleven bags per acre
1992	Poorly harvested
1993	Poorly harvested
1994	Harvested with rather good yield
1995	No harvest
1996	No harvest
1997	Maize were harvested with unit yield of five to eleven bags per acre
1998	Poorly harvested
1999	No harvest

The major cause of the crop failure is lack of soil moisture. Even during the long rain season the evaporation exceeds the rainfall. Rainfall is very erratic year by year and also month by month. Although there is no rainfall data for Partalo area, the years when crop failure happened were studied based on the rainfall data in the KARI, Perkerra RRC / the Marigat Meteorological Station for past 30 years. A normal rainfall happened in1991, when the daily rainfall was 5.5 mm in rainy days. The crop harvest correlates to the amount of rainfall from April to July significantly. Partalo has an ideal location to harvest rain water from the external catchment area.

1.2) Background on Needs/Project

In Partalo area, the fertile soils has been lost by erosion year by year, which made a large swamp filled up with eroded soils recently. Without proper soil conservation the villagers may face on severe land deterioration and loosing other resources like vegetation. The systematic soils and water conservation is required for the stabilization of rainfed agriculture. The proposed verification project on stabilization of rainfed agriculture has the following four components;

- Soil and water conservation on the external catchment and also in the cultivation area,
- Development of rainwater harvesting system
- Application of early maturing drought resistant crops and varieties.
- Improvement of farming practices with rain water harvest

The verification project is a great ambition for the Partalo farmers because they are not familiar with cultivation by nature. The Fanya Juu terraces was developed to conserve soils and water as well as to harvest the rainwater in the cultivated area. The main and lateral diversion canal would be placed to divert runoff from the external catchment area to each plot. The rainwater harvesting system is not new in Kenya. Once rainwater harvesting system was demonstrated in the Study Area under BSAAP. However, the technology was not suited in the area and any practical rain harvest technology had not introduced yet.

2) Settlement Pattern and Participation in the Verification Project

The larger Partalo village consists of five smaller villages i.e., Namget, Kisogou, Deregesi, Koitemet and Partalo. The community's economy is largely dependent on goats, sheep and cattle in that order. However, crop cultivation is not new and has been attempted by many farmers, including a women group, but the results had often been disappointed. The community has been experiencing a chronic grain deficit which is redressed either by outside purchase or government food relief deliveries. The drought in 2000, which is locally regarded as similar to that of 1984, had led to splitting of families. Some members had gone far away on the hills in Laikipia district looking for grass and water for cattle while the rest of the family remains in Partalo.

Partalo is relatively isolated and has virtually no social infrastructure such as access roads, telephones, schools and health facilities. Nevertheless, the community has evolved exchange relationships with the outside world including Marigat town (8 hrs walk) and Matwiku town in Laikipia district (5 hrs walk). In exchange for its livestock, the community buys grain, sugar, clothes and other household groceries.

The Partalo neighborhood has 20 homesteads but households from the other four neighborhoods have user rights (grazing or cultivation) at Partalo, since the land is communally owned. A person asserts his user rights by clearing and fencing a piece of land. Six households participating in the rainwater harvesting verification project come from three neighborhoods, namely two from Kisogou, one from Deregesi and three from Partalo.

2.7.2 Project Design

1) Stabilization of Rainfed Agriculture

1.1) Participatory Pattern

the verification project has six farmers and a women group. So called "the Partalo Rainwater Harvest Group" was formed with the elected chairman, secretary and treasurer. A total of 20 members for the women group were actively involved in the verification project together with six members. The six farmers belong to the existing group of mutual assistance for farming. The group had been organized spontaneously among the neighboring farmers for the congregated area. Many cultivators of adjacent area to the verification site assisted the rain harvest group during the construction of the main diversion channel, which were expecting the future expansion of the rainwater harvesting system to their fields (refer to Figure 2.6.1).

1.2) Technical Aspects

The design on terracing as well as the main and lateral diversion channels was made by a team which consists of the divisional soil conservators and a agricultural extension staff in the MOARD for Marigat and Mukutani divisions, based on the reconnaissance survey in late March. The major technical changes from the original ones are summarized as follows;

a) External Catchment Area

During the reconnaissance survey, the external catchment area was estimated at 17ha (43 acre), located in just upstream of the proposed cultivation land. However, the additional catchment was found in the upper area of the identified catchment after construction of the diversion channel. The lack of topographic data in the 1:50,000 map made it difficult to estimate the actual catchment area including the upper area.

b) Terracing

Although no specific technical change in the project design was applied during development of the Funya Juu terraces, the ditches were attached to the terrace structure to facilitate water distribution of runoff to Funya Juu terraces. The terrace trenches were installed to have the Funya Juu embankment. However, the size was too large to

distribute the normal volume of runoff water. That was the reason to attach the ditches with the Funya Juu structure.

c) Cross Section of Main Diversion Canal

The cross section profile of diversion channel was reduced with one side embankment channel from trapezoid shape from 2.5 m x 0.9 m width and depth of 0.7m to 1.0m x 0.6 m width and depth of 0.6 m during construction of the main channel. The embankment of the channel was placed only lower side of slope. However, the large volume of runoff damaged the main diversion channel just after construction. During the repair of the main channel the constructed channel would be expanded to have the original dimension of 2.5 m x 0.9 m with depth of 0.6 m in future. The canal bed of lateral diversion channels was changed to have more shallow position, almost same level to the level of farm, to make distribution of water terraces easy.

d) Tools

Such tools as a “Toribo (crow bar)”, wedges and a flat file were added to the tools for stone works which were distributed to the Partalo community.

e) Stone Check Dam

A few gullies were located in the catchment area (the plain area), two stone check dams were constructed due to the lack of topographic data. However, it was planned to place sand bags with pegs in the strategic places to control the runoff in the gullies temporally. The District office of the MOARD was in the position to support the Partalo Water Harvest Group regarding to construction of the stone check dams.

f) Tree and Grass Planting

Originally it was planned to plant 100 seedling of trees along the diversion channels for the multi purpose use such as, protection from flood, harvest of timbers, and browsing. In addition to tree planting, grass establishment was required to protect the embankment of diversion channels as well as Fanya Juu terraces. The trial on the selection of suitable grasses, for instance “Makarikari (Ver. Macari cariensis)” was conducted as one of the maintenance activities.

g) Kind of Seeds

The drought tolerant crop and varieties were selected and the seeds demand was estimated based on the cropping plan prepared by each project farmer. Pearl millet and two indigenous vegetables were added according to the recommendation by researchers in KARI organization and others

h) Installment of Rain Gauge

To collect rainfall data for the verification site, a rain gage was installed in verification site and measurement training was provided by the KARI, Perkerra.

2.7.3 Implementation Record

1) Selection of Verification Sites

During PCM workshop (March to July in 2000) four sites were identified for the verification project. The four sites were evaluated based on the criteria prepared by the Study Team. Then Partalo (downstream area) area was selected with the highest score.

2) Reconnaissance Survey

The reconnaissance survey was conducted by the team, aiming to determine the outline of project plan, including the number of farmers, the delineation of service area, the runoff catchment area and the location of diversion channel and crops to be grown. The team consists of soil and water conservators and agricultural extension officer, who belong to the divisional office of MOARD.

3) Implementation Process

The implementation process of major activities are shown in the followings.

3.1) Survey

The survey team carried out the work on topographic and area survey for terracing and cross section and longitudinal section for the diversion canals. The design was made by the soil conservation officer, divisional office of MOARD regarding to terracing and main diversion canals. The cost was estimated by the Study Team.

3.2) Development of Fanya Juu Terraces

For the ten acres of cultivation area, the Fanya Juu trenches and embankments were developed along the contour lines by the project participants including the farmers who are members of mutual assistants on farming with the supervision by the divisional MOARD officers. It took 17 days with about 30 to 60 farmers per day.

3.3) Main and Lateral Diversion Canals

The main and lateral diversion canals were constructed by the group farmers and the neighboring farmers who cultivated adjacent land. It took 16 days with about 20 to 30 farmers.

3.4) Planting of Seeds

The seeds of early maturing drought resistant crops and varieties were collected from various source of seed supply, KARI, Prekerra and Katumani stations, the Kenya Seed Company. Seeds were distributed to the participants in the conditions that the seeds fees are to be paid after harvesting. As of 15 May 2000, about 5 acres were planted with seeds.

3.5) Remaining Works

As of 15 May 2000, the remaining works were the panting seeds in about half area of the 10 acres, construction of stone check dams, planting of trees and establishment of grass development in embankments of diversion channels and Fanya Juu.

3.6) Others

In the evening to midnight on 12th May, a large volume of runoff from the mountainous catchment flew into the main diversion canal. The discharge of the runoff breached the canal about 100 meter and also about 50 percent of the lateral diversion canals. The Fanya Juu embankment were damaged in several locations. Temporarily the repair of main canal was made and also placement of sand bags in the gullies in immediate catchment was done as priority works after planting seeds according to decision of group leaders. A rain gauge was installed by the group members with assistance of the Study Team.

4) Organisation Issues during Implementation

4.1) Farmers Organization

The committee of the verification project prepared a plan for implementing excavation works included the following:

- Mobilizing community members from Partalo and also adjacent neighborhoods for Harambee (communal) work in excavating the canals
- Arranging for each family to contribute two kilogram of maize/beans mixture into a food pool for cooking during the communal work
- Bringing 10 kg of the maize/beans mixture from the food pool to the field where it is cooked and eaten only by those participating in the excavation works
- Arranging for a rotational schedule (one day one field next day another participant's field) when digging the in-field ditches
- Assigning each worker a "Kipimo" (measure) of 3-5 steps depending on how hard or stony the ground is
- Organizing for storage, issuance and accounting of tools availed by the Study Team/GOK on a daily basis

4.2) Minor Organization Crisis

After completing the in-field ditches, distribution laterals and main diversion canals had to be dug next. There was, however, little time before the rains. The Study Team/GOK staff therefore requested the group chairman to mobilize additional people in order to speed up the work. The chairman indicated food was becoming a major constraint and the community was unable to support an increased number of people. If some food supplement could be availed, the chairman said, the committee could mobilize more labor. The Study Team agreed to provide 75kg of maize and 40 kg of beans on agreement the food would be given as a loan to be paid after the harvest.

However, there was some misunderstanding at the time of recruiting additional labour from outside Partalo neighborhood. The newcomers thought they were coming to work for cash payment. So when the Study Team brought the agreed food supplement, the new comers objected to being paid with food and stopped working. The Study Team/GOK had to explain yet again that the project belonged to the local community and no payment should be expected from outside. The Study Team/GOK was only giving the participating farmers a food loan that they would pay back later. The construction soon resumed after this explanation.

4.3) Other Observations

As the field works were nearing completion, the local community held a meeting presided over by the assistant chief, in order to evaluate what had been achieved so far. They made observations as follows:

- Working on the verification project has offered the community an opportunity to understand one another and hence become more cohesive
- The farmers have realized that they can achieve a lot just by pooling their labour as can be seen from work already completed
- What the Partalo community has been doing has attracted visitors from outside the verification site even from as far as Marigat location
- A study tour would be useful in order to learn from farmers in other areas where rainfed agriculture has successfully been practiced
- Farmers adjacent to the verification site should in future be included in the rainwater harvesting programme

2.7.4 Extension to Chemerongion and Kapukun

1) Selection of Kapukun and Chemerongion

The improvement of rainfed agriculture by the introduction of rainwater harvesting system in Partalo, Arabal Location, Mukutani Division, has started since February 2000. The progress and impacts of the project has brought about positive response not only from the

direct beneficiaries but also from the people outside the verification project. In particular, the system enabled to bring some harvest without irrigation facilities in spite of severe drought during the monitoring period of this year. This fact that crops in Partalo survived only with the scarce rainfall during 2000 gave rise to great attention especially among those who visited there through inter-location monitoring tour.

Based on the successful results of the verification project of rainwater harvesting system during the study period, GOK understood the possibility of food security through the improvement of rainfed agriculture with the expansion of the rainwater harvesting system in the Study Area. Therefore GOK requested the JICA Study Team to expand the system to other two villages in the Study Area during July and August 2000 and JICA headquarters finally approved it in September 2000.

Among the villages that requested to introduce the rainwater harvesting system, two villages - one in Chemorongion, Arabal Location and another in Sabor, Kimarel Location - were selected for the new verification project sites for rainfed agriculture improvement with the rainwater harvesting system, taking into account the viewpoints of community organization and topographical/technical conditions.

For the two villages, the technical aspects and the organizational features were surveyed during this study period, from September to November 2000. The processes of survey included PCM workshops, preliminary site survey, land survey, baseline survey and related interviewing survey at these sites.

2) Survey Results on Chemerongion and Kapukun Sites

2.1) Chemorongion, Arabal

Chemorongion is located in Arabal Sub-location, Arabal Location of Mukutani Division, and was established around 1930. The village is far from most facilities and services. Arabal river is 9 km away from the village, equivalent to three and half hours walking. A secondary school in Kiserian is 11 km away, six hours walking. The local central town, Marigat, is 20 km far, seven and half hours walking. The administrative headquarters of Mukutani division are 20 km away.

Chemorongion Water Harvesting Group was established on October 15th with 22 members after they attended several seminars and realized the meaning and importance of rainwater harvesting system. The objectives of the group includes: 1) to enable the farmers to sustain and use the rainwater effectively, 2) to enable the farmers to be united and share various ideas, 3) to benefit and sustain members' families economically, and 4) to learn to be united and tackle, work together and overcome problems that individual farmer cannot manage. 11 committee members were also elected.

2.2) Kapkun, Sabor

Kapkun is located in Sabor Sub-location, Kimarel Location of Marigat Division. The site of water harvesting system is actually located in Barsibet village, but both Barsibet and Kapkun villages are virtually regarded as the same one village because Barsibet was divided from the former Kapkun village due to its population increase in 1999. Since both GOK and the Study Team use Kapkun to refer to the project site, Kapkun represents the new site for water harvesting system hereafter.

In Kapkun, Maoi river passes through the center of the area but villagers normally get water from shallow well drilled by themselves on riverbeds because the river is seasonal. However, people often take their livestock to near perennial river which is 5 km away from the village, equivalent to three-hour walking. A secondary school in Marigat is 12 km away, three-hour walking, and the trunk road which goes from Marigat to Kabarnet is 6 km far from Kapkun. The local central town and the administrative headquarters of Marigat Division, Marigat, is 12 km away, three and half hours walking.

In the village, there is a newly formulated farmers group named Amka Twende Farmers Group (‘wake up and go’ in English). This group comprises 18 farmers including 6 officials and 11 committee members. The aims of the group are: 1) to improve farming practices, 2) to exchange ideas concerning various types of crops, 3) to help every member for farming, and 4) to stabilize members’ livelihoods economically and socially. To attain these aims, the group has various activities such as rainwater harvesting for crop production, soil conservation and terracing, mobilization of farmers and bee keeping. Every group member has to prepare, fence, terrace, clear up and harvest his/her own land, but some practices such as purchasing seeds and weeding are communal basis as a group. However they have three major problems at present: 1) selection of suitable crops in the field, 2) lack of hand tools, skills and funds, and 3) crop pests.

On November 3, 21 farmers from Kapkun visited Partalo by a study tour and had discussion with Partalo farmers. The study tour was very successful so that Kapkun people learned a lot from the experiences of the Partalo farmers, while they gave some suggestions to the Partalo farmers for further improvement from their viewpoints. Followings are summary of the points discussed.

Good points in Partalo;

- Cohesiveness of the group – communal system of work
- Water conservation by the embankments of Fanya Juu terraces within the farm
- Good utilization of running water from the hills
- Conservation of soil in the cultivated farm
- Impressed by participation of women in digging of terraces and other activities

- Farmers' interest on the project even during the time of drought and famine, at the time when their livestock were dying of hunger
- The farmers remained steadfast and put much effort in excavation works on the main canal and Funya juu terraces.

Areas to be improved in Partalo;

- Desiltation of the main diversion ditch to improve water conveyance effectively
- Reinforcement of embankment of the main diversion canal by planting of grass and trees/shrubs
- Establish more stone check dams in the catchment (run-off) area to have a non-erosive run-off speed
- Use of live material for fencing to establish a strong fence – Lantana camara shrubs – to stop deforestation by use of thorns every year.
- Stabilization of the embankment of Funya Juu terraces to enhance adequate moisture retention in the farm for crop utilization/use.
- Fencing of the entire farm perimeter to keep off animals
- Reducing the trench of Fanya Juu terraces to enhance adequate flow of run-off to the crops
- Clearing of bushes to keep off animal pests like rodents
- Repairing of lateral, to allow uniform flow of water to the plots (eg. water runs fast – drop construction)

2.7.5 Encountered Difficulties and Countermeasures

1) Protection of Structure from Flooding Water

The flooding water destroyed diversion channels for several meters and lateral diversion for about 50 percent of total length, and even some Fanya Juu embankment on 12th May, 2000, just after completion of diversion canals. At that time, the water harvest system had no check dams because farmers were busy for construction of structure as well as planting seeds. Actually there was a need of study on control of flooding water in the area including the catchment in the mountainous area. The basic data including catchment area, rainfall and discharge, and infiltration are required to protect the structure from flooding.

2) Disturbance by Drought

The severe drought affected every livestock husbandry and food security. Although the total amount of the rainfall in last year was almost the average, the rainfall pattern was very unfavorable to grow crop under rainfed. The prolonged drought causes loss of animal and difficulty in daily life. The farmers suffered from severe food shortage. Under this condition farmers faced on the difficulty in participation of the verification

project.

3) Lack of Topography Map in Catchment Area

It was very difficult to get the data on catchment in term of area, topography and vegetation.

2.7.6 Lessons Learned

During the workshops (September to November in 2000) on the midterm evaluation of the verification project, the following items were issued for the lessons learned from the first year verification in Partalo;

- Rehabilitation works of water harvesting structure should be done earlier, from November to December,
- Regular desilting and repairs have to be done after every downpour,
- Cactus should be planted around the farm as fencing to prevent encroachment of animals,
- All the farmers should plant seeds at the same time according to the plan,
- Planting area should be arranged by bearing in mind the available labour,
- Communities need early and regular discussion of all expenses and disclosing all the members the purchasing arrangement and cash payment,
- Study tour is very useful way of exposing project participants to successful schemes.

The following items were raised as the lessons learned on the verification project by the all three farmers' groups in Partalo, Chemerongion and Kapukun in the workshops for final evaluation (September in 2001).

- Rainwater runoff harvesting
- Soil conservation
- Efficient run-off water control and conservation by Fanya Juu terraces
- Organization of community and farmers group for group activity
- Efficient diversion canal/ditch in controlling and conveying run-off into cultivated fields
- Early land preparation
- Crop diversification and trials of different maize
- Good crop husbandry
- Enhancing good yield through improved soil moisture retention

2.7.7 Evaluation

1) Evaluation of Planning Stage

In the workshop of planning stage (March to April in 2000), the following project impacts were expected for the project;

- People of Arabal increase some food availability,
- Living standard of people of Arabal may be improved to some extent, comparing with the case of without verification project.

Regarding the effectiveness of the project, the followings were identified in the workshop of intermediate evaluation (October to November in 2000);

- Runoff water were fairly harvested to stabilize rainfed agriculture
- First crops ripened to produce more than 76kg of grains including the converted grain amount for the pre-matured,
- Second crops are planted in the considerable area.

Besides the above, following observations were made during the field survey;

- Group or village wise activities on stabilization of rainfed agriculture were initiated in other Study Area for the expansion of similar development in other areas,
- Some amount of seeds were preserved for next year.

Not only the adjacent area of verification sites but also in the near area including other villages of Chemelongion and Kapkun, the rainwater harvesting had spread outside of Paltaro verification project area within two years of the verification period. It means that the verification project is very successfully accepted in the Study area. It was recognized that the people under the harsh semi-arid conditions have to diversify their activities to seek for other source of livelihood than livestock as their survival strategy. Rainfed agriculture is not an exception. It is emphasized again that farmers including Il Camus people have been engaged to farming practice, though the production was very poor. Improvement of rainfed agriculture could be the alternative approach for the development in the area.

2) Evaluation of Output and Outcome

2.1) Outputs

The outputs of the verification projects are summarized as follows;

Table 2.7.2 Production of Major Crops

Year	Major Crops	Partalo		Chemelongion		Kapkun	
		Area (ac)	Yield (kg/ac)	Area (ac)	Yield (kg/ac)	Area (ac)	Yield (kg/ac)
2000	Maize	4.2	228				
	Finger Millet	0.8	217				
	Beans	0.2	26				
	Pigeon Pea	0.5	22				
2001	Maize	4.6	404	4.1	1,551	1.2	981
	Finger Millet	1.3	135	0.8	214	0.3	N.A
	Beans	-	-	1.1	716	0.8	200
	Pigeon Pea	0.9	47	-	-		

Remarks: The maize unit yield is estimated by verification group farmers because the crop is not harvested as of 18th September, 2001 in Kapukun

Source: Agricultural Office, Marigat and Mukutani Dovisopns

The rainwater harvesting was extended rapidly during the two years of verification period by other farmers in Partaro, and the 5.2 acres of maize was harvested with unit yield of 1,211kg per acre in the adjacent area of the verification site. The acreage and production were larger than that of the verification site because these area have favorite condition to receive the residual runoff water. There are also indirect beneficiaries outside the verification project in Chemerongion and Kapkun even in the first year of the project, who applied the rain water harvesting in other farms than the verification farms. The 17 bags per acre of maize yield with rainwater harvesting in Chemerongion site is as much as 2.4 times of the yield without rainwater harvesting (7bags per acre) according to the five sample farmers (2001).

2.2) Outcome for the Stakeholders

Already almost all farmers applied the rainwater harvesting in Partaro and also there were many farmers who planed to introduce the technology in the surrounding villages. The community has been tightened the unity according to the result of workshop in the participatory villages. This means the outcome in term of diffusion of technology and institutional strengthening of community were very clearly observed.

2.3) Impact for the Surrounding Communities

It was observed that the impact of the verification project in Paltalo area was spread very rapidly to Chemerongion and Kapukun and the adjacent area of these areas, which means the impact for the surrounding communities of the verification project, that is adoption of verification technology to other areas is very significantly high.

2.4) Negative Impact

No significant negative impact was reported during the workshop on the final evaluation, except for the problems related to more tightening of run-off water allocation for water harvesting.

2.7.8 Way Forward

During the workshop on the final evaluation, the three groups of rainwater harvesting verification project raised the following items for the way forward;

- Extension of adoption area of rain water harvesting (Community)
- Environmental conservation and protection to secure rain water harvesting (Community)
- Strengthening group work to sustain the project (Community)
- Adhere to and review by-laws (Community)
- Seek/demand extension services instead of waiting (Community)
- Strengthening of training on record keeping, financial management and leadership (Community)
- Proper storage of produce in preparation for calamities such as drought
- Use of drought animals (donkey, oxen etc.) in ploughing
- Good governance and accountability (Community and GOK)
- Strong communication linkage among groups between community and GOK (External and internal exchange visits for stake holders (Community and GOK)
- Crop diversification (Community and GOK)
- Provision of technical advice and support (GOK)
- Facilitation and source funds (DDO, MOARD, DDC, NGOs)
- Community mobilization (Social Services, Civil Societies, NGOs)
- Provision of enabling environment for development, security and infrastructure (Provincial administration, Public Works and DDO)
- Hastening of individual land ownership to solve land distributes (Ministry of Land and DDC)
- Continuation of training and awareness workshop for farmers (GOK)
- Forewarning on climate changes (Meteorological Department)

The above said way forward is very comprehensive and covering almost all necessities for the further development and expansion of the rain water harvesting in the Study Area.

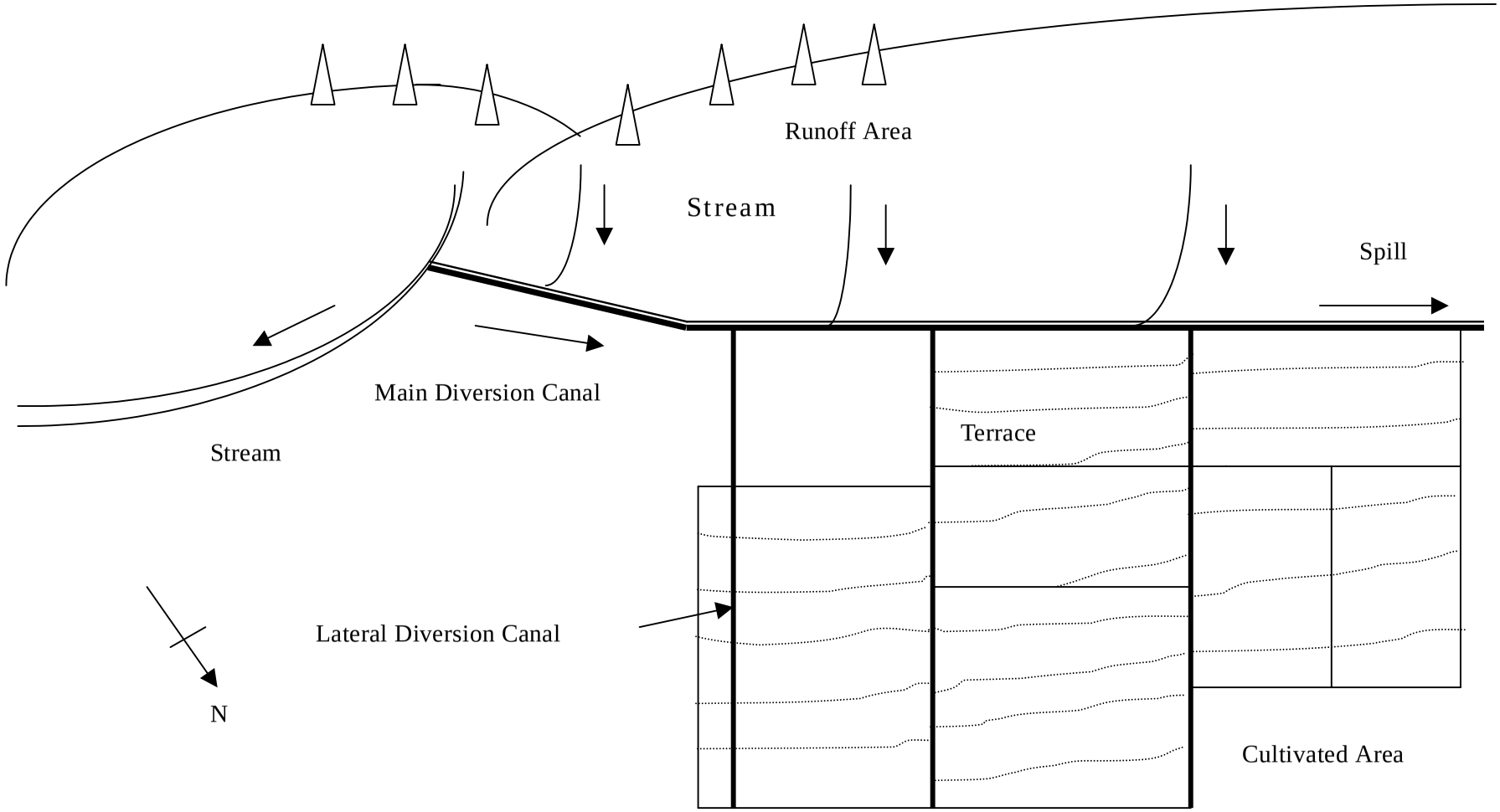

Figure 2.7.1 Layout of Rain Water Harvesting Structure, Parta

Table 2.7.3 Evaluation of the Verification Projects: Rain-fed Agriculture (Arabal and Kimalel)

1. Subject to Verify

Subject to Verify	*To examine if rainwater harvesting technique can stabilize the rain-fed agriculture and be easily disseminated into the different communities in the area.*
Result	*Not only the farmer beneficiaries of the verification project site in Partalo, but also almost all farmers around the project site have participated in construction of the structures and learned the rainwater harvesting technique. The technique was expanded rapidly around the project site within Partalo. The technique was also extended to other villages long away from Partalo, namely Chemelongion and Kapkun, both of which are remote from Partalo. The technique had good impact to the people. The effect of the rainwater harvesting was proved to be positive with trials of two-year verification in the three sites. From these facts, it can be said that the rainwater harvesting is effective in stabilizing rain-fed agriculture and could be practiced in and over the Study Area, where irrigation is not available.*

2. Evaluation of Planning Stage

	Original	*Change on the course of implementation*
2.1 Situation Analysis of the Project Area	*Food security is scarce almost every year except for rainy years, which may happen once every ten to fifteen years, and land is deteriorated without soil and water conservation.*	*No changed.*
2.2 Strategies / Approaches	*To apply rain water harvesting in rain-fed agriculture for increase crop yield and diversify crops with soil and water conservation.*	*No changed.*
2.3 Project Purpose	*Goal: Partalo and its surrounding area have enough food.* *Purpose: Increase and stabilize crop yields with diversification of crops to realize the Goal, and also conserving soils and water.*	*No changed.*
2.4 Project Design	*To train farmers at on-farm about construction of water harvesting structures, introduction of crop husbandry technology with quality seeds and operation and maintenance of the structures. .*	*The design of water harvesting structure has been slightly changed by reduction of capacity for main diversion channel and shallowing the canal bed of lateral diversion channels (Partalo) . The verification project is expanded to other two sites of Chemerongion and Kapukun according to community request.*
2.5 Input	*Survey works were done at contact basis by Study Team.* *Technical assistance of how to construct structures.* *Tools for construction of structures are provided as communal use and seeds/chemicals are supplied at credit basis and Study Tours were provided.*	*Some chemical fertilizers are provided for trial purpose without charging the cost for farmers.*

3. Monitoring & Evaluation of Implementation Stage

3.1 Encountered Difficulties	*1. Lack of any topographic map in catchment area makes difficult to estimated the area (Partalo and even other two sites).* *2. A large run-off discharge destroyed diversion and lateral channels as well as some Fanya Juu embankment (Partalo).* *3. Severe prolonged drought disturbed construction of the structure and land preparation works.* *4. At the beginning time, Partalo community could not understand the labor supply without payment.* *5. Pests of wild animals and diseases damages the crops.*

3.2 Countermeasures	*1. No solution, but catchment survey could produce topographic map.* *2. Installment of brush dams in run-off streams and other soil conservation works was made, which needs expansion .* *3. No solution, but food could be stored for in preparation of calamities as drought.* *4. Cost sharing system has been explained until the community understand.* *5. Employment of group-wise cultivation at the same time will reduce the pest damages.*		
3.3 Lessons Learned	Community 1.*The maintenance of structures should be done periodically or otherwise run-off water is not harvested on time .*	GOK *1.Continuation of training and awareness should be given in order to improve rain-fed agriculture and to extend the water harvesting.*	JICA STUDY Team *1. Need to support governmental officers and farmers on improvement of technology.* 2. *Inter-location monitoring is a very good mean to extend the water harvesting by their own initiatives.*

4. Evaluation of Output and Outcome

4.1 Outputs (Indicators)	*The water harvesting increases crop yield by 2.4times as compared to the maize yield without rain water harvesting as an average in Chemerongion, with applying quality seeds and diversified crops like pigeon pea, green gram and cowpea.* *Food security is improved because the stabilized rain-fed agriculture increase crop production.*
4.2 Vertical Outcome (Outcome for the Stakeholders)	*1. Not only the group farmers of the verification area but also almost all farmers have participated construction of the structures and land preparation and the rain water harvesting intruded outside the site rapidly among almost all farmers in Partalo.* *2. The rain water harvesting has increased crop production and food shortage will be alleviated considerably in 2001.* *3. The rain water harvesting structure promote soil and water conservation by nature especially in case of construction of Fanya Juu terraces.* *4. The crop husbandry technology with supply of quality seeds significantly improves crop production.* *5. The study tours and inter-location monitoring were quite effective to motivate the farmers for agricultural development.*
4.3 Horizontal Outcome (Impact for the Surrounding Communities)	*1. The water harvesting is extended in almost whole Partalo community and other communities of Chemerongion and Kapuku as of September 15, 2001.*
4.4 Negative Impact	*1. No negative technical impact is reported except for more tightening in allocation of run-off water .* *2. The owner of the Women Group's plot asked the group for returning the land by next year. Therefor the women Group have to acquire other land.*

5. Way Forward

5.1 Way Forward	Community *Community should conserve soil and water to secure rain water harvesting with proper maintenance of structures..*	GOK *Minimum extension services should be given to communities to further promote the rain-fed agriculture.*	JICA Study Team *Technique for rain water harvesting should be improved and transferred to other GOK agricultural officers to further extend the rain-fed agriculture beyond the study area.*

Note: Way Forward are based on the result of the workshop held in September 2001.

2.8 Rehabilitation of Pan (Rugus)

2.8.1 Background

1) Subject to Verify

Excavation of the Pan near villages has ever been implemented in the Study Area with the assistance of NGOs to alternate the source of safe drinking water. It is, however observed that most of the pans have been left silted up without maintenance, in stead that the new pans have been repeatedly dug. The verification project in Rugus was implemented to examine whether the pan could be maintained by the community beneficiaries rather than investing in new pan elsewhere.

2) Strategies / Approaches and Project Purpose

Rugus area has scarce rainfall, and also no available rivers to catch runoff, except for existing two small pans, Rugus and Lekiricha pans. Furthermore, although in the vicinity of area there exists Lake Baringo which is only available and stable water sources for drinking during dry season, water quality of it is not so suitable for drinking purposes due to high contain of fluorine. Under the circumstances, the highest demand of local people is how to get enough water not only for human but also for livestock. The PCM workshop here identified safe drinking water as the core objective and the rehabilitation of the pan was suggested.

3) Community Situations

Rugus is located in the eastern side of Lake Baringo. The ethnic composition is almost homogeneous and comprises the Il Chamus group that is also found on other parts of Lake Baringo flood plain. The community's economy is largely based on livestock and to some less extent on fishing. The access road to the area is difficult during the rains when travel to and from the area is only possible by foot or and boats. Hence, although only some 40 km from the divisional headquarters, the area has historically been relatively isolated and modernizing agencies such as government agencies, churches and NGOs have had limited impact (schools, heath facilities, churches). Past droughts have reduced incidence of cattle ownership in the area and an estimated 40 percent of the people are reported to rear cattle under a loan arrangement system where a household cares for some one else's cattle in exchange for milking rights.

Although the community is tradition-bound, it nevertheless aspires to better living conditions including pursuit of their priority objective, i.e readily available water for human and livestock consumption. Rehabilitation of the pan was expected to contribute to this objective. For this objective to be sustainably achieved, the community was expected to adapt their traditional mechanisms for use in managing the pan that would be a communally owned asset.

4) Existing Pans for Water Sources

People in Rugus are mainly depending their livings on livestock and most of males are in the field looking for food and water for livestock at daytime. And no infrastructures are found in this area except for poor road, a primary school and above said two pans, namely Rugus and Lekiricha. These two pans at the time of March 2000 were common in the conditions like 1) much deposited silts are observed, due to no periodical maintenance works, 2) water of these pans is shared with local people and livestock which causes the contamination of water, 3) collected water from runoff through flat catchment areas is muddy, and 4) no maintenance works were observed since these pans were constructed

The types of these existing pans are almost circular in shape with 60 m to 70 m diameter from dike to dike. Their present capacity is approximately estimated at 500 m^3 considering deposited silts with one meter in depth, while its original capacity could be supposed to be about 1,500 m^3. In the case of drying-up during the dry season, women are forced to get water from Lake Baringo or far water resources. This water fetching and hauling are hard work for them and take about a half-day.

To solve these constraints, rehabilitation works of Lekiricha Pan have been identified as first priority of local people through the second PCM workshops held during March 2000. The Lekiricha pan is located between Lake Baringo and the Karau Hills and is nominally used by about 60 households from the four villages of Rugus, Iltepes, Longicharo and Lekiricha. The area surrounding the pan slopes gently from the Karau Hills to Lake Baringo. The soils consist of deep alluvial clays that support thorn bush and grass.

Box-2. History of Lekiricha Pan

The Lekiricha Pan was excavated using a crawler tractor over a three day period in Feberuary1992 by the Baringo Food & Fodder Project (BFFP) a predecessor to the present RAE. There was no community participation at the time of excavation. When it rained in April 1992, the Pan was filled with water and both livestock and people started using the pan water soon after. However, it was noted that bulls were destroying the pan embankment with their long horns. Hence, the chief mobilized the community to fence off the Pan perimeter with thorn bushes leaving only one opening for both livestock and people.

Since there were no arrangements for operation and maintenance, the fence was frequently breached by livestock resulting in erosion of the embankment and muddying of the stored water. Occasionally, the chief would summon a few people and have the breached sections repaired.

During the first year of the pan's construction, the stored water was used from April to December. There after, however, white ants and livestock destroyed the thorn-bush fence thus exposing the stored water to increased pollution with mud and livestock waste. By 1996, the stored water lasted for two months (May-June) and was unavailable during the dry months.

In the absence of a co-ordinating committee, the community never discussed the problems associated with the Pan and possible solutions. However, some elders approached RAE in 1997 and requested for a tractor for de-silting the Pan but there was no positive response. After the El Nino rains of 1997 and 1998, the Pan was even more silted and its storage capacity became insignificant.

2.8.2 Project Design

1) Project Design

During project designing, four results/outputs were identified as a) rehabilitation of Lekiricha pan, b) maintenance of Lekiricha pan, c) construction of water tank for Rugus Primary School, and d) transfer of information from pupils to parents. These results/outputs were assumed to bring Project Purpose of "Drinking water for people and livestock" and then Overall Goal of "People of Rugus get enough drinking water." Major rehabilitation works of the Lechicha pan were designed to implement 1) desilting of the pan, 2) watering places separately for human and livestock, 3) excavation of a silt trap, 4) fencing off the pan from animals and 5) tree planting in the immediate upstream catchment against soil erosion. Figure 2.8.1 shows the Layout for rehabilitation work of the pan.

The need for a community-based organization was also identified during the first and second workshop sessions. In this connection, the community recommended a pan committee as the best instrument for coordinating community efforts towards rehabilitation, operation and maintenance of the Pan. However, apart from informal kinship and family ties, there were no existing community organizations within the area. Hence a new committee was to be established with its By-Laws.

2) Project Design Changes

There were two major changes as below on the project designing for rehabilitation of the pan during the planning stage. One was additional construction of a water tank and the other was a method of desilting pan, which was finally determined after a trial pursuit. Those changes are:

- In the alternative analysis, majority of the participants supported rehabilitation of the Lekiricha pan because of its bigger capacity, central location as well as its bigger service coverage in terms of livestock and people. Several women were, however, strongly against it. From the discussion, the Study Team found that the reason behind the opposition by the women was that they preferred the Rugus pan to be rehabilitated because it is more convenient for the pupils of Rugus Primary School. They wanted Rugus pan to be rehabilitated because it is near the school. The community, the officers and the Study Team finally decided to rehabilitate the Lekiricha pan, and at the same time to construct a water-tank at the site of Rugus Primary School.
- During the first round of workshops, the Study Team found that the most of the workshop participants did not believe that they could dig a deep pan manually, even though they thought they could rehabilitate a pan. They also asked the Study Team to avail a bulldozer in case they could not make it. Under the circumstances, the Study Team and the community agreed to try out manual digging of the Lekiricha pan for a week to determine either to dig manually or to introduce a bulldozer. After reviewing the result of the week, it was evaluated that the manual work would be impossible. The community, the officers and the

Study Team, therefore, decided to use a bulldozer for four days just to desilt the pan and dig the silt trap.

There are also changes remarkable in the project designing sessions that were:

- The Study Team had a proposal to make use the desilted sand from the pan of farmyard. However it was not incorporated in the project design, because of low interest by the community in new development of farm as well as anxiety of high costs of loading the sand.
- Number of nursery trees to be planted for the purpose of erosion control in the catchment was decreased from 12,000 to 1,000 trees, because the catchment area was surveyed to reduce by 20 acres. Also it was agreed between the Study Team and District Working Committee on April 2000 that financial and logistic undertakings for the tree planting were taken over from the Study Team to the District Forestry Office.

2.8.3 Record of Implementation

1) Community Organization

1.1) Formation of Pan Management Committee

The new committee was formulated with 13 committee members with almost equal representation from each of the four participating villages. The community used several criteria in selecting the committee members such as: leadership qualities, ability to reconcile with other community members and possession of livestock.

Compared with other Study Area, the Rugus community relies more on the local chief, councilor, Kanu chairman and local primary school teachers in that order. Hence these formal leaders proved critical in establishing a rapport between the Study / GOK Team and the community.

1.2) Strengthening of the Lekiricha Pan Committee and Other Support Persons

There are two main ways of increasing the capacity of a community-based organization. These include a) exposing the organization to challenging tasks, b) imparting knowledge and skills to key members of the organization. Both strategies are complementary and were used in strengthening both the Lekiricha committee and other support persons. The capacity of the committee was severely tested at the time of Pan rehabilitation. At this time the committee needed to mobilize labor for carrying out minor adjustments on pan embankments, soil conservation measures within the micro-catchment of the pan, fencing of the Pan perimeter and planting of grass and trees within the micro-catchment. The committee and support persons were also exposed to capacity building activities as summarized below;

Table 2.8.1 Summary of Capacity Building Activities for Lekiricha Pan Committee and Support Persons

Capacity Building Activity	Participation	Facilitation
PCM planning workshops (March 2000)	- All committee members - All support persons	- Study Team - DSS, MOARD, MOWD
De-silting pan manually and Evaluation of desilting exercise (April 2000)	- Committee members - Other support persons - All community members	- Study Team - MOARD
Planning alternative mechanized method of desilting pan using crawler tractor (April 2000)	- Committee members - Other support persons	- Study Team - MOARD - MOWD
Learning visit to Tangulbei Pan (May 2000)	- 2 Committee members - 2 key support persons	- Study Team - MOWD
Registration of Lekiricha	- Chairman & Secretary	- Study Team - DSS
Appreciating and contributing to rehabilitation plan of the pan (May 2000 ~)	- Chairman - 2 key support persons	- Study Team - MOWD - MOARD
Training in community mobilization (May 2000 ~)	- Committee members	- Study Team - DSS

1.3) Cost-Sharing Arrangement

The community and the JICA Study Team mutually agreed on a cost-sharing arrangement that provided for a 10 percent cost allocation to the community. On the basis of the 57 households that are likely to benefit from the pan water, the community decided to contribute one goat per household, with the first 10 goat contributions already identified by the end of October 2000. The goats would be sold and the accrued money handed to the JICA Study Team. The cost contributed by the community was finalized with Ksh 24,315, 10% of the total construction cost (labor contribution by the community was not counted in the cost).

2) Survey and Structure Design Work

2.1) Lekiricha Pan

Minimum cross sectional survey was done to design the size and elevation of Lekiricha Pan. The scale of the pan was 60 to 70 m wide from dike to dike and two meter high from bottom to top of the dike. Height from lowest bottom to ground surface was 0.4 to 0.7 m. Slope of embankment was gently 1 to 5 or 10 due to falling down of soil from slope surface.

Dimensions and structures types of the Pan were proposed as follows taking into

consideration the existing pan size and climate conditions such as evaporation from water surface.

- Catchment area : 8 ha
- Effective capacity : 3,400 cum (0.5 m silted)
  : V=100 mm (rainfall)×80,000s.qm(area)×0.4(runoff ratio)
  : Bottom 40 m×40 m with max. depth 2.0 m
- Silt trap : 10 m×10m with max. depth 1.5 m
- Drinking place : 1 place (for human and animals)

2.2) School Water Tank.

The roof water catchment water tank at the site of Rugus Primary School was designed to build as masonry made. Size of water tank was designed to be 2.9 m in diameter, 2.5 m at height and the capacity of 15 m^3. Rugus village had no skilled workers such as masonry, concrete mixing worker. Therefore such workers needed to be employed from outside the community.

3) Construction Work

3.1) Lekiricha Pan

Earth works of the Pan and silt trap with 3,000 m^3 in volume were done by using bulldozer from May 15 to 19, 2000. Bulldozer was hired from Agriculture Mechanization Service (AMS). The works started to drain out the stagnated water with maximum depth of 40 cm by rainfall. And then excavation work of silt trap and Pan followed. Some trees with diameter of 10 to 15 cm in the Pan were knocked down during the works against the Study Team instruction.

The community did fencing work by using thorn bush and Rapai plant. The fencing work was allocated by length into four beneficial villages. This job was regarded as women's work and some community leaders and GOK staff supervised the work. After a series of flash rain in the mid July 2000, women were also engaged in grass planting. However, the grass planting was broken off after the pan water was dried up. Though the grass planting was assumed to prevent the pan bank from soil erosion, grass was hardly established due to shortage of rain.

Earth work with digging and soil removal works for infiltration gallery, transportation of materials such as sand and stone, fitting concrete culvert for shallow well and laying conduit pipeline for leading water from infiltration gallery to shallow well were completed by the community with the assistance of the Study Team / GOK officers.

The main members of participants for the work were 19 people. Also, some women engaged actively in this work by using tools supplied by the Study Team such as shovels,

mattocks and wheelbarrows, etc. The excavation work by the community took about four months for digging an amount of about 90 m^3. Manual digging was a hard work due to compacted dry soil, and excavated soil had to be put up 2.5 m higher than the ground. Chief of the location had important role to bring the community together instead of the Pan Committee.

During the process of implementing the community works, women provided most of the labour with the possible exception of digging the trench. This under-lines the importance of women place on water since they are the ones responsible for fetching it. In addition, the Lekiricha village that is located nearest to the pan provided more and consistent labour as it was likely to benefit most when the pan is fully rehabilitated. On the other hand, Longicharo village is located furthest from the pan but adjoining Lake Baringo. Community from this village can expect to gain only marginally from Lekiricha Pan and therefore showed the least participation.

3.2) School Water Tank

This construction started on October 12 and completed in the late November 2000. In this case, community hired skilled workers because special techniques were necessary for construction. Meanwhile, the women group in the community made the ballast and the men of the community did the foundation work. Water for mixing cement and sand were fetched by the women and school children. In particular, pupils brought one small Jerrican each following a teacher's instruction from nearby Rugus Pan. Also teachers participated in some operations.

2.8.4 Encountered Difficulties and Countermeasures

1) Speed of Construction

The construction work by the community was slower than expected. Te reasons were their living conditions associated with the severe drought in 2000 as well as the difficulties of construction itself. Community people had shortage of food by the affection of the drought and some of them took food once in a day and men were busy looking for something to eat. Excavation work of outlet was too hard due to compacted soil. Besides, Rugus people did not have any previous experiences in using tools such as wheelbarrows, fork Jimbe, etc. All the same the construction had to go with the community pace since it was a community-based project. Even though provided necessary assistance, the Study Team kept respect for the idea that the owner of the project was the community.

2) Community Cohesiveness and Leadership

In the plan of activities, the community was to elect a Pan Committee that would mobilize the community in supplying labor and other inputs for the rehabilitation works. Though

active in the beginning, the committee, it subsequently slackened and failed to effectively discharge its duties during critical stages of the rehabilitation process. Instead of the committee, the location chief became the main contact for the JICA Study Team and the principal community mobilizer.

To the local community, the chief who was a civil servant symbolized government power (lion emblem on his cap, gun strapped on shoulder and donning a camouflage uniform). He also attracted respect accorded the Il Chamus "Laguanani" or traditional chief. He had therefore what it takes to mobilize the community and inspire its members into action. Unfortunately, he probably achieved this at the expense of the Committee. Indeed during earlier committee meeting, the committee chairman seemed ever eager to let the chief do the talking and indeed take the lead.

3) The Pokot Crises

The invasion of the Rugus area by members of the Pokot ethnic group and subsequent evacuation of the local community from the Rugus area completely paralyzed project activities at the Lekiricha Pan and the Rugus Primary School. All the activity was suspended for a month until the conflict was mediated. A summary of events associated with the Pokot crisis is given in Box 2.

Box-3. Summary of Pokot Crises

The Pokot crisis has been looming since September 2000 when members of the Pokot community requested to graze their cattle at Rugus because there was no grass in their area. After some mediation by the Provincial Administration, the Il Chamus agreed but indicated the visitors should not go beyond Rugus. Subsequently, some 100-150 Pokot herders, with an estimated 10,000-15,000 cattle, were stated to have moved to the Rugus area. All were calm until the Pokot, contrary to the original agreement, drove their cattle to Kiserian where they were challenged by Il Chamus youths. A conflict ensured and one Il Chamus incurred gunshot wounds that triggered the crisis. Cattle were stolen on both sides thus inflaming the tension further. Consequently, Pokots deployed a rescue team to Rugus while Il Chamus mobilized their men and relocated their livestock, women and children to safe havens in Ngambo, Eldume and Salabani.

Meanwhile the Pokot seized household and other valuable goods from the now deserted Il Chamus homesteads (utensils, tools, clothes, mattresses, etc.). The provincial administration moved quickly and in a series of meetings diffused the tension. The meeting of 10th November was particularly significant since the Pokot agreed to return to their side of the border and terms for returning seized livestock by both sides were spelt out. Meanwhile, activities at the two verification sites came to a halt.

2.8.5 Lesson Learned

1) Good Environment or Amenity: Still Luxury?

During desiltation of Lekiricha pan by bulldozer, most of trees inside the pan were knocked down. Though the Study Team was against to cut the trees, the community did not oppose

it. To avoid cutting those trees, extra work was also needed, but it was not put in action. Even though the outsiders want to keep the trees by their own criteria (good environment or amenity), villagers might not think so. It is almost impossible to keep them, unless the work was burdened to the outsiders and the value of the things is in accord with the community.

2) Step by Step with Community Pace

As mentioned above, the people in Rugus have nature to diversify activities for their living. Although they form a schedule for some heave operation by allocating their due equally by village, the schedule can be easily broken up with the changing climate, which drives people to farm, fishing, collecting fruits etc. The plan should be flexible and be ready for rescheduling at any time.

3) Real Need as the Best Motivator

In comparison with the other three villages, the community of Lekiricha village was the most disadvantaged in terms of access to domestic water. They were therefore more motivated to sacrifice their time and labor during implementation of rehabilitation works. Even in the absence of a strong pan committee, the people mobilized themselves with the assistance of the location chief.

4) Leadership Appreciated by Community

Compared with other parts of the Study Area, the Rugus community seems to rely more on the Chief. Actually, the Chief has been very active mobilizing the villagers. In other areas, the existence of the person who has strong leadership, such the Chief like here, implies that it has influence on infiltration and progress of the project for community people. Admiration for the leader even allowed him to behave like a way of top-down order. During the workshop held in Kabarnet in September 2001, one lady from Mukutani described her leader as “Chief is our eyes.”

Under the harsh conditions which interrupt people to incorporate in an activity for a longer time, as it was concluded in the workshop by the community, top-down approach or in another word dominant decision making by the community leader will be still workable as long as it is appreciated by the community members.

5) Conflict Mitigation

The participants of this verification project are basically pastoral tribe who looks for good grassland and water for livestock. For the people who live in this area, the conflict with Pokot who are also pastoral tribe can be usual. Therefore, there is probability that a new contention connected with drinking water to this area will arise due to the rehabilitated pan in the future. Before the implementation of the project, arrangement for regarding the

vicinity social environment and politics with respect for their customary deal should be taking into action.

2.8.6 Evaluation

1) Evaluation of Planning Stage

It was presumed that the community's economy is largely based on livestock and to some less extent on fishing. It was, however, recognized during the study that the villagers in Rugus have been practicing farming whenever water is available to it. Villagers clear the bush and divert the water from the seasonal river into the land when the water flows there. The people under the harsh Semi-Arid conditions have to diversify their activities to seek for income as their survival strategy. Agriculture is not exception. It is emphasized again that Il Chamus people have been engaged to farming practice, though it has been heard that Il Chamus are not eager to practice farming. Improvement of farming practice could be the alternative approach for development in the area.

2) Evaluation of Output and Outcome

2.1) Outputs

To rehabilitate the Lekiricha Pan, the work for desilting, excavation of silt trap, fencing, and construction of outlet well with filter had been complete. However, planting trees in the catchment area to minimize soil erosion and the siltation of the pan had not been done yet. Also with the same regards the community carried out grass planting around the pan bank, but it was observed that the grass planted in the part of the bank had already withered up. Though it had been agreed that the District Forestry Office would take responsibility for tree planting in the catchment area, it should be taking account that the erratic rainfall could cause failure of the operation. Layout of Lekiricha pan after the rehabilitation is drawn on Figure 2.8.2.

According to the baseline survey, average use period of the Lekiricha Pan in the recent five years is consistent with two months per year except for 1997 when there was much rain due to El Nino phenomena. With the rehabilitation of the Pan, the length of water retention of the Pan was prolonged by around four months in year 2000 and this year 2001 the water in the Pan has not dried up since last April. People were even being able to fetch water from the silt trap for long duration. However soil erosion of the bank was worsening due to lack of slope protection. Also it was observed that the community has not done the maintenance work of desilting or whatsoever.

The outlet well with filter was functioning well. The muddy water in the Pan conducted into the outlet well is filtered to be transparent. The first microbiological test conducted by the Laboratory of Marigat Health Center revealed that the filtered water in the well contained much less colon bacilli compared to the water in the pan and the silt trap. It

was, however, found that the women were fetching water from the outlet well only for washing. They were still drinking the water fetched from the pan or silt trap.

The women beneficiaries reported that the water from the outlet well, nevertheless its clean appearance, smelt and tasted strange. That accelerated the calls of rumor that the water was poisoned by their opponents. Also the low water level in the well associated with the decrease of the water volume in the pan itself made it difficult to fetch water, discouraging people to use the well. The smell and taste of the well water could be caused by the concrete dust in the filter melted into the water and it will disappear as the water rotated. However at the moment the community beneficiaries could not see the benefit of the filter and were expressing unwillingness to pay for their cash contribution.

As for the water tank attached to the building of Rugus Primary school, the tank had been full of rainwater displaying its effectiveness. It is expected that the community will keep maintaining the facilities with their initiative.

2.2) Outcome for the Stakeholders

While it was found, as above that the outlet well was not fully utilized, the community on their own initiative started digging a channel with the length of 1.2 km to divert river water to the Lekiricha Pan, so that the water level of the well rises. Although the community were not satisfied with the output of the Pan, they still kept motivation to utilize the Pan as much as possible. Also the experiences of digging work during the construction may have given them confident to achieve the channel digging since the community of Rugus did not have any previous experiences in using ordinary tools such as wheelbarrows and folk Jimbe.

2.3) Impact for the Surrounding Communities

Through inter-location monitoring, it was expected that other communities which own similar pan in their areas would apply same technique implemented in Rugus, such as excavating silt trap, fencing off the Pan to prevent the water contamination from animal intrusion and filtering to clean the water. So far any movement to apply these applications have not been observed.

2.4) Negative Impact

As mentioned above the leadership of the location Chief was indispensable to the project. While in the short term this is all right, in the long term it may be undesirable since a strong Chief is likely to constrain growth of alternative community-based leadership. Indeed, when the Chief retires from government service, there will probably be a vacuum in the leadership of the community because his residential homes (where his wives are) are located away from Lekiricha village. A balance needs to be drawn between formal leadership and community-based leadership in order to enhance project future

sustainability.

Though the pan after excavation was able to retain water longer than before, some women beneficiaries might have been depressed somehow with the fact that the output was not content as they expected. In Rugus case with the evidence of community-initiated channel digging work, output under expectation might have driven people for self-help. However it might also be the factor to discourage people for further action.

On the other hand, some people excused the cash contribution because the work of the Study Team was nothing. Though the effect of the filter has not been proved to the community, desilting of the pan increased the water retention capacity and the silt trap has become another source of water for the community. Furthermore the water tank at Rugus Primary School is functioning well. Despite all the effects, the expression of dissatisfactory against the Study Team might be a strategy to reason their nonpayment. Arrangement for cash contribution leaving them without any payment until the end of all the operation might have retained their dependency.

2.8.7 Way Forward

As mentioned above, the filtered water has not been properly used, though it was proved that the filter could clean the pan water. People are reluctant to pay their due, as well. To reverse the people's negative mind in using filtered water to be positive, health promotion activity will assist the people to understand the usefulness of the filter. One of the verification projects is with the Health center and its laboratory to enhance health staff to closely communicate community people with useful health information. Regarding the experience in Rugus, coordination with sectors as health and water will be essential for the future project from the planning stage to communicate and understand between outside supporters and community beneficiaries.

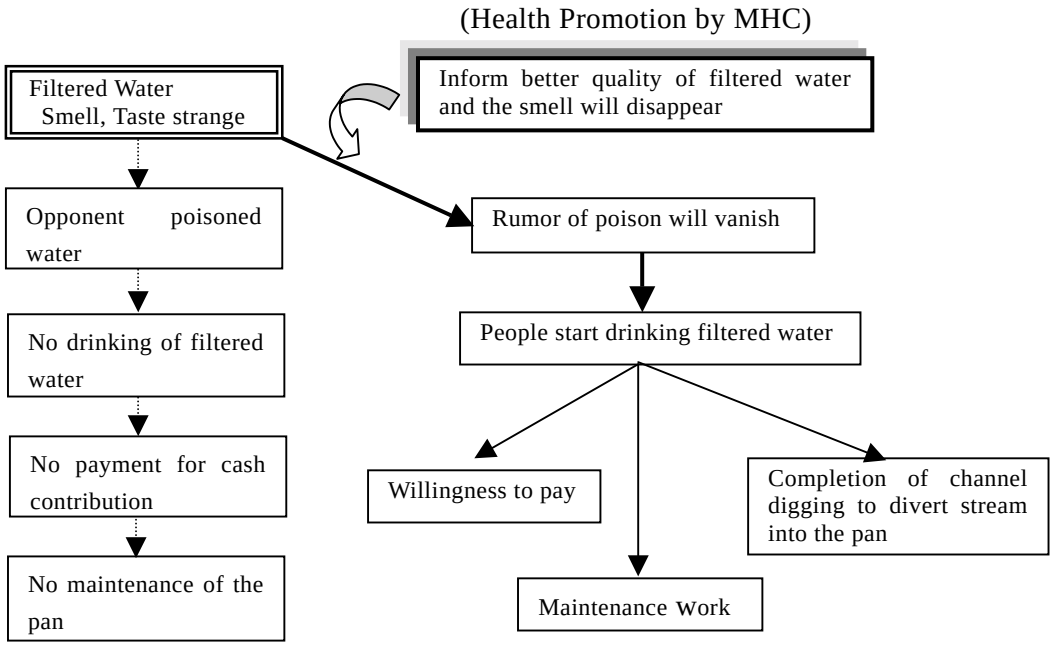

Figure 2.8.1 Cooperation between Rural Water Supply and MHC

Traditional attitudes and cultural practices within the project area place women at a comparative disadvantage (limited education opportunities, early marriage, bride price, limited control over household assets, responsibility for most household tasks). This disadvantage is clearly attested by the generally weak physique and low literacy level of Rugus women. Consequently, at the time of planning sessions, women tended to be passive and were content to follow men's lead. During the implementation period, however, women participation was disproportionately higher than that of men (moving soil, fencing, digging trench, etc.). The lesson arising from this observation is that under the right conditions, women can effectively spearhead development activities. Project success is therefore likely to be enhanced if the latent energy and needs of women is sought and harnessed.

People in Rugs are far diversified in their living because of the harsh Semi-Arid conditions. Men disappeared from the villages several time during the implementation of the project for grazing and looking for food. They shifted their emphasize on their activities from grazing, fishing, hunting and farming when the relevant resources were available. When the grasses become in short, they take their animals for a journey. When flash of rain comes and water in the river is available, they concentrate on farming and when fishes seem near the territory, they concentrate on fishing. Their living in such diversified nature will make the regular maintenance of the pan difficult. Regularity in activities under the Semi-Arid condition seems to be hard to install.

Therefore to rehabilitate and maintain the pan or some extent for any other project in the area, occasional assistance by outsiders as a way like food for work as well as close communication and supervision and even the top-down approach with the community leadership as long as appreciated by the community members will be the significant way to relieve the constraints in the area and to meet the community needs towards the development.

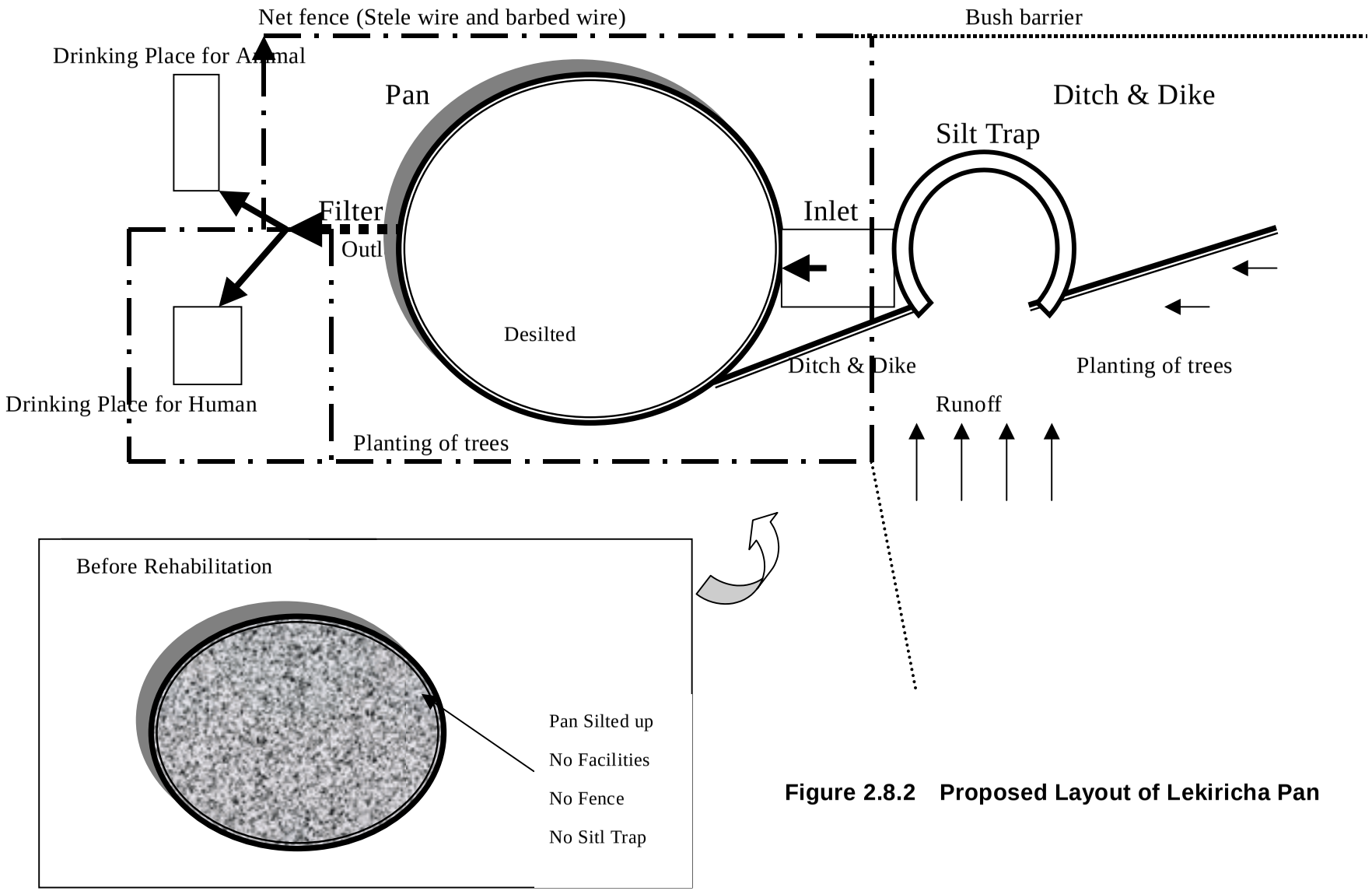

Figure 2.8.2 Proposed Layout of Lekiricha Pan

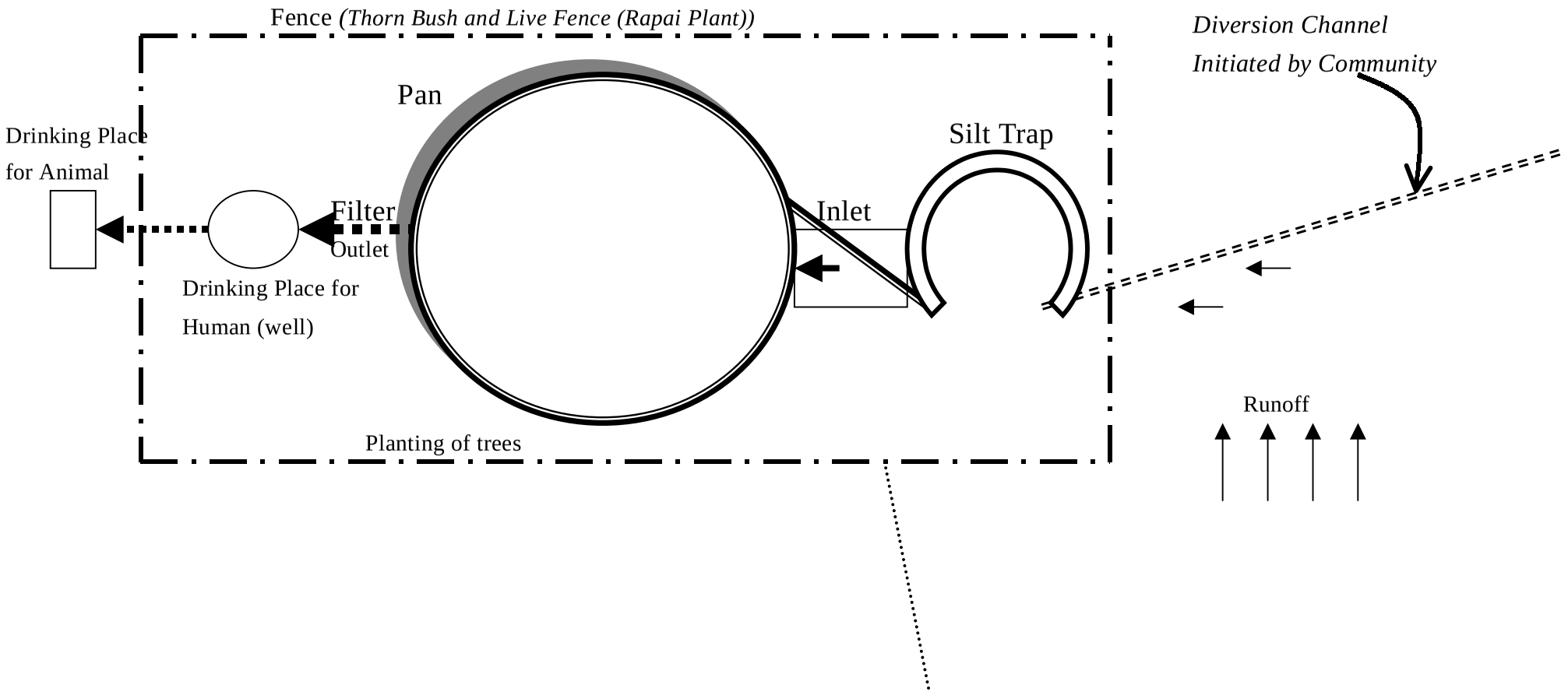

Figure 2.8.3 Layout of Lekiricha Pan after Rehabilitation

Table 2.8.2 Evaluation of the Verification Projects: Rehabilitation of the Pan (Rugus)

1. Subject to Verify

Subject to Verify	*To examine whether the pan could be sustainably maintained by the community beneficiaries rather than investing in new pan elsewhere.*
Result	*1. Though the rehabilitation was once completed, maintenance work by community has not been done and silting is again proceeding. This is because men have to take their animals far away during dry season, which is the most suitable time for desilting. Accordingly, the pan committee lost its function because they were busy looking for their own food. People here have to be engaged in various activities such as animal herding, farming, fishing hunting etc. for their survival. It is therefore evaluated that the sustainable maintenance of the pan by the community in such diversified nature seems very difficult.* *2. Water tank can be an alternative water source with much less maintenance where there are wide roofs available for collecting rainfall.*

2. Evaluation of Planning Stage

	Original	*Change on the course of implementation*
2.1 Situation Analysis of the Project Area	*Il Chamus are mostly pastorarists and are not practicing irrigation agriculture seriously.*	*There are Il Chamus farmers practicing irrigation agriculture for long time.*
2.2 Strategies / Approaches	*Improving drinking water situation and livestock improvement are the priorities.*	*Improved irrigation agriculture could be another approach.*
2.3 Project Purpose	*Drinking water for people and livestock*	
2.4 Project Design	*1. All the digging work was planned to be done by manual work* *2. Rehabilitation of a Pan was the only component.*	*1. The soil was very hard so that it was proved to be extremely difficult.* *2. A water tank was added for the primary school by strong request of women..*
2.5 Input	*1. No budget for bulldozer* *2.No budget for water tank*	*1. Additionally A bulldozerwith 90% subsidy was hired to desilt the Pan* *2. Water tank was budgeted with 90% subsidy.*

3. Monitoring & Evaluation of Implementation Stage

3.1 Encountered Difficulties	*1. During bulldozer operation, trees were knocked down by the machine operator against the Study Team intention.* *2. Farming, fishing or other food collection prevented the villagers, especially men, to attend the digging work and also workshops.* *3. Although Pan Committee was established, it did not function.* *4. Pokot intrusion suspended the construction work.*
3.2 Countermeasures	*1. Followed the intention of the community.* *2. The work operation was rescheduled and intensive assistance by the Study Team wad done.* *3. Chief became the main contact to the Study Team.* *4. After the settlement of the tribal contention, community started the work again.*

3.3 Lessons Learned	Community 1. We learned how to use some tools such as wheelbarrow. 2. We got more knowledge through JICA 3. We learned that it will be better if the water was treated.	GOK 1. Government needs to do more close and frequent supervision	JICA STUDY Team *1. Understanding community's priority and do not force outsider's criteria, unless the operation was burdened by the outsider* *2. Schedule must be flexible according to the field condition and the pace of the community.* *3. Leader of the community can be dominant in decision making as long as the community appreciates the leader.* *4. Some arrangement to regard surrounding social environment and politics would be considered.*

4. Evaluation of Output and Outcome

4.1 Outputs (Indicators)	*1. Almost all the work was complete except for tree planting in the catchment, which will be undertaken by the District Forestry Office. But the grass planted in the bank withered up due to shortage of rain.* *2. Retention of water extended from 2 months to more than 4 months and people can even use the water in the silt trap.* *3. The installed filter/well is effective. However people do not drink the water from well because they say water smells and taste strange or water level in the well is low. Even there occurred a rumor that the water was poisoned by their opponents.* *4. Water tank is well functioning.*
4.2 Vertical Outcome (Outcome for the Stakeholders)	*Villagers decided to dig a channel to divert water from the Mukutani River by their initiative (Output with less expectation might give people self-effort).*
4.3 Horizontal Outcome (Impact for the Surrounding Communities)	*Not observed.*
4.4 Negative Impact	*1. Long dominance of one leader would cause the absence of leadership, after the one retires.* *2. Output lower than their original expectation might be a factor to discourage people* *3. Villagers refused to pay cash contribution due to poor output. However it might be a strategy to reason the nonpayment. Arrangement for cash contribution without any payment until the end might have retained their dependency.*

5. Way Forward

5.1 Way Forward	Community *1. It is needed to complete canal digging to divert river water into pan* *2. Since pan is shallow, more depth will be required.* 3. Soil conservation by grass planting is needed.	GOK *1. Government needs to do close and frequent supervision.* *2. Cooperation with other departments such as Health, Water, Home Economics etc. is necessary.*	JICA Study Team *1. Health promotion in association with water project will be necessary to communicate and understand the community as well as proving the people of the effect of the filter.* *2. Women had important role in the implementation. Gender issues should be coordinated.* *3. It is difficult to sustain the regular maintenance of Pan under Semi-Arid conditions that require people to diversify their activities. Therefore occasional intervention by GOK/Donor will be needed.*

Note: Way Forward are based on the result of the workshop held in September 2001.

2.9 Strengthening of Marigat Youth Polytechnic (Marigat)

2.9.1 Background

1) Subject to Verify

The verification project on strengthening of Marigat Youth Polytechnic (MYP) was carried out in order to make it work as a hub of network in the community. Networking would feature the "Jua Kali" artisans, Kokoto women group and the larger community, particularly the primary and secondary school graduates from the community.

2) Strategies / Approaches and Project Purpose

The objective of this project, which was identified by the stakeholders during the PCM workshops, was to "improve the market for 'Jua Kali' products" through strengthening MYPs carpentry workshop.

3) Situation Analysis

Youth polytechnics became popular since Kenya gained independence. At that time, they were referred to as "Village polytechnics". However, when it was found that this name was somehow despised if not derogatory, their names were changed to "Youth polytechnics". Many of these institutions were started so as to provide training with a view to assist the youth to become self employed or even secure employment. Today, quite a number of them have replaced the name "Youth Polytechnic" with "Technical Training Institutes". A close example is Baringo Technical Training Institute in Kabarnet town.

Table 2.9.1 Status of Polytechnics in Baringo District

Polytechnic	Regular Sponsors	Other Sponsors	Current Status
1. Baringo Technical Institute	Community, GOK, World Vision, CCF, politicians	World Vision, CCF	Good enrolment (average of 150), very well equipped, good infrastructure
2. Kituro Youth Polytechnic	Community, GOK, Catholic Church, CCF		Good enrolment (average of 100), very well equipped, good infrastructure
3. Ochii Youth Polytechnic	Community, GOK		Good enrolment (average of 100), very well equipped
4. Marigat Youth Polytechnic	Community	Skorping (Denmark CARE- Kenya), JICA	Stable but low enrolment (34), carpentry workshop well equipped
5. Nginyang Youth Polytechnic	Community, GOK		No enrolment since 1992, well equipped, but equipment vandalised and neglected
6. Kabartonjo Youth Polytechnic	Community, GOK	UNICEF	No enrolment since its inception, poorly equipped, very good infrastructure

Unlike the other five polytechnics in Baringo district and even many others in the country, MYP is purely a community owned institution with no regular support from the GOK or other sponsors. Yet the polytechnic has managed to operate consistently on meagre resources. Occasional support has been received from the community, CARE Kenya and the Skorping community of Denmark. By comparison, there are 5 polytechnics in Baringo district, all of which receive substantial support from the GOK and other sponsors. However, 2 of these polytechnics have not enrolled any trainees, one for about nine years now while the other one since its inception in 1985.

2.9.2 Project Design of the MYP Project

During a PCM planning workshop that brought together various stakeholders of MYP, we decided that the project would focus on strengthening of carpentry workshop by equipping it with modern and more advanced tools and equipment. Additional support would be provided to the polytechnic by hiring a carpentry expert for a period of 6 months. His role would be to assist the polytechnic in training of trainees in the use of the new equipment, and in the production of more advanced products. Instructors would also undergo a short training sessions on Training of Trainers as a way of improving their skills.

By improving MYPs equipment and skills, we expected them to increase their links with "jua Kali" artisans, some of whom are former MYP graduates. Carpenters from Marigat who use MYPs equipment would receive better and more advanced services, while the Kokoto women Group would benefit from training and hiring of some of the tools. Consequently, both Jua Kali artisans and members of Kokoto Women group would benefit by receiving higher incomes. In addition, short courses organised by MYP in a flexible manner, were expected to attract "Jua Kali" artisans and other community members.

In this verification project, we also planned to introduce short courses, both upgrading and introductory, in carpentry, motor-vehicle mechanics, garment making and masonry departments. Linkages with "Jua Kali' artisans were to be promoted by providing quality services as well as hiring out tools to them. Trainees were to be supported through high level training on the modern equipment and through production of carpentry and garment production. Central to this plan was the procurement of the advanced equipment for the carpentry workshop as well as the re-organisation of the workshop. Lastly, MYP was to in crease the awareness of its services and courses to the entire community through intensive awareness creation activities.

2.9.3 Project Design Changes

Regarding the implementation of short courses, some changes were made. First, MYP tried to implement the courses on the regular trainees, but this was not cost effective as they did not pay an extra fee. Ultimately, this plan was put on hold.

2.9.4 Implementation Record

1) The Management of MYP

MYP is a community owned institution. A management committee, whose membership is derived from members of the surrounding community, runs it. While its day-to-day running is under the manager, the executive committee is also closely involved in executing duties and making important day-to-day decisions. The implementation of the verification project utilised this structure to plan and carry out the planned activities.

2) Implementation Procedure

2.1) Introduction of Short Courses

a) Development of Training Plans

The development of training plans begun in May 2000. All the three training instructors developed tentative training plans, which included the development of lesson plans and timetables. Each of these plans had two major phases: one for beginners and another for upgrading course, which was likewise broken down into modules.

b) Procurement of Equipment

The Study Team together with the Manager of the Polytechnic procured equipment for the carpentry workshop in May 2000. The Polytechnic received all these equipment on the 26th of June in good order. The equipment were received as follows:

Table 2.9.2 Equipment Supplied to Strengthen Marigat Youth Polytechnic

Equipment	Date Received
1. Small equipment (an assortment)	26/6/2000
2. Woodwork hardware materials	"
3. Woodwork electrical equipment	"
4. Saddlers, 20mm	3/7/2000
5. Equipment for Kokoto group	18/7/2000

c) Implementation of Short Courses

After a rather successful advertising campaign for the short courses, the polytechnic received a large number of young men and women who registered an interest in the beginners' courses. Many of these applicants came from "Kampi Turkana" village of Marigat, as a result of awareness raising by a member of the Polytechnics Management committee living in this village. From the forty men and women who expressed an interest on the first day, only 2 actually reported back the following day with money for registration. Finally, these two trainees were registered in the full 2-year Trade Test courses. Reasons given by the committee member for the huge drop was that one

company in the Perkera scheme was hiring casual labourers at that time attracted most of the would-be-trainees. Others may have failed to get money for fees. However, it is also thought that they believed the courses would be offered free.

Considering this experience, the polytechnic decided to continue with the short course curriculum for their full time trainees. In this plan, the eighteen trainees attended a short course in a different department. Carpentry trainees attended short course lessons in Mechanic or Masonry etc. Though they were asked to pay for the short course, none of them paid, but the courses still continued. The justification for this shift in plan is that in the long run, it may attract people, particularly for the upgrading skills. Since then, 3 grade test trainees have benefited from an upgrading short course, which appropriately focused on the operation of the new machines.

2.2) Promotion of Linkages with "Jua Kali" Artisans

a) Re-organisation of the Carpentry Workshop

Following the procurement of equipment from the Study Team, the polytechnic re-organised their workshop to accommodate the new machines. Besides, re-organisation was necessary to facilitate the provision of services and practical training sessions for trainees. From an original smaller machine room and classroom, the workshop now features a bigger workshop, a timber store and a smaller but adequate classroom for carpentry trainees.

b) Provision of Services to "Jua Kali" Artisans

A wider range of services was made available at the workshop. Before these new services were introduced, the only available services were cutting wood on the circular saw and rolling on the lathe machine. But since the new equipment were received by the polytechnic, artisans from the "Jua Kali" sector in Marigat and its environs (stretching as far as Kampi ya Samaki) seek the following new type of services:

- Moulding service on spindle moulder
- Planning on planner / thicknesser
- Splitting wood on the band saw
- Cutting wood curves on the band saw, and,
- Mortising on the mortising attachment of the planner thicknesser.

c) Linkages with the "Kokoto" Women Group

In order to regulate the relationship between the Kokoto Women Group of "Kampi Turkana" and the polytechnic, the two parties signed a tentative agreement on June 28th, which specifies their mutual roles. In addition the Polytechnic gave a commitment

undertaking to provide technical support to the Kokoto women group in identifying more efficient methods of breaking stones and converting them into building ballast.

Under a new revised contract the Polytechnic hired out equipment to the Kokoto group on the November 13th 2000. The group hired tools and equipment (wheelbarrows, hammers, mattocks, sieve etc.) for facilitating making of construction ballast. In particular, the agreement provides for a 10-week hiring duration and requires the women group to make weekly payments for using the equipment. The group has assigned one of its members the responsibility of safe keeping of the tools and equipment. All the tools were hired at a total cost of four hundred and eighty shillings, for a 10-week period.

Table 2.9.3 Tools Hired by "Kokoto" Group (November 13th 2000)

Tools	Purpose of tool
- 5 spades	- Scoop ballast
- 10, 3kg hammers	- Crush smaller stones or ballast
- 2 wheel barrows	- Transport ballast over short distances
- 1 rake	- Separate or arrange ballast
- 1, 10kg masonry hammer	- Crush big stones
- 2 mattocks	- Crushing stones
- 10 construction basins	- Measure ballast
- 2 sieves	- Grading of ballast

In another form of support to the women group on the 15th November 2000, the masonry instructor from the Polytechnic trained the committee members of the group on how to grade ballast using a sieve made by the polytechnic and hired out to the group. Similarly, the polytechnic has planned for a training session on record keeping, following a request by the leaders of the group made on November 13th. So far, one short course training session on record keeping has been given to the Kokoto group of Kampi Turkana.

2.3) Support to Grade Test Trainees to Produce Higher Quality Products

a) Quality of Training

As part of the ongoing strengthening of training programme, the woodwork class intensified its training programme, effectively adding value to it. Particularly through the efforts of the carpentry expert, trainees were able to produce high quality stools and tables that were eventually displayed in the showroom. During this period, trainees also practised their skills through the production of a magazine rack, desks, tables and billboards for clients.

An Executive Board meeting for the polytechnic was held on the 7th of November 2000, to discuss the opening of a showroom that was identified at Marigat centre. The showroom was identified and a plan to renovate it and pay the rent was approved. A job description

and an advertisement for a salesperson was drawn and she was interviewed and employed by the middle of February 2001. Meanwhile, some furniture's to be displayed in the showroom were ready (five stools and five coffee tables). Other furniture were be added as the design and production plan got underway from December 2000.

b) Showroom

After several attempts to open and operate a showroom, finally MYP managed to open one in Marigat town on February 2001. The showroom was stocked with products made by the instructor and trainees. The showrooms monthly rent is six hundred shillings. Since that time up to the end of July 2001, MYP sold furniture worth thirty one thousand shillings through the showroom.

2.4) Capacity Building/ Training

a) Study Tours

Two study tours were organised for the various stakeholders of the polytechnic. The first one, consisting of the polytechnic instructors and trainees, took place between the 17th and 19th of May, 2000. The tour took the participants to Comboni Polytechnic in Gilgil town, Naivasha Technical Training Institute in Naivasha and Isinya Polytechnic in Isinya, Kajiado district. All these polytechnics provide the same courses (Trade Test Courses) as Marigat Youth Polytechnic. However, Comboni polytechnic is more advanced and well established in their training. Yet, just like the other polytechnics, it faces the common challenges of self-reliance. And like Naivasha Training Institute, one of the ways they have tried to avoid the negative attitudes developed against the original village polytechnics is to change their names to sound more technical.

The second study tour was held for members of the Polytechnic Management Board. This one-day tour took them to Comboni Polytechnic on the26th of July 2000. The group consisted of seventeen people, including a few community leaders.

b) Training of Trainers

A Training of Trainers (TOT) Skill Upgrading course was organised for the 4 polytechnic instructors. After considering proposals from 5 different consultants and trainers, the Naivasha Technical Training Institute was nominated to provide the tailor-made TOT course at their institute. The 10-day course was held from 31st July to 10th August 2000. The following subjects were covered in that training:

- Curriculum Development
- Entrepreneurship
- Team work

- Teaching methodology

Over all, the training laid emphasis on important issues which pose considerable challenge to polytechnics and their graduates: namely, self-reliance, self-employment, developing working trends with "Jua Kali", reducing training period/cost and sustaining Income Generating Projects. Though the topics covered sound quite good, the effects of the course to the staff are yet to be clearly felt. So far, they have put into practice the skill on conducting a Training Needs Assessment, developing action plans etc. However, they leant about how to convert waste (sawdust) into something useful, good record keeping among others, but the lack of action in this area questions the effect of the knowledge.

2.5) Increasing Awareness of the Polytechnic

The chiefs, instructors and the Management Board members undertook awareness raising in the month of May through local leaders "barazas" (community meetings), announcements in churches and advertisements in schools. Such "barazas" were held in Chemulingot, Kampi Turkana and Kabarnet. Notices advertising the courses offered and their starting period were also send to primary schools while some were posted in Marigat town.

2.9.5 Encountered Difficulties and Countermeasures

1) Low Enrolment

Enrolment in the short courses that were introduced performed poorly. At the beginning, the creation of awareness appeared to be impressive indeed when thirty eight potential trainees applied and attended interviews. However, after one week, only two trainees remained. They were integrated into the two-year carpentry course. However, one of these trainees dropped out after a month while the other completed his first year but did not report back to MYP at the beginning of the year 2001. All these trainees mentioned the lack of fees as the reason for discontinuing. But the first group of thirty eight trainees who reported and dropped out in the first week seem to have thought that the training would be offered free of charge. Apparently, the message they received was distorted, giving the impression that a donor would subsidise the training.

Apparently, our study indicates a rather low level of awareness of MYP among the members of the community. Awareness is particularly low in Kampi ya Samaki and Sandai. However, it is higher in Eldume and Loboi. These findings suggest that communities further away from Marigat town are less aware of the polytechnic. The illustration of the findings from the socio-economic survey were as follows:

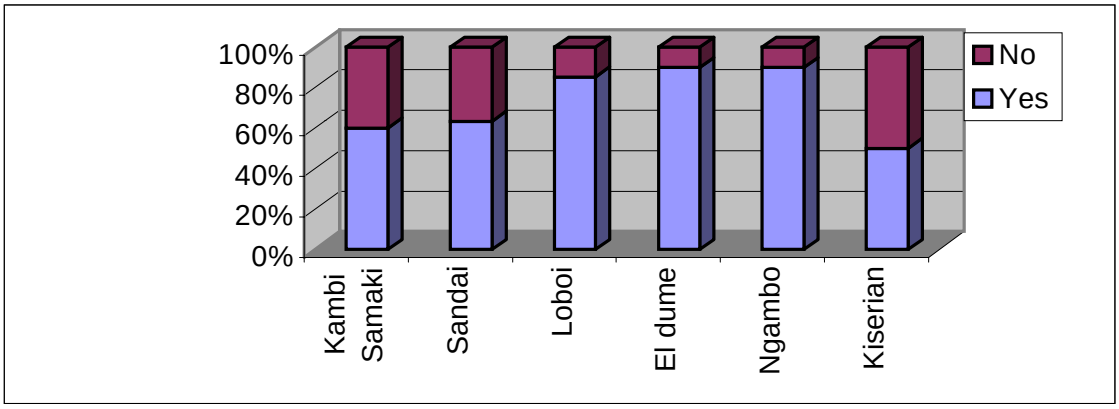

Figure 2.9.1 Extent of Awareness of MYP in the year 2001

In this study, a total of 178 respondents from villages in the areas were interviewed. In each area, thirty respondents were interviewed, except in Loboi (34) and Kiserian (24). Over all, 74% are aware of MYP.

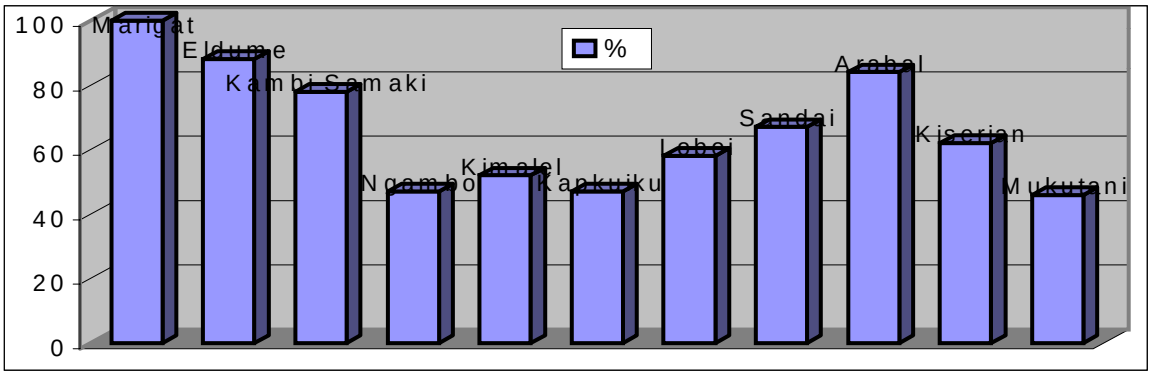

Figure 2.9.2 Percentage of People Aware of MYP in 1999

In our study conducted in 1999, the over all percentage in our sample who were aware of MYP was 66%, compared to 74% who are aware of MYP in the year 2001.

2) Difficulties in Relationship after Hiring the Carpentry Expert

The carpentry expert was hired on an initial contract of 6 months. During this period, he contributed a lot towards the project. But at the same time, relations between him and the manager were becoming poor. There was confusion over reporting and authority channels as the expert send his reports the Study Team and not the manager. Over and above, this confusion was reinforced by the fact that both were carpenters by profession, setting a stage where each seemed determined "to protect their territories". Even after the Study Team opted not to extend the contract of the carpentry expert, he extended his presence in

the polytechnic, effectively sustaining this conflict.

3) Difficulties in Selling New Design of Furniture

Sometimes in August 2001, the polytechnic made an attractive wall unit for a customer. On completion, they had spent much more than what the client was ready to pay. Yet he had given the specifications for the beautiful furniture and was not willing to pay the higher price. Although MYP will still complete the furniture and display it in their showroom, this incidence underscores the difficulty of selling really good products within Marigat town and the surrounding areas. Similar difficulties would be encountered if they designed and made furniture from expensive timber, or with expensive finishings.

4) The Burden of Motor Vehicle Mechanics and Masonry Courses

Although the course on motor vehicle mechanics was introduced on the initiative of MYP management committee, the support from the Study Team aimed to spread its benefits to all other courses. This course required a heavy initial investment. A motor vehicle engine and chassis was bought from MYP account. In the year 2000, the course attracted 6 trainees. But in the year 2001, it attracted only two trainees. Currently, it is a course (and department) that is "riding on the back" of other departments. While the garment making and carpentry courses continue to attract a sizeable number of trainees hence generating money in form of fee payments, motor vehicle an masonry courses continue to draw enormous support from MYPs accounts.

5) The Management Committee Lost Focus

Certain decisions that have been made by MYP management committee suggest that they have strayed outside their focus, which is training. And the way to continue with this focus is to spend most effort on attracting a reasonable enrolment. However, the management committee spent more effort discussing issues that were not relevant to training or decisions that were unhelpful. For example, they took a lot time hiring extra staff, yet enrolment has stagnated! The result of this decision is that they not only have to spend more on salaries, but also that one of the new staff, with a class of only two first year trainees, will be under-employed.

6) Trainee Accounts could not Begin

In spite of the fact that trainees were involved a lot in production, this did not lead to the establishment of trainee accounts. The major project in which they were involved was more than thirty kilometres away, at Nginyang primary schools. Because of this distance, they were required to camp at the school where they were making the beds and tables. Eventually, the cost of feeding them ate up all the profits they made.

2.9.6 Lessons Learned

1) Subsidisation and Dependency

Difficulties in attracting a higher number of trainees both for the short courses and the long ones reveal a certain attitude within the community. The common reason given for not enrolling is that the parents lack money to pay fees. Yet they do not question the relevance of the courses or how useful the courses may be. Discussions with key informants indicate that although the community is generally poor, they also have little appreciation for training and more important, they have developed a high dependency on subsidised services. For example, all the schools in the Study Area are provided with free food under the school-feeding programme. It is common knowledge that this is related to enrolment in schools to the extent that the withdrawal of this food would certainly lead to a drop in enrolment. Similarly, education is provided free at the primary level of education. All these type of subsidies are not provided at the polytechnics. Other polytechnics have turned to sponsors who assist them to can cover a major part of their budget rather than depending solely on fees.

2) Need for a Constitution for MYP

Since its inception, MYP has had problems with its members of the management committee. These problems result from unclear responsibilities and the composition of the members. The first committee worked without a guiding constitution. They thought their positions were permanent until 10 years later when the manager referred to a constitution for government supported polytechnics, invoking the section that requires elections to be conducted every 3 years. This brought a feeling of betrayal among members of this committee. The second committee appointed in 1997 was considered ineffective in its work. In the year 2000, it was replaced by the current committee, which has carried the same feelings from the previous committees. All along, no constitution has been formally adopted and shared by the committee. Therefore, procedures and responsibilities are so unclear that some of the influential members are making far-reaching decisions alone. Until policies, procedures and by-laws are formulated or adapted, documented and shared, such a “constitutional” crisis will continue.

3) Need for Institutional Capacity Building

A weakness in the capacity of both the management committee and the instructors has led to a situation where they have lost their focus on the core business of MYP, which is training. All the activities done by MYP should have some relevance to promoting this core business. This requires that first of all, the polytechnic formulate a clear mission, vision, goals and strategies. Secondly, the main decision-makers should share understand all these goals so that they can focus on achieving them.

4) Need for Formulating Clear Procedures and Clarifying Roles and Responsibilities

Members of the management and executive boards need to know clearly their responsibilities in relation to those of the MYP manager and instructors. Whenever an action is taken, for example hiring of new staff, each person needs to understand their roles in this, as well as the process to be followed in executing or implementing those decisions.

5) Balance between Good Quality Products and Affordability or Exploring new Markets

Considering the difficulty involved in selling good quality products, there is a need to balance quality and affordability. Marigat town does not have a people with a taste for sophisticated products. But because MYP is still challenged to produce quality products, they will need to find and outlet for such products, whether it will be the limited and occasional market within, or the abundant market outside e.g. in Kabarnet.

6) Promoting Linkages with Kokoto Women Group

In the beginning, the "Kokoto" women group started off at a high note. They requested for, attended various training sessions at MYP, and even fenced off a small area where they intended to crash and store their ballast. Later on, they sold some good amount of ballast. However, in 2001 their activities have gone down. Except for one single good sale they made in July, they have not done much. It seems that the pace at which they started off last year, drew some reaction from middlemen involved in the same trade. These men create their own business by telling potential buyers that the price offered by the women's group is two times more than that charged by others. To some extent, they succeeded to strike a blow to the activities of the women's group. In 2001, the group has been generally dormant, waiting for an opportune moment to make a comeback. Meanwhile, they still cherish their group even as the members work on ballast individually while some seek on-farm work at the Perkerra Scheme.

2.9.7 Evaluation

1) Evaluation of Planning Stage

Since the PCM planning workshop was conducted, no changes to the initial plan were necessary. Attempts were made to implement the original plans, only that several difficulties were encountered in the process.

2) Evaluation of Output and Outcome

2.1) Outputs

Following the implementation of the project, MYP prepared detailed training plans that

included lesson plans and timetables, for the planned short courses. These plans were divided into two phases: the beginner's course and the upgrading course for trained or experienced applicants. In preparing for this moment, the carpentry workshop was re-organised and equipped also, not just in readiness for the trainees but also for providing more efficient service to "Jua Kali" artisans. For the workshop to be complete, an experienced machine operator was hired to take responsibility over it. In addition, record keeping was improved so that statistics about the number of clients and the amount paid would be tracked.

Regarding production, MYP trainees were involved in actual practical production of furniture. A case in point is their work at Nginyang primary school between November and December 2000. At the same time, a showroom for displaying products and selling them was opened.

2.2) Outcome for the Stakeholders

a) Enrolment increased

In 1999, overall enrolment for the two-year courses offered at MYP stood at 17 trainees. In the year 2000, enrolment increased to 33 trainees while in the year 2001 the enrolment was 34 trainees. Therefore, since 1999, enrolment increased by 94 percent in the year 2000. In the year 2001, it increased by 1 trainee. It more or less stabilized at the same level. While this increase is comparatively high in relative terms, it is low considering the potential of the polytechnic, the number of potential primary and secondary school dropouts as well as other active polytechnics in the district. Further analysis reveals that the intake for the year 2000 was 26 trainees compared to 14 in the year 2001.

Table 2.9.4 Enrolment at MYP from 1998 to 2001

Year	First Years		Second Years		Total
	Male	Female	Male	Female	
1998	2	6	-	6	14
1999	3	6	2	6	17
2000	20	6	1	6	33
2001	6	8	17	3	34

b) Record keeping and accountability improved

In the past, record keeping in general was so poor that it was difficult to distinguish different items entered on the records. However, this has improved since the beginning of this verification project. In particular, the records in the carpentry workshop were very well kept and updated on a daily basis. Items giving detailed information such as number of customers per day, length of feet of timber worked on and type of services provided, is featured in the MYP records. In effect this has improved transparency and accountability.

c) MYP income increased

Over the same period of study, the income of the polytechnic has increased from 176,042 Ksh in 1997 to 256,651 Ksh by August 2001. In the past, a significant proportion of MYPs income was covered by items such as fund-raising, "Jua Kali" training, sources that were not reliable year in year out. On the contrary, a larger proportion of the income in the years 2000 and 2001 was drawn from an increase in production sales, services to "Jua Kali" artisans and fees. These sources are not only more reliable but also relate to the core activity of the polytechnic and tap its internal potential. Total production sales increased from 16,710 Ksh in 1999 to 59,499 Ksh in the year 2000. School fees still provides the largest share of the income. But it has recovered significantly from a low level of 61,787 Ksh to 99,400 Ksh paid, out of the expected 280,100 Ksh in the year 2001. Similarly, the income from "Jua Kali" services has increased from 11,269 Ksh in the year 2000 to 29,055 Ksh by July 2001.

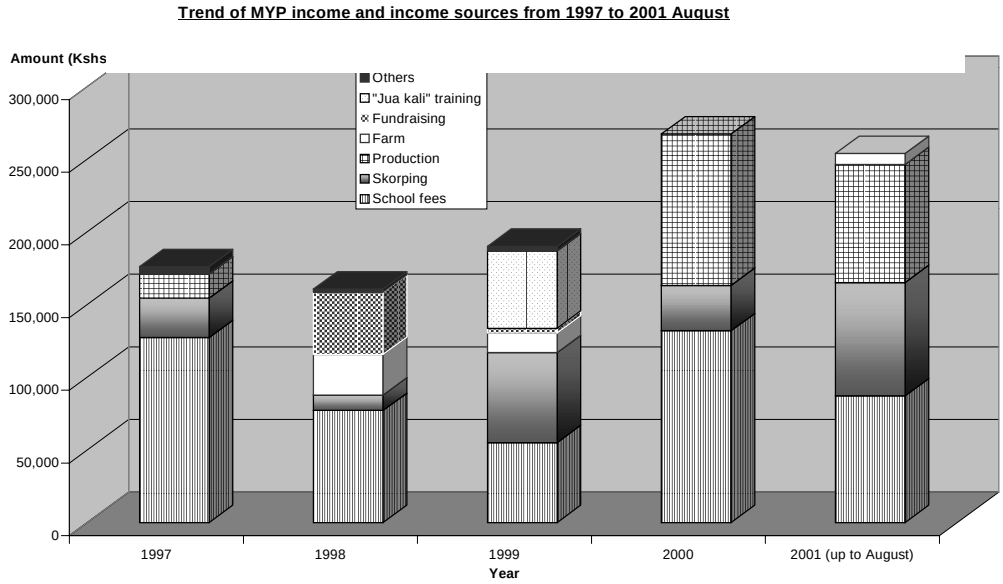

Figure 2.9.3 Trend of MYP income and Income Sources from 1997 to 2001 August

Over all, the findings show a trend where the income of MYP is increasing. At the same time, the sources of income are increasingly shifting to school fees and production, items we consider to relate to the core activity of MYP.

d) New Designs made

New designs of furniture have also been made, though to a limited scale. For example, designs such as a magazine rack, T-doors, sugar dishes and advertising stands were produced at MYP only in the entire Study Area. However, opportunities for more designs are unlimited, given the specialised equipment at their disposal.

2.3) Outcome for the Surrounding Community

a) Linkages with Kokoto Women Group and "Jua Kali" Artisans

The surrounding community has also benefited from the MYP project in many ways. At Kambi Turkana, the Kokoto Women Group hires tools from MYP. These tools have helped them improved the process of crashing ballast, grading of their crashed ballast and transporting it from one spot to another. Similarly, they have received training on handling and grading ballast as well as bookkeeping. This has not only been a motivation factor to them but also an opportunity to organize and expand their business. In the month of July, they earned a profit of 4, 000 Ksh from only one sale of ballast, an amount that is beyond their imagination.

Similarly, "Jua Kali" artisans have benefited from services that could not be obtained within the Study Area. In particular, the artisans in Marigat town can access specialised

equipment such as the mortiser, thicknesser and band saw. For bulky, quick and accurate work, they can access the planner and power saw. In addition, large-scale production can now be undertaken competitively and swiftly by MYP. It is this advantage that has enabled them to secure orders for school desks and benches for example.

2.4) Negative Impact

a) Conflict between the Management Board Members

Although conflicts between the management board members have arisen in the past, it seems that they have accumulated to reach an unprecedented high level this year. As a result, work has been affected as some members have decided to take a low profile while others often engage in unhelpful differences. Accusations, which appear to be simple enough to solve, are being made by members against their own colleagues at the detriment of MYP work. Eventually, this conflict is highly likely to end up with some members surrendering their positions.

2.9.8 Way Forward

1) Formulation of a Constitution

In order to streamline the work of the management and the executive committee and to clarify their roles in relation to each other, a constitution will need to be formulated. This will need to go beyond adopting the constitution for government run polytechnics because MYP is not government run. However, as a way of beginning, they can adapt and modify that constitution to suit the needs of MYP. Finally, this constitution should be made public and shared among all the members of the boards and staff.

2) Developing Clear Procedures and Systems

In order to guard against misuse of authority and possibilities of conflict among committee members and even the staff, there will be a need to formulate clear policies, procedures and systems of procurement of goods and services, hiring and firing staff, handling finances and other essential areas.

3) Aggressive and Timely Awareness Creation

Work on increasing awareness of the polytechnic is a continuous process. In future, the polytechnic will need to target students in their final year of primary and secondary education. This will require the posting of information on time, that is during their last term before they leave the school.

Table 2.9.5 Evaluation of the Verification Projects: Marigat Youth Polytechnic (MYP)

1. Verification Purpose

1.1	Subject to Verify	*To find out whether MYP can become a hub of network in the community. Potential community groups that were identified for networking included the "Jua Kali" artisans and the Kokoto Women's group of Kampi Turkana in Marigat.*
1.2	Result	*The polytechnic can serve as network for the larger community, in particular the "jua kali" artisans. However, like many other polytechnics in the region, it is not easy to achieve the financial sustainability of the polytechnic on training only. Therefore, a showroom was opened to sell and display furniture and clothes produced at the polytechnic by trainees and instructors.*

2. Evaluation of Planning Stage

		Original	*Change on the course of implementation*
2.1	Situation Analysis of the Project Area	*There is a high demand for high quality products in the community, which the MYP can tap, to its advantage. Similarly, there is a need in the community for skills training for employment and / or self-employment.*	*The market in the Study Area, particularly for sophisticated items are very limited. People consider affordability first.*
2.2	Strategies / Approaches	*Extending support to the MYP carpentry workshop. Through this support, benefits would spill over to other MYP departments, "jua kali" artisans and the community as a whole.*	*A Training of Trainers component and study tours for all instructors, committee members and trainees was necessary to enhance a common pursuit of their goals.*
2.3	Project Design	*MYP was to develop plans for training in short courses for beginners and short upgrading courses for experienced artisans. Through quality training, they would produce high quality products that would fetch a good price in the market. All this together with increased awareness creation would help to achieve a higher enrolment at the polytechnic.*	*Changes were made to the short course training. At first, MYP tried to apply short courses to the regular trainees on the 2-year courses, but this was not cost effective. For the moment, short courses have been put on hold.*
2.4	Input	*Electrical equipment and tools for the carpentry workshop, timber, training of trainers course and a study tour for the management committee, trainees and instructors.*	

3. Monitoring and Evaluation of Implementation Stage

3.1	Encountered Difficulties	1. MYP still registered low enrolment for its two-year courses, and a very poor response to its planned short courses. 2. Selling new high quality designs was difficult because they were more expensive. 3. The consequence of introducing the motor vehicle mechanics course by MYP management committee was that it took up more money that it brought in. The masonry course is also a burden to the other courses with a higher enrolment. 4. Relationships between the carpentry expert and the manager turned sour during and even after the duration of his contract. 5. Trainee accounts could not be credited because the major work they carried out was also so far away that they had to live on site where they spend up all the profit on food and travelling.
3.2	Countermeasure	1. Attention was shifted from producing just quality products but doing so while ensuring that they are affordable as well. 2. Although safety plans had been discussed, after the accident at the workshop giving all responsibility to the machine operator enforced the safety plans.

	3. The concerns for accountability were addressed by hiring an accounts clerk and streamlining record and bookkeeping. 4. The contract for the carpentry expert was not renewed.		
3.3 Lessons Learned	MYP staff / Committee *1. MYP staff and committee members should keep their focus on the core business of the polytechnic, which is training. A higher enrolment is necessary for this.*	GOK *1. The GoK needs to resolve the conflict between the committee members.* *2. GoK needs to influence the appointment of committee members with good character.*	JICA Study Team *It is needed to understand the over all situation of polytechnics in the district and the country as a whole. It is also needed to understand the effects of dependency on subsidies by the community and how this is related to enrolment in educational institutions in general.*

4. Evaluation of Output and Outcome

4.1 Outputs (indicators)	*The carpentry workshop was re-organised and is functioning very well. A machine operator and an accounts clerk were hired to serve clients and to streamline activities in the workshop. In addition, a showroom was opened to sell and display furniture and clothes produced at the polytechnic by trainees and instructors.*
4.2 Vertical Outcome (outcome for the stakeholders)	*Accountability has increased, safety measures at the workshop were put into place and enforced, enrolment increased from 14 and 17 trainees in 1998 and 1999 respectively to 33 and 34 in the year 2000 and 2001. Finally, new designs were made using the new equipment in the carpentry workshop.*
4.3 Horizontal Outcome (outcome to surrounding community)	*Benefits to the community includes benefits through linkages between MYP and Kokoto Women group which hires tools and have received training in handling ballast and bookkeeping. "Jua kali" artisans also benefit from the use of the new and advanced MYP equipment that has brought such essential services closer.*
4.3. Negative impact	*1. Though differences between committee members have occurred in the past, since the verification project, they seem to have intensified. It is likely that people feel like protecting their "territories" so that they can remain involved with the new MYP.* *2. Hiring of the carpentry expert brought in salary differentials, confusion in the line of reporting, authority and eventually poor relationships.*

5. Way Forward

5.1 Way Forward	MYP staff / Committee *Focus more on increasing enrolment through timely and focused awareness raising.*	GOK *Regulate and monitor the management of the polytechnic.*	JICA Study Team *1. The management committee remains an important organ of MYP. Therefore the roles between the members and in relation to the MYP staff should be made clear in order to guard against conflicts. Similarly, a constitution will need to be formulated specifically for MYP and to be shared by all staff and committee members.* *2. Achieving a higher enrolment should always remain the key focus of all MYP stakeholders because training is their core business. In this respect, MYP should intensify awareness creation efforts and ensure that advertisements are posted on the right time to the right target – primary and secondary students on their final year.*

Note: Way Forward are based on the result of the workshop held in September 2001.

2.10 Strengthening Marigat Health Center

2.10.1 Project Design

For project designing purposes regarding people's health, the Study Team has investigated and analyzed three factors; people's priority, epidemiological conditions and Primary Health Care strategy.

1) People's Priority

That is "water". It became clear through the various surveys such as PRA, PCM workshops, or individual interviews at the pre-designing stage. This "water" included two meanings. One is for domestic water, particularly for safe drinking water. The other is for food production either irrigation water for a "Shamba" or for the grass enough to keep cattle well producing milk.

1.1) Empirical Wisdom

Generally, local inhabitants are experts in rural life. They have significant wisdoms regarding survival in ASAL environment. They know how to quench their thirsty, how to avoid disease, and how to treat patient. They have a kind of medical science based on their daily experiences. For instance, anatomy of dead livestock contributed to their understanding of internal organs. They have classified causes of diseases into four categories. External conditions such as cold wind blow into a child head; infectious agents, although they may not have seen them directly; constitutional or genetic defect; and lastly spiritual reasons. The variety of their herbal medicines easily exceeds 200.

It is a common sense among them that a pool of water left over upon a dried-up riverbed, or in contrast, a very first splash of water after dry-season would cause diseases. When fetching water, they dig a small-hole on the riverbed beside a stream, and wait for some "filtered" water come-up inside the hole instead directly from a stream. They watch the water quality and surroundings carefully. They are quite sensitive to any smell, colour or taste change, dead fish, oil and any other contaminants. They are equipped with those safety sensors as a naturally given human capacity, but not with a modern microbiology. For instance, detecting existence of Vibrio Cholera in their water source is totally beyond their capacity.

1.2) Epidemiological Background

Infectious diseases are major burden of diseases in the area.

Major outbreaks
Cholera; ’99, ’98, ’95, ’90, ’88, ’83, ’81
Malaria; ’00
Yellow Fever; ’93
Meningitis; ’92

Endemic
Malaria, URTI, Intestinal parasite, Amoebiasis, etc.
And nutritional disorders

Through the discussion with local health staffs, it becomes clear that there are some 21 of infectious diseases around the area. Namely;

Amoebiasis*	Leishmaniasis	Schistosomiasis*
Anthrax	Malaria	Shigellosis*
Ascariasis*	Meningitis	Tetanus
Brucellosis	Pneumonia	Trypanosomiasis
Chickenpox	Rabies	Tuberculosis
Cholera*	Respiratory disease	Typhoid fever*
Hookworm disease	Scabies	Yellow fever

Among those diseases, Anthrax, Brucellosis, Rabies, Tetanus, Trypanosomiasis and Tuberculosis are defined as ‘Cattle association diseases’ or ‘Zoonosis’. In order to control these diseases, both human and animal health programmes should be considered in closely related interventions.

It should be noted that those marked with (*) are categorized as waterborne diseases.

Demographic database is rather weak. Currently no reliable information on population by sex and age group are available. Therefore calculations of some important health indicators such as IMR, MMR, TFR, and Life Expectancy are difficult.

1.3) PHC Strategy

PHC[1] is the strategy agreed worldwide to achieve “Health For All” as the ultimate goal. Analyzing past failures of PHC realization in the international health fields, one key factor is weak interactions between a health institution and a community. Often the distances are so far (physically, socially as well as psychologically) that health staffs, particularly those who are engaged in public health, are demoralized to communicate with a community. In this context, the interaction between the Marigat Health Centre and the communities has become a major focus of PHC in Baringo.

[1] There are two imprecations in PHC; comprehensive PHC and selective PHC. The comprehensive PHC implies a kind of ideology that health belong to each person, not to a hospital or an academic institute.

The Marigat Health Centre consists of three departments; clinic, public health and DVBD laboratory. Each department provides respective health services. Communities are benefited and responding it with joy.

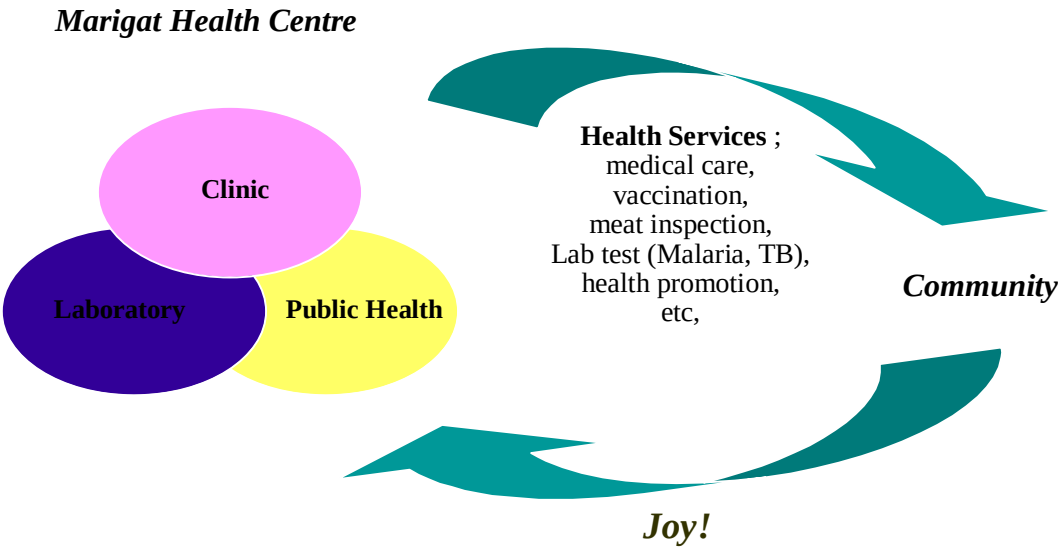

Figure 2.10.1 Conceptual Overview of PHC Interaction

1.4) Verification Project

Since people have strong will to access to safe, clean and not contaminated drinking water and well motivated to avoid diseases, particularly infectious, waterborne diseases, the Study Team has designed project with following two components; "Bacteriological test in DVBD Marigat Laboratory" and "Communication between Marigat Health Centre with the communities". These two components are also linked in interactive manner.

a) Bacteriological Test

People are deeply conscious about safe water. However, most of them rarely had a chance to access microbiology. If the lab could identify vibrio or salmonellae contamination in community's common water source, it would help them a lot and they would surely take appropriate countermeasures.

Major pathogenic bacteria[2] can be identified by bacteria culture. For other pathogens including viruses, need some other laboratory methods such as immunological test. In general, bacteria culture is a simpler method compare with immunological ones, but still effective and applicable in this settings. The verification project concentrates on the

[2] ANTHRAX (Bacillus anthracis), BRUCELLOSIS (Brucella melitensis), CHOLERA (Vibrio cholerae), MENINGITIS, SHIGELLOSIS (Shigella), TETANUS (Clostridium tetani), TUBERCULOSIS (Mycobacterium tuberculosis), TYPHOID FEVER (salmonella typhi)

bacteria culture.

The information obtained from the test result is key source information to be incorporated into the interactive communication with communities. As well, necessity of test such as from which water source, how often, with which contaminants, is to be determined based on the interactive communication with the communities.

b) Communication with the Communities

As a service provider, Marigat Health Centre should be equipped with deep insight into the community's life. It is a pre-condition to provide any kind of services. The communication is a continuous process to watch, listen, investigate, observe and to inform, show, notify, explain, encourage and promote favorable change in people's mind, knowledge, attitude and practice for better health. It must be performed in interactive manners. It is a core concept of comprehensive PHC.

Then the verification project has been designed to establish effective health communication.

Communication on health matters
(health staff ⇔ community, both ways)
- community's point of view
- effective media (slideshow, billboard)
- appropriate health messages

Communication needs its content. Laboratory's microbiological test result is to become one of powerful information for the communities. Moreover, community's response is to encourage or re-direct the Health Centre's manner of providing any services. In this way, these two components are interlinked within the verification project.

2.10.2 Implementation Process

The project activities actually started in June 2000 by setting up the laboratory equipment and developing a slideshow programme.

1) Slideshow

The first programme developed in the project was "Health Status of the Eldume Community[3]". It worked as a demonstration mainly for the health staffs, what is a slideshow and how to prepare and develop a programme.

[3] 14th June 2000 at Eldume community

1.1) Behavioral Change in Health Staffs

From the second programme development, the health staffs actively took initiatives. We picked the latest Cholera outbreak episode in Kampi ya Samaki as a main theme, titled "Cholera outbreak, its cause and how to prevent; countermeasures taken in June 1999".

During its development, number of health staffs participated was increasing day by day. We were working on it in the public health office. Several public health technicians those who were assigned in different locations became frequently appeared. Firstly they indicated their curiosity to the unfamiliar digital slideshow technology, and then began to suggest their own ideas or messages concerning health to be incorporated into the programme. Later, some of them confessed that they had lost interest to visit their community after repeatedly instructed people "wash your hand" or "use latrine" without getting any positive responses. Some were really demoralized and poorly motivated until they found something new and powerful information with effective mass communication media, that is slideshow.

1.2) "Official" Health

Some other public health staffs were involved in meat inspection and authorization to eating premises in daily bases. They had a tendency to be a health authority. Sometime they acted almost like a public health police. The messages from them often took a form of "not to do this" or "it is bad" or "this is dirty".

A couple of days after the second programme development had started, a clinical doctor began to participate the work. Being asked for some messages to the community, he responded, "definition of diarrhoea". "What is the definition of diarrhoea?" "Consecutive two to three lose or watery stools." "Is it useful information for a mother in that community?" After several seconds of silence, he responded "no", smiling.

1.3) On-Site Material Development

As the health staffs getting familiarized with slideshow, they were realizing underlying communication mechanism of the method. On the showground, audiences were entertained. Although it was hardly visible, but surely they were evaluating the positions of the MHC to them at the same time. How deeply they knew about our life? How closely they were standing to our community?

Developing process of a programme was designed to make it specifically tailored-out for the target community. Main topics were chosen from local and recent episodes in order to make the programme "here and now" reality. The staffs spent at least a half day within the community, observing, investigating and interviewing with people prior to each slideshow. This "village walk" contributed a lot to update and deepen their understanding and put them closer to the community's life.

Then appropriate health messages were chosen and organized with the emphasis of following four points.

- respect to their empirical knowledge
- based on their reality
- encouraging, promotive, not punitive
- entertaining as well

On each slideshow, the staffs were responsible and performed a series of activities except computer operation, which had been done by JICA consultant.

1. Village walk
2. Getting pictures into PC
3. Editing
4. Rehearsal
5. Slideshow
6. (feed back)

1.4) Too Sophisticated?

This kind of health promotion slideshow has been realized by digital graphics technology. It requires a digital camera, a computer and a digital projector as key components.

Table 2.10.1 Tools and equipment used in the slideshow

Items	Notes
Computer	Portable type, 40watts
Digital camera	640 x 480pix
Projector	Liquid Crystal Display (LCD), 250watts
Generator	650watts
Stabilizer	220v and 110v, 500VA
Screen	3m x 2m, made by 2 MOH bed sheets
Rope, pegs, pins, clips	Screen set-up, guideline for audience
Fuel tank	10l, polyethylene
Laser pointer, PA[4] system	for effective presentation
Lamp stand	Particularly for site clearing after the show

Because of its unfamiliar features, discussion arose on its cost, applicability and sustainability. Is it too sophisticated? Is it too high-tech?

[4] Public Address System, including loud-speaker and amplifier

Level of the total cost for the slideshow equipment are almost equivalent to making some 500 copies of conventional health promotion posters in colored and full-sized version.

The slideshow activity in this project has clearly demonstrated several innovative advantageous points, which were hardly found in conventional communication means. Firstly, it can tailored-out health messages for the targeted village life. It is far more specific than any textbook information and thus familiar, acceptable and realistic to the people.

Secondary, properly arranged pictures are able to convey messages much clearly than thousands of words without difference of languages the local community has.

Thirdly, the displayed screen acts as a kind of mirror, which reflecting people's everyday experiences. It encourages people to review themselves objectively. Last point is for service provider's side. During the preparation as well as in the showground, a number of interactive opportunities are there. Thus make distance between MHC and community closer.

Computer technologies are evolutional. Most of us had never anticipated today's rapid extension of word processor, spreadsheets or e-mail a decade ago. Hesitation in introducing a new method of communication simply because it seems too "high-tech" would not be justified if it had rationalized advantages.

Significant advantages

- ✓ real scene of their own life (here and now)
- ✓ a picture can tell a lot (language barrier free)
- ✓ opportunity to review their daily life objectively
- ✓ chances for the health staffs to learn, to investigate, to understand more detail of the community's life

Costly?

Equivalent to 500 copies of conventional posters (coloured, full-size)

2) Laboratory Enforcement

The purpose is to enable microbiological test in Marigat DBVD laboratory. It is crucial part of the verification project in order to integrate bacteriological information into the community's empirical wisdoms.

2.1) Agony of A Lab Staff

In our second slideshow programme, regarding the Cholera outbreak episode in Kampi ya Samaki in 1999, we have included one slide which is to show the result of the laboratory test for the community's common water source contamination. On the night, that particular slide was shown blank at the test result information, accompanied with a comment that, "now the Marigat Health Centre Laboratory is undertaking microbiological test for your common water source". After the show, a lab staff indicated to the staffs that he felt very bad because he could not managed to achieve the goal within two weeks preparation period. It was a first sign that he was motivated to serve for a community's health in a manner quite different from the lab's everyday routine.

Towards the PHC laboratory
Information for the community
- water quality inspection (regular monitoring)
- early-warning (outbreak, epidemic)

A series of consultation took place. The lab has never done bacteria culture before. That lab staff showed us microbiology setup in his lab and mentioned lack of two items; an incubator and de-ionized water.

Table 2.10.2 Microbiology Setup at DVBD Laboratory, Marigat

Steps	Necessary tools/components
1. Sterilization	auto-clave[5], hot-air oven, electricity, water
2. Specimen reception	anaesthetic ether, stool containers, water containers, urine containers, snails containers, scoopers
3. Media preparation	weighing balance, de-ionized water, volumetric flasks, media holders (plates), gram-staining
4. Culture	incubator at 37°C, sensitive discs
5. Results reading	Microscopes[6], cultured specimens

2.2) Developing An Incubator

The lab staff asked us the possibility of supplying incubator from JICA. As the consultant denied, he started seeking from MOH instead. The consultant suggested him to try to make an "improvised" incubator. Famous Dr. Koch[7] maybe not equipped with electrical incubator which the MHC lab staff expected to have. There were some boxes and heat insulating materials kept after de-packing of donated equipment.

[5] One "Autoclave HA-300MD complete with accessories" has been supplied by the JICA study team in June 2000
[6] Two "Olympus Binocular Microscope CH-30-213E" and one "Olympus Binocular Dissecting Microscope SZ-4045" have been supplied by the JICA study team in June 2000
[7] Dr. Robert Koch, discovered Vibrio Cholera, Novel prized in 1905.

2.3) Fifteen Months

The discussion was repeated, in November on the Study Team's next visit. The MOH responded the MHC lab staff that they could not understand why such request came-up from a "lucky" lab receiving a donor's project. No action has been taken on the "improvised" incubator.

In September 2001, the last visit of the Study Team, we repeated that discussion again. We have finally agreed to take action forward to challenge the "improvised" incubator on 5th September. Then we started trial from following day. Day by day, as our trials going on, the other lab technicians also come to join our trials. The progress was rather rapid. After several failures, they have achieved 36°C constant overnight on 12th. And finally, the first bacteria culture has been performed in Marigat successfully on Sunday 16th. Needless to say, they were very proud of that.

2.4) Towards PHC Laboratory

The lab staff has been maintaining his higher motivation towards PHC since he participated the series of slideshow activities. On the Rugus's pan issue, he said that he should have known the community's life much before.

Public water quality inspection or regular monitoring is one important component for the PHC laboratory. Another important activity is early warning function against potential outbreak or epidemic. In July 2000, he had a chance to exercise it. He identified Schistosomiasis from one diarrhoea patient's stool sample. After the field inspection, he found that the source was Perekera Irrigation water canal. Immediately they have developed a slideshow programme on that, titled "Kichocho/Bilharzia 2000, A New disease spreading in Marigat!!"

2.10.3 Evaluation

1) Output / Outcome

1.1) Communication with the communities

Between June and November 2000 and except for the months of September and October, 2000, there were 11 slideshows that were conducted as shown in the table below:

Table 2.10.3 List of the slideshows

Target Community	Date	Comments
Eldume	June 14, 2000	Rain interfered with the show, the screen was small and low and no public address system
ampi ya Samaki	June 22,2000	No Problems
Loruk	June 26, 2000	The system frequently broke down and the team used the public address system more effectively.
Marigat Township	June 29, 2000	No problem
Loboi P. School	July 3, 2000	"
Loboi Township	July 3, 2000	"
Ngambo	July 5, 2000	"
Sandai	November 8, 2000	"
Eldume II	November 10, 2000	"
Kapindasim	November 14, 2000	"
Kampi ya Samaki II	November 16, 2000	"

a) People's voices

- What have learnt:
  - The causes of Cholera and how it spread
  - The way of preventing Cholera
  - Symptoms of Cholera
  - How to prevent Cholera
- Habits before the show:
  - Using bush for toilet
  - Drinking water directly from the lake without boiling
- Action after the show:
  - Building toilet & boiling water before drinking
  - Maintaining hygiene at home and neighbourhood
  - Wash hands when came from latrine

b) Medical doctor's observations

Diarrhoeal diseases have been reduced; higher in 2000, less in 2001. Because of,

- slideshow impact (health information)
- continuous health education (Baraza, school sanitation)
- rain wash

- proper treatment

1.2) Bacteriological Test

The first, historic bacteria culture has been performed on 16th of September 2001 in Marigat Health Centre Laboratory. It was Sunday. Since the lab staffs started on 6th, they spent their weekends for developing that incubator. They were exited and enjoyed during the trial, then happy and proud when they achieved by themselves.

Those happy moment create confidence, remaining in their mind longer and encourage next challenge whenever it arose.

1.3) Close Collaboration

Within Marigat Health Centre, “public health”, “clinic” and “laboratory”, close collaboration has been promoted.

Among stakeholders in the area such as CCF, Catholic mission, Word Vision, respective communities, multi-sectoral collaborations have been promoted.

2.10.4 Lessons Learned

An effective mass communication media, such as digital picture slideshow, is able to not merely disseminate health related messages to the public, but also catalyze strong interaction between the health institutes and target communities, and then motivate all health staffs, whether in public health or clinical or laboratory, along with the comprehensive Primary Health Care strategy.

2.10.5 Way Forward

The staffs in Marigat Health Centre are well motivated and keep their strong will to have close interaction with respective communities. In order to continue these communication activities, further external assistance is preferable in the form of slideshow equipment and computer training particularly for digital graphics.

Table 2.10.4 Evaluation of the Verification Projects: Strengthening Marigat Health Centre

1. Subject to Verify

Subject to Verify	*To examine if the comprehensive PHC concept can be achieved with effective mass media.*
Result	*1. It was recognized that mass communications (slideshow etc.) are vital component to fulfill MHC's r responsibility. (in order to serve community's health)* *2. The staffs in Marigat Health Centre are well motivated and keep their strong will to have close interaction with respective communities.*

2. Evaluation of Planning Stage

2.1 Situation Analysis of the Project Area	Hypothesis *People are seriously conscious about obtaining safe water.*	Changes / Lessons *It is true.*
2.2 Strategies / Approaches	*Demonstrate the health promotion slideshow in order to motivate health staffs to communicate.*	
2.3 Project Purpose	*Effective communication between health staffs and communities*	
2.4 Project Design	*1. Laboratory enforcement* *2. Communication with communities*	*1. The lab staffs are capable to develop "improvised" incubator* *2. All health staffs are very willing and motivated by the slideshow*
2.5 Input	*Laboratory equipment, digital slideshow technique*	*Additionally plastic bottles for the "improvised" incubator*

3. Monitoring & Evaluation of Implementation Stage

3.1 Encountered Difficulties	*1. The health staffs thought the study team was a paternalistic donor.* *2. Lack of a incubator* *3. PHO and some other staffs have been transferred*		
3.2 Countermeasures	*1. Repeated discussions on the study teams interest.* *2. Encourage and suggest the lab staffs to develop one by their own.* *3. Task rearrangement for smooth handover*		
3.3 Lessons Learned	Community *What is the MHC mean to them; its roll, capacity, stance and responsibility.*	GOK (MHC staffs) *Mass communications are vital component to fulfill their responsibility. (in order to serve community's health)*	JICA STUDY Team *1. Clearer understanding on common interests is the key for success*

4. Evaluation of Output and Outcome

4.1 Outputs (Indicators)	*Diarrhoeal diseases reduced. People's health knowledge enriched.* *11 slideshows have been performed. 4 slideshow programmes have been developed.*

4.2 Vertical Outcome (Outcome for the Stakeholders)	*One "improvised" incubator has been developed.* *Multi-sectoral collaboration promoted.*
4.3 Horizontal Outcome (Impact for the Surrounding Communities)	*Not applicable.*
4.4 Negative Impact	*Not observed.*

5. Way Forward

5.1 Way Forward	Community	GOK *Maintaining PHC policy with emphasis on the comprehensive PHC concept*	JICA Study Team *The staffs in Marigat Health Centre are well motivated and keep their strong will to have close interaction with respective communities. In order to continue these communication activities, further external assistance is preferable in the form of slideshow equipment and computer training particularly for digital graphics.*

2.11 Rural Water Supply (Upper Mukutani)

2.11.1 Background

1) Project Purpose

The main sources of domestic and livestock water supply in Upper Mukutani are seasonal/semi-permanent rivers, rainwater pools or unprotected springs where these exist. The purpose of the Upper Mukutani Rural Water Supply is to provide clean water for domestic and livestock use to the local community.

2) Subject to Verify

The verification purpose is to test how the community can implement, operate and maintain a rural water supply project on a sustainable basis, as well as to examine if the development can contribute to social stability where two tribes compete for the same source.

3) Strategies/Approaches

A strategy that combined community participation and initiatives from JICA Study Team/GOK was adopted. This entailed holding discussions with the local community with a view to identifying their priority needs and keeping them up-dated on various planning activities. These discussions affirmed that water was the main priority need in Upper Mukutani.

4) Community Situation

The Upper Mukutani Rural Water Supply Project is located in Mukutani Sub-Location of Mukutani Location in Mukutani Division. It is about 60 km from Marigat Town to which it is connected by an unpaved rough road. The project is expected to serve 13 villages embracing 224 households and two main ethnic groups, namely the Il Chamus who are the majority and the Pokot. Key statistics of the project area are summarized in Table 2.11.1.

The community's livelihood is largely dependent on livestock (goats, sheep and cattle) that is supplemented by limited irrigated crop production as well as bee keeping. Community members walk long distances (over 7 hours walk time) to distant markets in Marigat within Baringo and Matwiku in the neighbouring Laikipia District to sell their products (livestock, livestock products and honey). In return they buy domestic groceries such as sugar, maize and beans as well as clothes.

The main sources of water supply is Mukutani River, which is seasonal, and Il Pirisati Spring which is prone to contamination by livestock and wild animals.

Table 2.11.1 Key Statistics of Upper Mukutani

Village Name	H.H.*1	Population	Ethnic Group	Cattle	Goat	Sheep	Water Point
Kabikoki "A"	20	93	Ilchamus	100	250	80	M. River*2
Kabikoki "B"	12	74	Ilchamus	150	100	30	M. River
Lendorok	21	133	Ilchamus	60	150	10	I. Spring*3
Londiani	18	124	Mixed	1000	1500	60	M. River
Laitapak	19	93	N/A	500	800	100	M. River
Mukutani Center	21	N/A	Mixed	N/A	N/A	N/A	M. River
Ngarua	19	N/A	N/A	N/A	N/A	N/A	Other
Narapala	15	N/A	Pokot	N/A	N/A	N/A	Other
Akure	10	N/A	Ilchamus	N/A	N/A	N/A	Akure Pan
Loingran	11	56	Ilchamus	100	200	50	Other
Lorukon	13	80	Ilchamus	80	1000	80	Itwa River
Lelerai	17	74	Mixed	500	1200	100	M. River
Socion	28	N/A	N/A	N/A	N/A	N/A	N/A
Total	224	N/A	N/A	N/A	N/A	N/A	N/A

*1 Household; *2 Mukutani River; *3 IlPirisati Spring; N/A= Not Available

5) Geology, Hydrology and Groundwater of the Project Area

Mukutani Division is located on the Mukutan plains and part of the Laikipia Escarpment. The rock covering this area is generally phonolite, which, on the surface, has weathered into shallow loamy and gravelly rocks. This area is also considerably fractured with faults that provide good water recharge conditions.

The area is traversed by a number of largely seasonal rivers that include Komol, Tangulbei, Mukutani, Ol Arabel and Weseges that drain to Lake Baringo – Bogoria basin. In addition, tthere are 12 springs including Il Pirisati Spring in Mukutani Location.

2.11.2 Preliminary Project Activities

1) Water Resources Surveys

While maintaining regular consultation with community members, the Study Team/ GOK, conducted a water resources survey aimed at gathering information on the potential of existing water resources (surface and ground water) for a rural water supply. The collected information was analyzed and the results discussed with community leaders. On the basis of the results, it became clear that the most important water sources for the Upper Mukutani community were Mukutani River and Il Pirisati Spring. In order to compare the potential of these two water sources, respective water samples were drawn and tested in November 2000. Laboratory analysis was executed using 27 parameters and the results are shown in Table 2.11.2.

Table 2.11.2 Water Quality Comarison between Mukutani River and Il Pirisati Spring

No.	Parameters	Unit	Kenya < > desirable aesthetic quality	Kenya ( ) permissible aesthetic quality	WHO Guideline	Mukutani River	Ibersati Spring
Physical/Chemical Water Analysis							
1	PH	PH scale	<6.5-8.5>	(6.5-9.2)	-	8.4	7-
2	Colour	mg pt/l				150	5-
3	Turbidity	N.T.U	5		5	73	6-
4	EC	μ S/cm				1388	575-
5	Iron(Fe)	mg/l	<0.3>	(0.5)	0.3	3.1	0.5
6	Manganese(Mn)	mg/l	<0.1>	(1.0)	1	1.4	0.0-
7	Calcium(Ca)	mg/l			-	12.8	0.8
8	Magnesium(Mg)	mg/l			-	3.9	9.0
9	Sodium(Na)	mg/l	<200>		200	335	118
10	Potassium(K)	mg/l			-	8.8	5.8
11	Total Hardness (Ca+Mg)	mg/l	<500>		-	54	39
12	Total Alkalinity	mg/l			-	662	254
13	Chloride(Cl)	mg/l	<250>	(600)	250	3	22
14	Fluoride(F)	mg/l	<1.5>/3.0*1		1.5	5.3	0.9
15	Nitrate(NO3)	mg/l	10		50	0.7	0.3
16	Hardness (Ca)	mg/l			-	32.0	2.0
17	Sulphate(SO4)	mg/l	<400>		400	109.0	15.0
18	TSS(Total Suspended Solids	mg/l				215	12
19	TDS(Total Dissolve Solid)	mg/l	<1000>	(1500)	1000	861	357
20	Silica(Si)	mg/l			-	48.8	25.3
(B) Bacteriological Water Analysis							
21	Total Colonies, spc	CFU/ml	-	-	-	>6500	>6500
22	Coliform group (24hrs)	/100 ml	not detected	not detected	not detected	>2400	>2400
23	Coliform group (72hrs)	/100 ml				>2400	>2400
24	Faecal Coliform	-	not detected	not detected	not detected	>2400	4
(C) Heavy Minerals Analysis-							
25	Arsenic(As)	mg/l	0.050	-	0.01 ( )	<0.005	<0.005
26	Cadmium(Cd)	mg/l	0.005	-	0.003 ( )	<0.005	<0.005
27	Mercury(Hg)	mg/l	<0.001>	-	0.001 ( )	<0.005	<0.005

Note*1 : In exceptional cases a Fluoride content of 3 mg/l may be accepted in Kenya

Using “Kenya permissible (or desirable) quality standards”, the water from Mukutani River could not be recommended for drinking, largely because of its high turbidity, Iron (Fe), Manganese (Mn), Sodium (Na), Fluoride (F) and coliform count. On the other hand, water quality of Il Pirisati Spring almost met the Kenyan standards except for turbidity and coliform count. These defects could however be remedied through protecting the water source from contamination by livestock and wild animals.

The Study Team and GOK staff explained these test results to community leaders. It was then decided to develop Il Pirisati Spring as the water source for Upper Mukutani Rural Water Supply.

2) Discussions and Workshops

2.1) Preliminary Discussions and Activities

In February 2001, the first meeting was held between the community and GOK/The Study Team on how a community-based water project could be planned and implemented. The two parties agreed on a cost sharing formula that provided for the community to contribute the equivalent of 10% of project material costs.

A preliminary discussion was held on 18th June 2001 on the results of field investigations between the Study Team and GOK staff at the district and division levels (Department of Water Development, Department of Rural Development; Department of Social Services). Subsequently, the Study Team prepared design drawings for a piped water supply using Il Pirisati Spring as the water source. The Department of Water Development checked the drawings and prepared a bill of quantities. Three quotations were invited from different traders for supplying required construction materials.

2.2) Site Discussion in Upper Mukutani

Site discussions were held at Upper Mukutani on 2nd July 2001 among 17 representative villagers, the Study team, Department of Rural Development and Water Development staffs. The study team explained the project design including outline of the construction works.

It was then agreed as follows:

- The community contributions would be announced in a baraza to be held later after a cost estimate is determined
- The number of beneficiary (224 households) and livestock dependent on the spring water should be clarified, in order to establish the capacity of spring discharge to meet water demands of the community. Present water discharge is approximately 42-45 litres/min. and fluctuates between 40-100 litre/min in a year
- There are 10-15 acres irrigated by seven farmers downstream of the spring source and the community should control the water flow after water facilities are constructed
- The community indicated that they still stood by their promise on the workshop held on February 2001, to pay 10% towards the project cost as to contribute implementation labour
- Water Users Committee was to be organized with by-laws for operation & maintenance

- During the contribution of works, management committee will be responsible for mobilizing the community under the guidance of the technical staff from GOk or the Study Team
- Some artisans will be available from the community to assist technically in the project.

2.3) Explanatory Workshop

A Workshop was held on 6th July 2001 at Upper Mukutani Primary School with the aim of explaining the project design to the community and reviewing issues discussed during the February workshop. The participation comprised 61 community members (including only 3 ladies), the Study Team, Department of Rural Development, Water Development and Soil Conservation staffs.

A Plan of Action was explained to the community members and included division of responsibilities as follows:

- Community would provide all manual work, while the Study Team through GOK counterpart staff will provide technical support.
- The Study Team will supply all required materials of which 10% of the cost will be shared with the community.
- Two supervisors and one surveyor will be expected to supervise pipeline trench digging while another supervisor would oversee the construction works.
- Fitting pipeline works were to be carried out by a pipe fitter and plumber from the Department of Water Development.
- A mason would carry out construction of inlet, outlet, cattle-trough and thrust blocks with community contribution of labour under instruction of the supervisor.
- Since the technical staff will be resident at Upper Mukutani during the construction period, the community was to assist them locate accommodation as well a storage place for building materials.
- The Water Users Committee would be organized on 10th July 2001
- The Study Team would provide manual tools to the community, 10 pick axe/mattocks, 5 normal mattocks and 10 spades.
- The pipeline trench construction works was scheduled to started on 11th July 2001

2.4) Agreement on Project Implementation

On 12th July 2001, it was agreed that the verification project for Upper Mukutani Rural Water Supply was to be a collaboration effort between the community of Upper Mukutani on one hand and GOK/JICA Team on the other. The two parties made a formal agreement on mutual obligations as summarized in table 2.11.3.

Table 2.11.3 Sharing of Responsibilities between the Community and GOK/JICA Team

Obligations of Community	Obligations of GOK/JICA Team
(i) Identify spring users, villages and livestock numbers. (ii) Mobilize labour for all manual works during construction and maintenance of the water supply system (iii) Organize a Self Help Water Supply Group for operation and maintenance of the spring water supply system. (iv) Maintain a record of all community activities undertaken within the Verification project. (v) Undertake responsibility for sharing 10% of construction materials cost to JICA Team after completion of the construction by December 2001.	(i) Survey the pipeline and design the construction works (ii) Provide materials, technical advice, supervision and implementation of the construction works in cooperation with the community. (iii) Provide technical advice as requested on spring water management as well as any other aspects necessary for the successful conclusion of the Verification project (iv) Train community members and committees to acquire appropriate skills, knowledge, attitudes and values, for effective operation of the spring water.

3) Community Training

A one-day training session was held on 6th August 2001 by the Department of Social Services staff for 35 community members at Mukutani Primary School. The training was mainly focused on procedures for registering a self-help group that would operate and maintain the water supply system as well as on the duties of a management committee. The members discussed and agreed that the project would be registered in the name "Il Pirisati Self-help Water Project".

In addition, the community members agreed to hold consultations among themselves on:

- Community 10% cost sharing and strategies for collecting funds
- Role of the community in the project particularly as regards its participation in planning, implementation and monitoring project activities

2.11.3 Implementation Progress

1) Deliberation on Material Quotations

Discussions aimed at analysing the tenders for material quotations were held on 16th July 2001 at District Rural Development office by a panel consisting of the Study Team and GOk counterpart members (DPO, District of Rural Development, Agriculture, Water Development staffs). Quotations from three suppliers were opened and the Study Team informed all the members present that the key item for determining the successful tender would be the price of the two inch diameter galvanized steel pipe because of the large

number of this item (over 450 pipes).

It was agreed that some suppliers, after winning the tender on the basis of the lowest price quoted, deliver inferior products thereafter. It was pointed that a Nairobi factory price of at least Ksh 2,000 per pipe would act as a guide.

The panel reached a unanimous decision that the pipes will be bought from Rift Electrical & Hardware of Nakuru but the commodities should be counter checked for specifications before purchasing.

2) Construction Schedule and Progress

2.1) Pipeline

The community started digging the 2.7 Km pipeline trench on 11th July 2001 and completed on 21st July 2001. They also finished carrying pipes along the pipeline course on 3rd August 2001.

Pipefitting work was done during the second and third quarter of September. The Air valves along the pipeline and Gate valves at blow-offs were installed and protected with lockable concrete culverts.

2.2) Inlet and Cattle Trough

The community executed digging work for inlet structure on 16-19th July 2001. At the same time, the carpenter and mason, with assistance from the community, started working on the form-work and reinforcement bars as from 18th July 2001.

The construction of Intake structure and the first cattle trough were completed by the first week of September 2001. The second cattle trough was completed on 22nd September 2001.

2.3) Outlet

The outlet point was decided by the community and sited just beside the Locational Chiefs office at Mukutani Trading Centre.

Digging works for the outlet structure was started on 28th July 2001, and completed on 3rd August 2001. The construction works of the structure was commenced on 4th August 2001, and completed during the first week of September.

2.4) Interim Management Committee

The community selected 11 members (one representative from each village) that constituted an “Interim Management Committee”. The committee was expected to mobilize labour

during the implementation period and collect 10% cost sharing contributions from the beneficiaries. In addition, the Committee was to oversee operation and maintenance of the completed project as well as resolve any conflict with irrigation farmers particularly during the dry season when the discharge from the spring is low.

The Committee would also report any problems beyond its capacity to the Department of Water Development at Marigat or Kabarnet for support but at the community's expense. To facilitate such community support on maintenance, some maintenance tools that were procured by the Study Team at the time of construction will be kept at Department of Water Development at Marigat office. These tools will nevertheless be handed over as soon as the community has a secure storage place at Upper Mukutani and has identified a capable person who can take care of the tools as well as carry out routine maintenance services.

The progress achieved by the committee up to September 2001 is summarized in Table 2.11.4.

Table 2.11.4 Summary of Progress as of September 2001

Obligation	Progress as at September 2001
1. Identification of spring water users	- A start is being made on compiling a list of prospective water users
2. Organization of spring water management group	- A interim management committee has been established - Group by-laws for Il Pirisati Self Help Water Group have been made, discussed and endorsed - An application for registration was submitted to the Department of , Social Services and a certificate issued on 17th September 2001
3 No records of community activities have been kept	
4. All manual works during construction and maintenance of the water supply	Community has provided labour for: Clearing bushes; pipe off-loading and carrying; off-loading other materials; excavation works for inlet and pipe trench; fencing of inlet and spring; Not yet done : Re-filling of pipe trench; installing live fence of *karia-karia* and *rapai* around the spring area; excavation of out-let drain; learning how to handle tools and execute maintenance works - Turn out has been rather poor with an average of 6-8 persons per day
5. Contribution of 10% of construction materials cost	Not started yet

2.11.4 Encountered Difficulties and Counter Measures

1) Low Turn-out for Community Labour

There was a low turn-out for communal labour during project implementation, particularly by young men. This might be attributed to the fact that social preparation was insufficient and that the interim committee presently lacks authority over community members. In order to address this problem the committee, with support of the Department of Social Services at Marigat, will need to educate the community on the by-laws and their implications. Such education should stimulate members to pay registration and annual fees as per their newly enacted by-laws.

2) Other Organization Problems During Implementation

Other organizartion problems were :

- Lack of record keeping skills by the interim committee owing to high illiteracy level
- Participation limited to one ethnic community i.e the Il Chamus with little involvement of the Pokots.

3) Heavy Rainfall During Project Implementation

There was heavy rain during the months of July and August 2001 that necessitated frequent work stoppage at the project site. Furthermore, the Marigat –Mukutani road was at times rendered impassable thus preventing movement of construction materials and technical support staff to the Project site.

2.11.5 Lessons Learnt

1) By the Study Team/GOK

1.1) Community Participation in Water Resources Assessment

In the process of assessing available water resources, the Study Team used existing indigenous knowledge on the water situation in Upper Mukutani. This speeded the time for information collection and analysis of available options. The combination of locally available information and formal water assessment techniques (quantity, quality and source ranking) assisted in arriving at an optimal solution to the problem of community water supply.

In the case of Upper Mukutani Rural Water Supply, the community also participated in screening possible options (seasonal rivers, bore-hole, roof catchment etc). More specifically, the community contributed in identifying Il Pirisati Spring as the most suitable water source from the viewpoint of water quality, quantity, reliability, cost scale as well as operation and maintenance implications (cost, technical).

This use of local knowledge coupled with community participation in identifying appropriate water supply solution was a significant lesson for any similar project elsewhere in the country.

1.2) Need for Sufficient Time for Social Preparation

There is little evidence to suggest that the people of the project area have had experience in community organization spanning a wide geographical area and cutting across ethnic lines. For the Upper Mukutani Water Supply Project, the chief became the main agent for community mobilization. The Study Team, on the other hand, had only three weeks to implement the main project works, an exercise that took much of their energy. Hence community organization received less attention than it deserved. This partly explains the low turn out for communal labour as well as during formulation of the by-laws.

This lack of sufficient social preparation is likely to weaken the community's unity and hence their capacity to effectively operate and maintain the project. For this reason, GOK will need to provide considerable follow-up support with the aim of strengthening the self-help water group.

The main lesson to learn is that as far as possible, sufficient time should be allowed for social preparation of the community in advance of the project works. This preparation should include reaching a consensus with the community on work scheduling as well as pre-construction payment of a portion of their cost sharing contribution.

1.3) Timing of Project Activities and Competing Household Tasks

In a pastoral situation, the first part of the morning is taken by livestock-related tasks such as milking, inspecting the herd for sickness and organizing grazing strategies for the day. Meetings for Project activities were often scheduled for mid morning. Perhaps attendance could have been improved by timing of meeting or communal labour for the second half of the morning.

1.4) Chief versus Project Management Committee

In a typical rural environment in Kenya, a chief is an important community gate-keeper (other gate-keepers are local informal leaders such as elders, local teachers etc.) who guard entry into the community by outsiders (GOK/donor staff etc). For development promoters/facilitators, a chief can offer valuable orientation regarding the general situation of the project area as well as in initial mobilization of community members. For the Upper Mukutani Rural Water Project, the chief provided this assistance but also more. He was centrally involved in mobilizing community members for communal labour thus rendering the interim committee redundant.

It was observed that the interim Committee chairman would hardly say anything in the presence of the chief. However, for three days when committee members were formulating the by-laws with support from the Study Team/GOK staff, the chairman opened up and gave some very useful contributions. Mercifully, the chief was absent during these three days.

The lesson that may be drawn is that a hyper-active chief, with all good intentions, may reduce the capacity of a group committee to grow in confidence and leadership. In this regard, there is need to work towards a balance between a chief's eagerness to get work done and a committee's slow but steady development of their leadership skills. In way of achieving this balance, a leadership and management training session, attended by the chief and committee members should be held where respective roles can be discussed and agreed. For instance, the chief's direct role could be high initially but should quickly reduce as soon as a committee is formed.

1.5) Domesticating Technological Innovations

During fitting of a *"bend"* and a *"tap"* at the out-let, curious members of the local community would stand and watch with obvious amazement as the technician wielded two exotic tools i.e *pipe ledges.* On the basis of an interview with the interim management committee, the community perceives the technology of installing the water supply system as remote and mysterious. Indeed for most of the people, this is the first time to witness gravity driving water down a long conveyance pipe. This attitude is likely to constrain the community's capacity to maintain the system.

The lesson to be drawn is that training of community members should be done from the very beginning. This could be started by entrusting selected community members with carrying and handling the tools and then following this by teaching them how to undertake simple tasks like connecting a pipe to a socket. This progressive initiation should lead to confidence building and eagerness to participate in the implementation process. If effectively done, such training should lead to ***domestication of the plumbing technology*** and less reliance on external support from the Department of Water Development during the operation and maintenance phase.

2) By the Beneficiary Community

In an evaluation workshop, the community indicated they have learnt the following lessons:

- The learnt that water can be moved by gravity some times up-slope so long as it is confined in a closed pipe
- They learnt to come together and deliberate on an issue of common interest to community members

2.11.6 The Way Forward

By and large, the Upper Mukutani Water Project is almost complete and the community is currently drawing fairly good quality water from the stand pipe and out-let. However there are a few finishing touches still remaining including the issue of 10% cost sharing as well as post implementation operation and maintenance. Since the Study Team had departed at the end of September, the way forward for the community and GOK is as summarized in table.

Table 2.11.5 Breakdown of the Way Forward for the Community and GOK

Community	GOK
(a) Interim Committee to mobilize community for re-filling the pipe line trench, deepening drainage channel at the out-let and planting live fence at intake (b) Interim committee to assign some three persons located near the pipeline with monitoring of any malfunctioning of the pipeline (c) Interim Committee to appoint two young men for training in handling plumbing tools by staff of Department of Water Develoment (d) Interim Committee to liase with Department of Social services in holding a general meeting aimed endorsing or re-electing committee members (e) Committee members in conjunction with Staff of Department of Social Services to sensitive community about by-laws of the Self-help Group with particular emphasis on registration fees and annual payment (f) Committee to prepare an annual plan for operating and maintaining the water supply system including a budget (g) Community to deliberate on extension of water supply to school and dispensary as well development of other water sources eg Lelerai for villages not covered by present project	(a) Department of Water Development to train two young men as advised by the Committee on handling plumbing tools (b) Department of Water Develoment to transfer routine plumbing tools to the Committee (c) Department of Water Development to training committee on operation and maintenance requirements and give to them the relevant manual (d) Department of Water Development to provide technical support at the community expense when called upon by the Committee (d) Department of Social Service to train committee members on management and leadership skills and assist them in sensitizing community members on by-laws of the Group

Table 2.11.6 Evaluation of the Verification Projects: Rural Water Supply (Upper Mukutani)

1. Verification Purpose:

Verification Purpose	To examine if the development can contribute to social stability where two tribes compete for the same source.
Result	***Though the project only recently implemented and it is too early to make a conclusion one way or the other, so far the facility has been well used by Il Chamus and Pokots and no significant conflict between the two ethnic groups has occurred.***

2. Evaluation of Planning Stage

	Original	*Change on the course of implementation*
2.1 Situation Analysis	*Water is a priority felt need at Upper Mukutani and considerable time (mostly women) is spent walking long distances fetching water*	*No Change*
2.2 Strategies/Approaches	*1.Two social preparation workshops* *2.Use of indigenous knowledge on water resources planning*	*No Change*
2.3 Project Purpose	*Provide clean and safe water to community members*	*No Change*
2.4 Project Design	*1.JICA/GoK to supply material and technical expertise* *2.Community to establish a management committee mobilizing implementation labour* *3.Main project components to consist of: fenced intake and spring; 2.7 km two inch pipeline, outlet with storage tank fitted with ball valve and tap; Stand pipe mid-way along pipeline; one cattle troughs*	*No Change*
2.5 Input	*Pipes, cement, Sand , culverts, plumbing accessories*	*An extra cattle trough was installed next to the standpipe, mid way along pipeline*

3.Monitoring and Evaluation of Implementation Stage

3.1 Encountered Difficulties	*1. Inadequate social preparation reduced attendance of community members for manual labour* *2. The committee was inexperienced and kept no records owing to committee members being semi-literate* *3. Community members turned late for meetings and for work* *4. Unusually heavy rains slowed implementation works* *5. Insecurity regarding brought material eg six pipes were cut with hack-saw* *6. Breakage of pipeline at joint because refilling of pipe trench was delayed thus exposing pipeline to heat and expansion*		
3.2 Counter measures	*1. One training session for the community was undertaken but was not enough* *2. Chief Mukutani location took over from the committee the task of mobilizing community*		
3.3 Lessons learnt	*Community*	*GoK*	*JICA Study Team*
	1. Water can be moved by gravity some times up-slope so long as it is confined in a closed pipe. *2. Pooling efforts by community members can yield better results than what an individual can* *3. Coming together can help community members to deliberate on an issues of common interest*	*1. Training for operation and maintenance should start early before completing project implementation.*	*1. Collaborating with community in gathering water rsources information can shorten project planning period.* *2. Need for implementation schedule that is less rigid.* *3. Advisable to provide for adequate social preparation period.*

4. Evaluation of Out-put and Outcome

4.1 Out-puts (Indicators)	*1. Construction of water supply system completed (intake, pipeline, storage tank and out let, stand pipe and taps, two cattle troughs.* *2. Clean water is available from the out-let located at the Mukutani center and five other villages.* *3. Some 80 households or 400 people estimated to be drawing water from the two water supply taps daily with two villages cutting water fetching distance by 2 Kms.* *4. There has not been sufficient time to monitor trend in water-borne disease.*
4.2 Vetical Out-come (Outcome for the stakeholders)	*1. None identified so far; Perhaps its too early since project has just recently been completed.*
4.3 Horizontal Outcome (Impact for the surrounding communities)	*1. The community located near the hills would like a similar project using Lerlerai Spring.*
4.4 Negative Impact	*1. Obstruction of natural water courses by the pile and thrust blocks which is likely to cause bank erosion.* *2. Conflict with 8 irrigating farmers particularly during dry season.*

5. Way Forward

	Community	*GoK*	*JICA Study Team*
5.1 Way Forward	*1. Interim Committee to mobilize community for re-filling the pipeline trench, deepening drainage channel at the out-let and planting live fence at intake.* *2. Interim committee to assign some three persons located near the pipeline with monitoring of any malfunctioning of the pipeline.* *3. Interim Committee to appoint two young men for training in handling plumbing tools by staff of Department of Water Development.* *4. Interim Committee to consult with Department of Social services in holding a general meeting aimed at endorsing or re-electing committee members.* *5. Committee members in conjunction with Staff of Department of Social Services to sensitive community about by-laws of the Self-help Group with particular emphasis on registration fees and annual payment.* *6. Committee to prepare an annual plan for operating and maintaining the water supply system including a budget.* *7. Community to plan for extension of exising project to service the school and dispensary as well as develop new similar projects eg Lelerai spring.*	*1. Department of Water Development to train two young men as advised by the Committee on handling plumbing tools.* *2. Department of Water Develoment to transfer routine plumbing tools to the Committee.* *3. Department of Water Development to training committee on operation and maintenance requirements and give to them the relevant manual.* *4. Department of Water Development to provide technical support at the community expense when called upon by the Committee.* *5. Department of Social Service to train committee members on management and leadership skills and assist them in sensitizing community members on by-laws of the Group.*	

2.12 Learning from Best Practices

2.12.1 Background

> "If we could get a donor support, it's good, but if not, it doesn't matter. We have our own work plan, which basically relies on our own internal resources."
>
> Mrs. Jane Kibiego
>
> Chairperson, Fruit Production Group, Keiyo
>
> (Mrs. Kibiego and her Group were trained by SARDEP experts)

At the end of the Phase I Study, i.e., the submission of the Preliminary Master Plan, the Study Team established many hypotheses on the ways and means for realizing rural development and poverty reduction in the study area. Among those, the most important for the administration systems were as follows:

- There is an acute need for introducing true political, fiscal, administrative and market decentralization, and the most important of all is the fiscal decentralization
- The best starting point of reform for decentralization is the awareness building, which can best be promoted through **learning from best practices ('seeing is believing').** The biggest lesson to be learned would be community mobilization and the spirit of self-help.
- There is a need to adopt both bottom-up and top-down approaches, but currently there is a huge gap between the tips of the two arrows. The best meeting point of these two directions is at the divisional level rather than the district level as advocated in the District Focus for Rural Development (DFRD) or draft Kenya Rural Development Strategy (KRDS). Thus, there is a need for **"Divisional Focus for Rural Development (Div.FRD)".**

In order to verify the second hypothesis, a series of study tours was included in Phase II (the verification studies) to kick off the awareness building activities under the general capacity building of administration staff. The objective of the Study Tour was to learn from best practices under circumstances similar to Baringo, and apply those to the planning of participatory rural development in Marigat and Mukutani Divisions. It was also envisaged that a follow up workshop of the participants would take place to review what actions were actually taken at the local level after the study tour. These activities were to be closely coordinated with other workshops for administration officers such as the one on decentralization.

2.12.2 Record of Implementation

During Phase II, the following activities took place for the general capacity building of administration staff:

- Two study tours (the first in March/April 2000, and the second in May 2000)
- A follow-up workshop for the participants of the two study tours (November 2000)
- A workshop on decentralization and community-based rural development (November 2000)

Both first and second tours visited the following three projects, namely:

- **Semi Arid Rural Development Program (SARDEP)** in the Keiyo District in the Kerio Valley (assisted by the Netherlands government)
- **Social Forestry Extension Model Project (SOFEM)** in the Kitui District (assisted by JICA), and
- Samburu District Development Project (SDDP) in the Samburu District (assisted by GTZ).

The preliminary selection of the best practices was made during Phase I based on the following criteria: a) being located in semi-arid lands, b) having a good track record of achieving effective community mobilization, and c) having something new or relevant to show in terms of technologies being used, organizational set up, incentive systems, etc. The above three projects were chosen after extensive consultations with government officials, NGOs, and donor communities.

During the preparatory period, the Administration Systems Specialist, together with a counterpart, made a preliminary visit to all the three projects. These preliminary visits turned out to be crucially important. At the outset of Phase II, it was agreed at the District Working Group that the participants would be selected from the Inter-Ministerial Steering Committee, District Officers, Divisional Officers, and local leaders (Chiefs, Sub-Chiefs, elders, teachers and other community leaders) of those locations which were included in the verification studies. For the First Tour, selection of participants from the local communities was made through a series of workshops convened at the outset of Phase II for planning the verification projects in Arabal, Sandai and Kampi ya Samaki locations. For the Second Tour, however, because of the overwhelming requests from those leaders of the locations not included in the verification studies, the Study Team decided to extend the coverage to other locations. However, the total number of participants had to be kept at 21 because of the budget limit.

1） The First Study Tour

For the First Study Tour, what actually took place was remarkably close to the planned schedule. We started the registration and orientation in the evening of Sunday, March 26, visited SARDEP Monday, traveled to Kitui on Tuesday, visited SOFEM on Wednesday, traveled to Maralal on Thursday, visited SDDP on Friday, and returned Baringo on Saturday, April 1.

1.1） Visit to SARDEP – Keiyo District, Kerio Valley

The SARDEP, which used to be known as Arid and Semi-Arid Land Program (ASAL Program), was first launched in 1982 and has been sponsored by the government of the Netherlands in four phases:

- ASAL I 1982-1987
- ASAL II 1990-1994
- ASAL III 1995-1999
- SARDEP 2000-2002

It was only at ASAL III that the program established a workable model, which was based on what they called 'the Transect Approach'. It focused development on an area demarcated by hydraulic boundaries rather than administrative ones, though taking account of the latter as much as possible. This was done with the understanding that unless the program area included the high lands and escarpments above the valley bottom (the original program area), the environmentally sustainable integrated area development was not possible. The program created an effective organizational structure, developed a system of highly participatory implementation, and above all, created a remarkable sense of self-reliance and ownership among the local participants.

The visit to SARDEP on March 27 commenced at the AIC Training Center in Cheptebo, where we received a general briefing from the SARDEP team and visited the demonstration farm adjacent to the center. Presentations were first class and an active Q&A session followed. In the afternoon, the team was divided into two groups and visited various gravity schemes and fruit production groups. The SARDEP hosts prepared an excellent program for us and all the participants were favorably impressed by the project, in particular by the motivated farmers (see the box at the beginning of this section) and the institutional framework of SARDEP. Farmer-to-farmer dialogue was especially effective.

1.2） Visit to SOFEM/KEFRI – Kitui District

The Social Forestry Program in the Kitui District started in 1985 with JICA assistance. The overall goal of the current phase, the Social Forestry Extensions Model Project for Semi-arid Areas (SOFEM), is to equip the inhabitant of semi-arid areas in the Kitui District with the appropriate technology to plant and tend the trees through the development of social forestry. SOFEM was particularly relevant for Baringo because of the knowledge that the area farmers had already acquired thanks to the Project and could share those with the Baringo participants on a farmer-to-farmer basis.

On March 29, we visited SOFEM in the KEFRI compound in Kitui Town. Again, the hosts were well prepared and we received excellent briefing followed by eye-opening field visits, which included women's groups, small nursery, Enzaro jiko (actually in use by

farmers), core farmers' farms where private tree planting was under way, water catchments, solar cooker, and a pilot forest. Perhaps the most interesting, however, was the SOFEM's Demonstration Farm (Demo II) where all kinds of new (and appropriate) technologies were displayed. The participants were animated by all these demonstrations and active discussions followed.

1.3) Visit to SDDP – Samburu District

SDDP started in 1992 as a food security program with assistance from GTZ. This program was very relevant to Baringo because of its similar agro-climatic conditions including some devastating effect of the droughts. Under such harsh conditions, the local community rehabilitated (by hands) a large pan during the height of the dry season, which was something to see for the Baringo participants.

On March 29, we visited SDDP project. The effect of the drought was obvious, and we could see virtually no agricultural activities: everybody seemed to be preoccupied with securing drinking water for survival. After the general briefing, the SDDP Team took us in two groups to some primary school building projects and pan rehabilitation projects as well as meetings with local (Samburu) farmers, who briefed us on their various committee activities. Although the field visits were less well prepared than SARDEP and SOFEM programs, the visit was extremely relevant because of the closer similarity to Baringo in terms of economic, environmental and social conditions in Samburu. The participants were surprised to see silt removed by hand by the local communities of a large pan in such a dry condition, although the work was supported by 'Food for Work' program.

1.4) Wrap-Up Session

On the last day of the Study Tour, we had a two-hour wrap up session. The team was divided into three local community groups, divisional officers' group, district officers' group and a one man 'group' of the IMSC, and discussed what were the major lessons learned during the entire trip and what actions they would recommend to their communities or offices. After the small group discussions, a plenary meeting heard the report from each of the groups.

1.5) Post-Tour Questionnaire Results

Questionnaires were circulated before and after the Study Tour. Rating was made on a scale of 1 to 5 (1 poor, 2 fair, 3 good, 4 very good, and 5 exceptionally good). The weighted average score was 4.35, an extremely high score in deed. Among the three best practices, SARDEP was rated highest both in terms of relevance and lessons learned.Among the various sessions, the wrap-up session was rated highest. Regarding the length of the Tour, about 80 percent considered it about right. There was no gender bias on this issue. On the logistic side, while transportation was rated high, food and beverages were given a low mark, especially the lunch box was unpopular. The

participants also found the hotel accommodation in Maralal poor, although it was the best available in town.

2) The Second Tour

The second Study Tour took place in May 2000. Some improvements were introduced to the program learning from the experience of the first tour, namely, the sequence of the visit was changed to go to SDDP after SARDEP, and then to SOFEM, which enabled cutting the duration of the tour by one day. Compared to the participants of the first tour, the second tour participants were generally more senior and held very influential positions (many of them location chiefs and county councilors). They were more critical of specific aspects of the tour than the first group, but they rated the tour as a whole higher than the first group, i.e., an average score of 4.65.

3) The Follow-Up Workshop on Study Tours

The workshop took place on 8-9 November 2000 with 40 participants of the two tours. The objectives of the workshop were:

- To hold a reunion of the former participants and maintain the network
- To review what follow up activities had been taken actually by each Location regarding the action plan prepared at the end of the study tour
- To make recommendations for further follow up

The participants actively compared notes on how much each Location had achieved with regard to the Action Plan, and analyzed the reasons for achievements or non-achievements. The major issues identified were financing of local initiatives and monitoring of such activities particularly on handling of funds. More training of community members was considered essential. They also felt continuation of subsidies would still be required. Nobody knew for how long. They rated the follow up workshop highly and wished to continue such reunion as well as the study tours.

4) Workshop on Decentralization and Community-Based Rural Development

As mentioned in the background, the Study Team considered decentralization a key for improved administration systems in the project area. It was imperative, however, that all concerned had a clear understanding of what decentralization was, and moreover, of how to actually institutionalize decentralization effectively and sustain it. Against this backdrop, GOK and JICA decided to add a 'Workshop on Decentralization and Community-Based Rural Development' as one of the new components of Phase II.

The Decentralization Workshop was conducted during 15-17 November 2000 in Kabarnet. The objectives of the workshop were:

- To learn how to institutionalize decentralization and community-based rural development effectively
- To learn about Kenya's and Baringo's experience in decentralization
- To identify key issues regarding decentralization in the Marigat and Mukutani Divisions and recommend possible solutions
- To enhance capacity of the participants to initiate, consolidate and manage policy and institutional reforms for decentralization

The participants were selected from the Inter-Ministerial Committee, District Working Committee, Divisional Working Committee and civil society and community leaders. Some 40 persons attended the workshop. Three resource persons were invited from outside, aside from the Study Team members, and made presentations on various topics. Much of the training materials were prepared by the Administration Systems Specialist, who in turn used some of the World Bank Institute's materials in addition to his own.

In the action-packed two-and-a-half day workshop, the participants learned about the basic theories on decentralization as well as the experience of Kenya and Baringo, and identified issues and possible solutions for Marigat and Mukutani in institutionalizing decentralization. The workshop was generally well received and it was recommended that such workshop be repeated in future with more participation of beneficiaries.

2.12.3 Encountered Difficulties

During the entire period of the Study implementation, our counterpart personnel, be it from the Central Ministries or District offices or Divisional offices, complained about the total lack of operating costs in their offices to participate in the study implementation. They demanded per diems be paid by JICA as well as free meals and hotel accommodations, where applicable. The Study Tours were no exception. At the orientation of the first study tour, representatives of the participants appealed to the Study Team that they be paid some incentives (pocket money) to participate in the tour. Aside form the government officials, even other participants demanded to be paid, because, a) attending a week-long study tour would deprive them of earning daily incomes from their works, and b) it was the local custom that if one was away from home for so long, he was required to purchase souvenirs to his families and friends. The Study Team explained that they could not pay such incentives because a) it was against the worldwide JICA policy, and b) the participants were already given free transport, free meals, free lodging and above all free information and experience seldom offered to them. The Study Team never paid pocket money as such, but it was a source of contention throughout the tours particularly with government officers.

Another difficulty encountered was the general frustration expressed by the central government officers. More than once they expressed their displeasure that they were somehow sidelined by the Study Team and were not given due respect normally accorded to

central government officers, for example, better hotel accommodations than those for normal participants. Further, they felt that under the spirit of 'Divisional Focus for Rural Development', too much attention was given to the divisional level and as a result the central government officers were neglected. Their frustration was even heightened because of their total lack of operating budget to visit the project sites unless being accommodated by the Study.

2.12.4 Lessons Learned, Outputs and Outcomes

The participants in the study tours indicated many lessons learned, among others,

- community mobilization based on people-centered, bottom-up, participatory approach (all the programs they visited)
- transect approach (SARDEP)
- effective use of demonstration farms and training centers (SOFEM)
- selection of individual farmers for demonstration (SOFEM)
- utilization of appropriate technologies such as Enzaro jiko, water-harvesting, disease and pest control (SOFEM)
- organizational structure to mobilize communities such as Project Management Committee (SARDEP) and District Inter-sectoral Committee (SDDP), and
- training villagers to become para-professionals such 'para-veterinarians' (SDDP).

The participants also indicated their plan to share the lessons learned with their own communities. Each Location prepared an Action Plan to be carried out after the study tour. The group from Arabal Location, for example, came up with the following action plan:

- Divide Arabal into 5 transects
- Create awareness in all the 5 transects
- Mobilize existing and new groups
- Elect Project Management Committee (PMC) in every group
- PMC to prioritize projects in their community
- Project groups to provide land for demonstration and training centers
- Select individual farmers for demonstration
- Organize study tours for learning from best practices.

The Arabal Chief's report at the Follow-up Workshop indicated that in fact all the above plans were put to practice within six months after the study tour. However, not all the locations actually put their action plans into practice. The actual achievements made varied from location to location. Naturally, those locations chosen to have verification studies achieved a lot more than other locations as they were supposed to. Nevertheless,

some locations not selected for conducting verification studies still made tangible achievements, e.g., improved cooking stove in Eldume (they even improved the design of Enzaro jiko to suit their smaller kitchen). For those locations not selected for conducting verification studies, the 'Expanded Monitoring and Evaluation' was devised, in which they monitored and evaluated the progress of the verification projects in other locations. This achieved a remarkable demonstration effect.

The participants from those locations where relatively little achievements had been made, they sited the reasons to be drought and lack of resources, especially financial resources. Lack of transparency, accountability and political interference were also cited. It was interesting to note that the participants were not entirely clear about the exact role of the government in this process, although they did acknowledge their contribution.

Study tours were followed by many other study tours for more specialized groups, such as women's group from Kampi ya Samaki to learn about Enzaro jiko and handicrafts, Partalo rainfed farmers to observe water conservation techniques in Machakos, Marigat Polytechnic teachers and students to see more successful polytechnics, etc. "Seeing is believing" turned out to be most true, and those various study tours proved to be the most useful tool for awareness building and participatory action planning.

The choice of the best practices was balanced and adequate. However, one thing common to all the three projects we visited was the presence of a big donor behind each project, who provides a significant amount of cash grant every year. It would be interesting to know what would happen after such grant funding ceases (2002 for SARDEP, 2002 for SOFEM, and 2000 for SDDP). Notwithstanding the future uncertainties, those projects have contributed in training and motivating the local communities enormously, and their impact would be felt for a long time to come. It was indeed this community motivation and mobilization (particularly how they started the ball rolling) that the JICA Study Team wished the Tour participants to learn, and to a great extent this objective appears to have been achieved.

The workshop on "Decentralization and Community-based Rural Development" revealed several issues related to decentralization. Those issues and possible solutions cited by the workshop participants are summarized bellow:

Issues	Possible Solutions
Lack of **transparency and accountability** at all levels: • At the community level, it was not clear what was the total cost of the verification project, e.g. Sandai irrigation, which resulted the community in hesitating making 30% cost sharing (30% of what?) • True level of contribution by government and communities is not reflected in budget and planning	Involve all stakeholders at the planning and budgeting stage: • In particular, involve community at the workshop not only in activity planning but budget planning • In doing so, all forms of contribution, i.e. land, labor and local materials, should be valued
Lack of **communication** at all levels: • while the communication between JICA Team and Divisional Officers and Location Chiefs seems to be good, often District Officers and particularly Nairobi Officers are not well informed • the communication between Division Officers/Location Chiefs on one hand and Sub Locations and villages on the other is not good	• Due to lack of budget, it is recognized that frequent participation of Nairobi officers in activities being done at the project level is difficult, but • District Working Group should be convened monthly, and where some transportation happens to be available Nairobi officers should participate • Creation of Village Development Committee should be considered
Capacity building at all levels: • Especially training of Project Management Committee members is lacking, e.g. training of PMC treasurers in fund management • This workshop on decentralization is good but more officers and especially beneficiaries should be trained on the subject	• Learn form SARDEP: they have well established system of project proposal, project approval, budgeting, cash-in cash-out ledger, implementation schedule, monitoring sheet, etc. • Organize more workshop of this kind (decentralization) and include beneficiaries
Unclear **ownership of land:** • Kampi ya Samaki Multi-purpose building	• Get title deed for the building
Sustainability of verification projects: • Financial sustainability • Organizational/institutional sustainability, e.g. weak bylaws and its enforcement • Political sustainability, e.g. political interference that might jeopardize community's majority wish	• Continuation of some form of subsidy by donors • Scale down continuation to the level where the community can maintain with available resources • Capacity building of all stakeholders, but especially key persons in community, e.g. PMC members

The last item, sustainability, was the toughest issue. Even for such modest projects as our verification projects, the participants were unsure if they could be sustained without any outside assistance. The most serious of all was the financial sustainability. The Kampi ya Samaki multi-purpose building, for example, was constructed with 90 percent subsidy by JICA. While that was the initial capital cost, can the community operate and maintain it

without any form of donor subsidy? What about Sandai Irrigation Scheme? What about the Livestock Improvement in Arabal and Sandai? What about the Marigat Health Centre? Nobody was sure in the workshop about the extent of the subsidies needed and for how long.

2.12.5 The Way forward

After completing the Phase II, and having verified the hypotheses established at the end of the Phase I, the Study Team recommends inclusion in the Master Plan of a Capacity Building Program for participatory rural development, which consists of the following projects:

- Learning from Best Practices: continuation of study tours
- Training on Participatory Planning and Project Management: continuation of training on PRA,RRA, PCM and Project Management
- Local Awareness Building Campaign in Support of KRDS
- Strengthening of the Marigat/Mukutani Divisional Office
- Perkerra Integrated Development.

As to the 'Learning from Best Practices', the study tours to the SARDEP, SDDP and SOFEM should be continued under the Capacity Building Program. Study tours could also be organized to other areas such as Kajiado, Machakos, Meru (near Isiolo), Makeuni (Israeli-assisted scheme), West Pokot, Rangwe (Kisumu) and Narok. These study tours could be included in the first 5-year of the Master Plan implementation.

Learning from Best Practices is now a proven and powerful mechanism to keep motivating the local communities for adopting new way of life and various innovations. It is worth continuing the momentum created during the Study.