No.

JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA)

MINISTRY OF AGRICULTURE AND RURAL DEVELOPMENT
(MOARD)

THE STUDY
ON
THE INTEGRATED RURAL DEVELOPMENT PROJECT
IN
THE BARINGO SEMI ARID LAND AREA
(MARIGAT AND MUKUTANI DIVISIONS)
IN
THE REPUBLIC OF KENYA

FINAL REPORT

VERIFICATION STUDY

MARCH 2002

SANYU CONSULTANTS INC.

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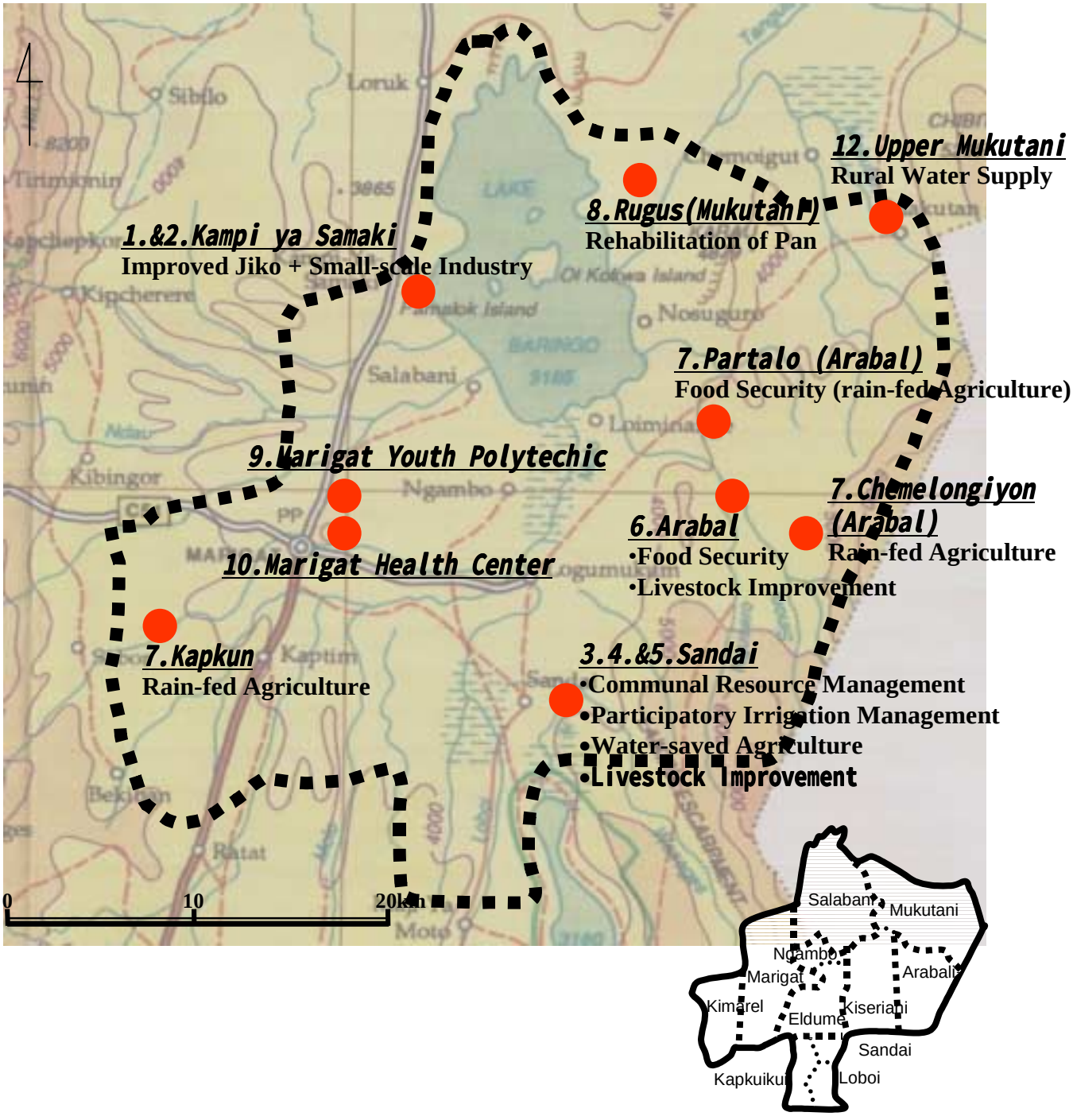
Location Map of
The Verification Projects



1. Promotion of Improved Jiko

Energy Efficient
Saving Cooking Time

2. Improvm't of Rain-fed Agriculture

Partalo: 9acre(6F+WG)
Kapkun: 10acre(17F)
Chemorongion: 10acre (16F)

3. Improvement of Bucks

Arabal & Sandai Locations
Introduction of Improved Bucks

4. Improvement of Dip

Arabal & Sandai Locations
Equipment Provision

5. Pan Rehabilitation in Rugus

Beneficiaries: 60HHs

6. Participatory Irrigation Manag't

Sandai Location
Beneficiaries: 240 HHs
Area: 290 ha
Incl. Land Leveling (see up-right)

7. Promotion of Small Scale Industry

Kampi ya Samaki

Muungano W.G.
420 membership

8. Rural Water Supply

Upper Mukutani S. Location

80 HHs Beneficiaries

Source: spring

9. Strengthening of M. Youth Polytechnic

Equipment Provision

10. Strengthening of M. Health Centre

Slideshow

Summary of the Verification Projects

1. Small-Scale Industry（Kampi ya Samaki）

1. Background

Kampi ya Samaki is a place blessed with high potential of business including tourism and fish. People in this area are highly diversified with different ethnic groups and different businesses. Women here have been engaged in small-scale businesses to supplement their household income.

2. Subject to Verify

1. *To examine if women could utilize, through a group activity, their resources (tourists, fish, honey, handicrafts) to generate income sustainably.*
2. *To examine if capacity building of women could be realized through the preparation of multi-purpose building and business, so that their various own development activities go on in dynamic way and continuously.*

3. Input

1. *Allotment of 1,000m^2 plot from Baringo County Council (Ksh3,200 including site planning, land survey, inspection and provision of certificate, 100% of cost borne by the women's group)*
2. *Multi-purpose building of 210 m^2, six rooms and a kitchen (Ksh1,350,000 (10% of cost, Ksh135,000, borne by the women's group) + Ksh207,915 for the extra cost (Ksh4,010 borne by the women's group))*
3. *Electricity wiring, Ksh87,000 (10% of cost, Ksh8,700, borne by the women's group)*
4. *Toilet, Ksh65,000 (10% of cost, Ksh6,500) borne by the women's group)*
5. *Utensils, honey bottles, labels and beehives for business (100% of cost, Ksh30,198, borne by the women's group)*
6. *Leadership trainings (leadership, general management and election), technical trainings (handicraft, honey and fish processing), and business trainings (financial management, business skill and budget planning)*
7. *Study tour for handicraft marketing to Nairobi and Mogotio*

Note: The women's group had finished all the repayment of Ksh184,408 (Ksh460/woman) to JICA and Ksh3,200 for land acquirement. They were during the course of fund raising of about Ksh400/woman for business operation)

4. Implementation Process

1. *United women's group of 401 members was organized for the construction of multi-purpose building and business operation.*
2. *The building construction was completed in the end of September 2001, delayed for ten months from the initial plan because the contractor did not execute the contract due to price escalation of materials and opaque management of money. Finishing work of rear three rooms was carried out under the control of women's group, rather than contract base between JICA and contractor.*
3. *Series of trainings and study tour were provided on time and utensils and materials for business operation were also purchased as planned.*
4. *Business start delayed due to the construction delay and size of the building was too big to start with. Business finally started with a handicrafts & honey shop in September 2001.*
5. *At the initial stage of business operation, stock of handicrafts and honey were limited. The climate condition was the factor to have limited the resources of honey and plant materials for handicrafts.*

5. Output (originally expected/programmed)

1. *Existing 18 small women's groups were united to form Lake Baringo Muungano Women Self-help Group with 401 members.*
2. *Building (see photo) and toilet construction were completed by September 2001. Fencing, tree/flower planting under preparation (initiated by women's group).*
3. *Women acquired skills in honey/fish processing, handicraft making, business management, etc.*
4. *Two baskets, four bangles, two belts, three necklaces and one chair were sold in two weeks.*
5. *38 bottles of honey were sold in two weeks.*
6. *Restaurant not yet open.*

6. Evaluation (in a rating of 1-5)

1) Efficiency	*2*	*Building construction delayed 10 months since the contractor did not execute the contract due to price escalation of materials and opaque management of money. It resulted in postponement of business commencement. Efficiency for the building construction is evaluated to be poor. As for business promotion, data is not enough to evaluate the efficiency at this moment.*
2) Effectiveness	*N.A.*	*Due to delay in building construction and commencement of business, realized sales of handicrafts and honey were limited. Certain income for members was not recognized yet. Effectiveness is not available to evaluate at this moment.*
3) Relevance	*N.A.*	*Relevance is not available to evaluate at this moment.*
4) Sustainability	*N.A.*	*It is too early to evaluate sustainability at this moment. However, women's group, especially committee was strengthened and intention to continue their business utilizing multi-purpose building and further expansion has shown up.*

7. Capacity Building

1. *Committee members had cultivated strong leadership through great number of meetings (61 meetings (32 committee and 29 general meetings) during 19 months since the women's group was organized) and activities required for fund raising, plot acquirement, building preparation, business planning, procurement of materials for business operation, etc. Especially, great change was observed for the leadership of the chairlady; compared with the inaugural speech in 1999, her voice and attitude had full of confidence during the recent general meetings and workshops after experienced all above.*
2. *Members of women's group have become more self-assured and were able to initiate own activities. For example, the chairlady of the group sent her husband to a tourist hotel in Kampi ya Samaki to market bottled honey, some of the members were preparing tree/flower seedlings to plant in the building plot, and fund raising for business preparation and fencing was completed. These activities were all initiated by the women's group.*
3. *Members of the women's group learned to trust, cooperate and unite in a group and with different ethnic groups. Basically women in the area used to form a women's group within the same ethnic group, but through the activities of verification project, they decided to work as one united group rather than the separated groups to keep equal balance among members.*

8. Impact and Outcome (others than expected/programmed)

1. *Women were encouraged to discuss and visualize their future development plan such as extension of their plot and management of petrol station. They are eager to continue their own development activities.*
2. *The project attracted other groups outside of the area to have similar projects or to have linkage with the Muungano women's group. For example, some women from outside of the area had visited the handicraft shop and showed interest to market their handicrafts, or beekeeping groups from other location requested divisional officers to sell their honey to the women's group. Future possibility of networking among different communities was recognized.*
3. *Concerning about negative impact, husbands of some members did not prefer to have wife engaged in time-consuming activities and complained. It might bring domestic problems.*

9. Verification Result

1. *Availability of resources to generate income, such as honey and fish, fluctuate depending on the natural condition, especially precipitation of the year. During the drought year honey production becomes low while fish production increases. On the other hand, honey production recovers in the following year if there is enough rain, while fish production becomes low due to over catch of the previous year. In ASAL areas, income generating activities should be diversified to secure certain level of income and stabilize livelihood, rather than concentrating on one business even though it has high potential of development.*
2. *Preparation process of the venue (multi-purpose building in case of this project) has strengthened, united and activated women's group and they gained self-confidence.*

10. Way Forward

1. *Continuous rather than intensive, but ad hoc support/training is required from GOK side, especially in skills of business planning, record keeping and accounting. Training courses provided during the verification period had some effect for business preparation, but additional support at the right timing helps them remember and practice the obtained knowledge. Women's group is expected to look for outside market for their products, especially bottled honey, with the assistance of GOK.*
2. *Women's group is expected to complete electricity connection and operate restaurant, as well as the continuous sales of bottled honey and handicrafts.*
3. *For future implementation of such project, small scale is preferable to start with, and scale of input could be enlarged step-by-step in accordance with the group capacity. In such way, benefit, though it's small, could be realized from the earlier stage and it would facilitate the group to continue their activities.*
4. *Contract for building construction was made between the contractor and Study Team, but women were involved only for the selection of contractor, and the contractor did not listen to the women's claim for the construction delay. On the other hand, training courses were mostly planned and provided by the Study Team and degree of involvement of women's group was low, and some of the courses had a poor reputation. Beneficiaries should therefore be involved not only in the planning stage of the project, but also all the process of implementation stage.*
5. *For the development of income generating activities in ASAL areas, diversification is necessary to stabilize certain level of income, considering unreliable resources over years.*

2. Promotion of Improved Jiko（Kampi ya Samaki → Whole Study Area）

1. Background

Firewood available in the Study area is becoming scarce and scarce, and the time women need to fetch keeps on getting longer and longer. Environmental degradation is being worsened due to the increasing pressure of firewood associated with population growth, and this situation makes women difficult to do income generating activities as well. To conserve precious natural resources (trees) as well as to spare enough time to do income generating activities for women, an energy and cooking time saving Jiko is envisaged.

2. Subject to Verify

1. *To examine if the improved Jiko could well be adapted in ASAL area and then could save firewood, which in turn contributes to sustainable environmental conservation.*
2. *To examine if the improved Jiko could reduce time of fetching firewood and cooking, thereby creating more time that the users could spend for income generating activities.*

3. Input

1. *Anthill soil, stones, cow dung, and water that are all locally available materials.*
2. *Technical assistance of how to make the Jiko and its dissemination (one GOK home economics officer with transportation).*

4. Implementation Process

1. *Three local women were initially trained as the Jiko expert, and then merry-go-around scheme (alternate construction by the members of 3-5 with an assistance of the Jiko expert) was introduced to promote the improved Jiko.*
2. *Training local women invited community members' jealousy, thereby the expert became regarded as a member or an agent of JICA. Community members in Kyamp ya Samaki area ended up in total dependency on the Jiko expert to construct. This gave overburden on the expert, so that she finally stopped working as the expert.*
3. *Merry-go-around scheme did not well work in some areas either because some members did not collect even the local material of soil and stone available just around her house, rather waiting for the group members to assist.*
4. *Taking into account above situation, just grouped construction or individual based promotion was more focused in association with inter-location monitoring that is a very workable mean to motivate women to construct the Jiko.*
5. *Full sized Jiko (3'x4') could not be accommodated in small houses where most of poor people reside (full size Jiko required a kitchen house to be installed). Therefore, small sized Jiko (2 fireplaces) became focused in order to diffuse into poorer people.*

5. Output (originally expected/programmed)

1. *Jikos constructed in the Study area as of September 15, 2001 are: 26 in Kyampi ya Samaki (originally targeted area), and 61 in other areas as a result of extension through inter-location monitoring. Out of the total 87, 73 are still well functioning.*
2. *The Jiko can save firewood by 63% as compared to the conventional 3-stones Jiko (average of 83 samples), and can reduce the cooking time from 90 to 40 minutes for supper and 60 to 30 minutes for breakfast as an average. The saved time is mostly spared to take rest and in some cases invested in farm work and income generating activities.*

6. Evaluation (in a rating of 1-5)

1) Efficiency	*5*	*Input is very small that is locally available material only with a technical assistance, while the output is very high and diffusion can also be done with minimal support by GOK.*
2) Effectiveness	*5*	*The Jiko conserves 63% firewood and reduces cooking time to at least half.*
3) Relevance	*5*	*The Jiko greatly contributes environmental conservation, as well as release women's burden thereby women become able to spare the saved time to do productive works.*
4) Sustainability	*4*	*Though normal condition ensures the sustainability of the Jiko, water scarcity area would have difficulty to maintain the Jiko, thereby giving "4" to the sustainability (maintenance should be done once in every one or two weeks and it requires about 3-5 litter water).*

7. Capacity Building

Those below are, though indirectly, attributable to capacity building for the women who use the Jiko;

1. *Thanks to the saved time, the women have become able to talk more with their spouses and children, making their relations better as well as contributing to establishing her status in the household.*
2. *Children now can reach school in time because the mother can feed them earlier thanks to the fast cooking (some children had sometimes been late for school), releasing indebted feeling to the school.*

8. Impact and Outcome (others than originally expected/programmed)

1. *Women who use 3-stones Jiko usually suffer from back pain, but now the back-pain has mostly disappeared after the introduction of the Jiko, especially for women with big body-size.*
2. *Clean water became mostly available because the water can be boiled at the same time of cooking meals, contributing to easy promotion of hygienic practices.*
3. *Chicken and goats are no longer messing the food that are cooked at higher place than 3-stones and placed on back-top of the Jiko.*
4. *No child turns over food because the food is placed on the Jiko. Security for children is now kept so that the mothers feel very happy and also elder children can help mother in cooking in much safer situation.*
5. *The Jiko gives good appetite because the charcoal, after cooking ugali at the center, can be put to the sides so that vegetable and tea/water remain hot.*

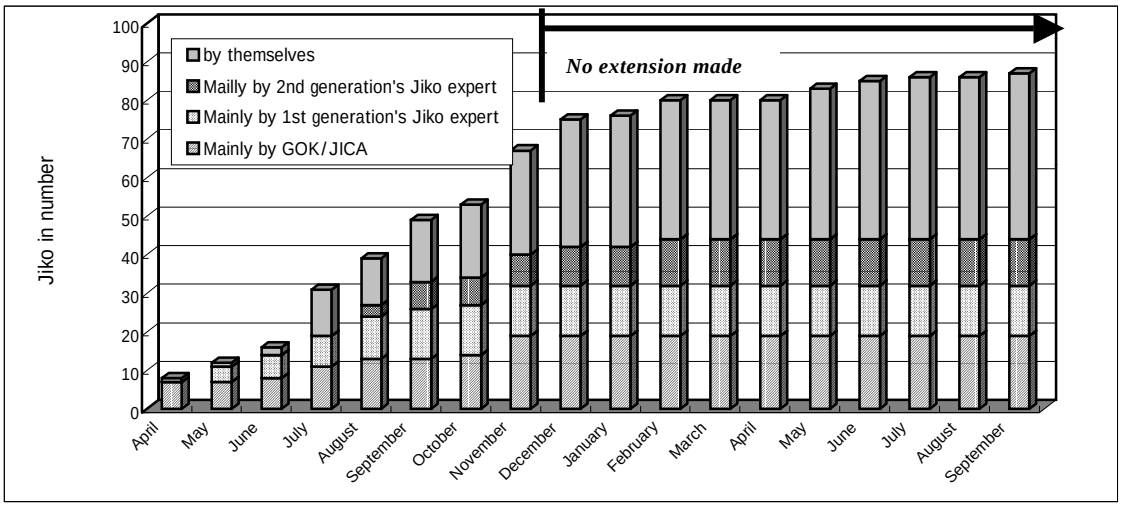
9. Verification Result

1. *The improved Jiko has been well adapted in the Study area, as a total of 87 Jikos has been constructed with a minimal assistance from GOK and JICA Team. The Jiko can save firewood by 63% as compared to the conventional 3-stones Jiko (average of 83 samples), thereby it was proved that it contributes to sustainable environmental conservation.*

2. *However, as the full sized Jiko requires kitchen house separate from living house, poor people who live in a hut-house wherein kitchen is together accommodated have difficulty to install the Jiko. Therefore, a small sized Jiko (2 fire places; see photo) which could be installed in a hut-house should be promoted for poor people.*
3. *The Jiko can reduce cooking time from 90 to 40 minutes for supper and 60 to 30 minutes for breakfast as an average. The saved time is, at present, mostly spent to take rest and talk to spouses and children. Some women, though still several numbers only, invested the saved time in their farm work and businesses.*

10. Way Forward

1. *Expansion of Jiko beyond the originally programmed area, which is Kampi ya Samaki, had started as early as June thanks to the inter-location monitoring tour. The major construction manner has shifted to "by themselves", which means Jiko is constructed without any presence of GOK/JICA or Jiko expert. Though this shows, to a certain extent, self-sustainability of the program, the fact that the dissemination after November, 2000 has very slowed down as shown below implies still a minimal support by GOK/Donors to further extend the program; namely, extension services as well as technical advices by a home economics officer with transportation.*



2. *To further diffuse the Jiko, flexibility rather than sticking on training Jiko expert or merry-go-around scheme, should always be pursued. Here, a guide is: 1) a demonstration be done as the first stage; 2) some time after the demonstration, GOK/donors shall visit the villages again to facilitate several ordinary women to form a group and then construct the Jiko by themselves; 3) in line with regular monitoring to avoid technical error, neighboring villages be also visited to further diffuse the Jiko, and 4) in parallel with those above, new version of Jiko, two fireplaces Jiko, should be tried in order to further expand to poorer households.*

3+4. Participatory Irrigation Management + Water Saved Agriculture (Sandai)

1. Background

Sandai community has developed an irrigation system of 700 acres with the assistance of GOK. However, irrigation efficiency is low because of high seepage losses, poor maintenance of water channels and lack of sound water allocation and distribution. It is considered that improvement of the irrigation water management will enable to increase irrigation efficiency leading to increase of agricultural production.

2. Subject to Verify

To examine if the community can sustainably rehabilitate, operate and maintain the irrigation system without GOK/Donors' periodical intervention.

To examine if the land leveling practice as on-farm water management can be built in the irrigation system to contribute to water saving in a plot and thereby making it possible to distribute water into wider areas.

3. Input

1. *Materials for canal lining (cements, wood, equipment for concrete mixing etc.): 270,490Ksh (30% borne by community)*
2. *Materials for diversion boxes (steel gates, cements, wood, ballast etc.): 260,715Ksh (30% borne by community)*
3. *Skilled Labor for canal and diversion boxes: 141,400Ksh (30% borne by community)*
4. *Transportation for canal and diversion boxes: 448,000Ksh (30% borne by community)*
5. *Tools for canal and diversion boxes (mattock, jembe, wheelbarrow etc.): 43,720Ksh (Grant by the Study Team)*
6. *Unskilled Labor for canal and diversion boxes: 1,480 man-date: 133,200Ksh (100% borne by community)*
7. *Land leveler and operator: pilot 9 acres: 47,140Ksh (30% borne by beneficiaries)*
8. *Seeds for water saved agriculture: 1,680Ksh (100% borne by beneficiaries)*

4. Implementation Process

1. *Masonry lining of main canal for 300m from intake was done (See right photo). Though the lining work was progressed on time, community participation in manual labor decreased day by day. Misunderstanding between community and GOK/JICA Study Team on community's cash contribution and labor participation led to delay of community's payment.*
2. *Six division boxes with gates were planned to install in the main and secondary canal. Diversion boxes were installed after the completion of the canal lining, according to the community's perform ance of cash contribution. Installment schedule of cash contribution was made, but the community could not follow the schedule with some excuses such as school fee, drought, etc.*
3. *Land leveling for water saved agriculture was operated to the seven selected farmers. Though land leveling was implemented on time, severe prolonged drought delayed the cropping.*
4. *Study tour for NIB Perkerra irrigation scheme was conducted as part of water management training.*

Canal Lining of 300m

5. Output (originally expected/programmed)

1. *Canal lining of 300m was completed in August 2001.*
2. *Three diversion boxes out of six were installed by November 2001. Remaining three gates have been stored in the Divisional Office in Marigat because of poor cash contribution of the community.*
3. *17%(56,000Ksh) of cash contribution has been completed. Remaining due for the community is about 280,000Ksh.*
4. *In 2001, with the increase of irrigation efficiency and rotational irrigation, 90% of the irrigation farmers got sufficient water as compared to planned target of 60%.*
5. *Crop area for cash crops such as tomatoes and watermelons were increased and French beans were newly introduced in 2001.*
6. *Land leveling increased on-farm irrigation efficiency by about 50% as compared to the irrigation hours without land leveling (average of five sample farmers).*
7. *Land leveling increased the crop yield by 30 % as compared to the yield without leveling (average of five sample farmers).*
8. *The irrigation area expanded around the leveled farms.*

Diversion Box

Farm after Land Leveling

6. Evaluation (in a rating of 1-5)		
1) Efficiency	*4 (2)*	• *Construction work was completed on time and could catch up with the first rainy season when people started cropping. Also utilizing locally available materials minimized the construction cost.* • *As for land leveling, its cost including transportation was high because only large scaled machinery was available, though the operation was effectively implemented.*
2) Effectiveness	*4 (4)*	• *About 90% of the farmers got enough water against the planned target of 60%, and they now feel more confident to take even risks to try new crops such as French beans and tomatoes.* • *The land leveling practice was also effectively implemented and contributed to yield increase, saving irrigation water thereby expanding irrigated area.*
3) Relevance	*4 (3)*	• *Sandai irrigation scheme was one of the few irrigation schemes in the Study Area and improvement of irrigation efficiency without exploiting new water source under scarce water resource in ASAL was relevant as a development approach.* • *Land leveling is an effective method to save irrigation water, but the shortage of available machinery constrained the approach.*
4) Sustainability	*2 (3)*	• *In spite of high effectiveness of the project, farmers' organization and institutional reform in this community is extremely challenging and requires considerable time and patience since dependency has deeply rooted in this community. Therefore, while the efficiency, effectiveness and validity of the project are considered to be high, sustainability should be rated as poor. It is probably very difficult to sustain the irrigation system by the community without periodical rehabilitation assistance.* • *As for land leveling practice, it is still difficult to build-in the whole irrigation system unless the implementation cost is reduced.*

7. Capacity Building

1. *Although the project was successful in terms of efficiency and effectiveness, there is not significant evidence about people's capacity building. People's attitude of dependency still remains and most of the community members are reluctant for the cash contribution (only 17% of total due has been collected.). However, it was observed that the Chief of Sandai location showed positive attitude and discretion in organizing community and one beneficiary of land leveling expressed on his future vision not to depend on donors. Except for few community members, they might have learnt little from the project.*
2. *There was another small irrigation system on the other side of the river, left out from the project. However the people on the other side rehabilitated the canal by their own initiative. Project could bring a significant disparity in the community, but also it may bring stimulant to the people.*

8. Impact and Outcome (others than originally expected/programmed)

Project triggered latent leadership conflicts as a negative impact, particularly with regard to a contract with a community member who owned a vehicle for materials transport. Employment created by projects can be a seed of community internal conflicts over benefits.

9. Verification Result

Although the project was effective, people's dependency still seems remaining, e.g. at the first week of canal lining work, 80 to 100 people joined the earthwork and the number decreased to 10 after they knew there was no payment for the work from the Study Team. Finally 6 youths remained but in fact the contractors who were hired by the Study Team were unwillingly giving them pocket money. The approach by Donors to count community labor as their part of cash contribution may have promoted the dependency, diminishing their sense of ownership. Rushing implementation bound to the administrative/budgeting condition may also have curtailed people's initiative. Unless otherwise GOK/Donors change their approach to the community and vise versa, sustainable participatory irrigation management, including the rehabilitation, is very difficult due to the deep-rooted dependency replenished in the long history of external assistances (Their behavior of getting assistances from donors is even sophisticated.).

10. Way Forward

1. *For the subsidy arrangement, community should be involved in cost estimation and budgeting from the initial stage and be given notification for the project cost at the earliest stage.*
2. *A certain part of project cost may be required as the community's commitment prior to the project commencement, so that they drive their initiative and motivation.*

5+6-1 Livestock Improvement: Buck Scheme (Sandai&Arabal)

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.

2. 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 find out the applicability and sustainability of the program through carrying out the program in two different locations, Arabal and Sandai, the former being pastoral hilly area and the latter being more or less agricultural oriented area.*

3. Input (30 % of the cost below born by the community except training)

Sandai Location	*Arabal Location*
5 bucks (total 7,750 Ksh)	*5 bucks (total 7,750 Ksh)*
Transportation of the Bucks (2,000 Ksh)	*Transportation of the Bucks (2,500 Ksh)*
2 castrators (total 12,600 Ksh)	*2 castrators (total 12,600 Ksh)*
5 choppers (total 32,400 Ksh)	*2 choppers (total 12,960 Ksh)*
Training (improved breeding + record keeping)	*Training (improved breeding + record keeping)*

4. Implementation Process

Sandai Location	*Arabal Location*
1. *5 breeding groups with a total 50 members were formed in early June, 2000.*	1. *5 breeding groups with a total 36 members were formed in early June, 2000.*
2. *5 backs were purchased in Kimose and delivered to the groups on June 12, 2000 (the groups' due, 2,925 Ksh, was not settled on time and finally they paid at the end of August 2000 after several times negotiations).*	2. *5 backs were purchased in Kimose and delivered to the groups on June 13, 2000 (the groups' due, 3,075 Ksh, was paid on the same day as agreed with the Study Team).*
3. *The bucks started mating in August 2000, and to date the bucks have mated about 50 does (record keeping is very poor).*	3. *The bucks started mating in August 2000, and to date the bucks have mated 115 does (record keeping is very good).*
4. *Castration started in July 2000, and 120 he-goats were castrated in the following few months. Then, no authentic records of the castration and even the fee collected became available.*	4. *Castration started in October 2000, and 9 bulls and 317 he-goats have been done as of September 2001. The record including the fee collection is kept well.*
5. *To date, death of 2 improved bucks has taken place.*	5. *To date, all the 5 backs are very well, however death of 5 crossbred kids has taken place.*

5. Output (originally expected/programmed)

Item	*Sandai*	*Arabal*
Crossbred offspring:	*24 born and 22 expected*	*43 born and 72 expected.*
Offspring died:	*No record*	*5 offspring*
Improved-buck died:	*2 bucks*	*No back died*
Increase in birth weight:	*1.8 kg to 3.0 kg (average)*	*1.8 kg to 3.0 kg (average)*
Castrated livestock:	*at least 120 he-goats*	*317 he-goats and 9 bulls*

6. Evaluation (in a rating of 1-5)

Aspect	*Sandai*	*Arabal*	*Description*
1) Efficiency	*2*	*4*	*In Sandai, 2 improved backs died mainly because of poor management thereby 2 is given, while Arabal recorded high performance.*
2) Effectiveness	*3*	*4*	*Though 2 improved goats died in Sandai, the cross bred kids were proved genetically improved (the weight increased to 1.6 times of local ones). Therefore, 3 given in Sandai and 4 in Arabal.*
3) Relevance	*2*	*4*	*Sandai area is more or less agriculture oriented, therefore the groups did not give much keen interest to take due care of the bucks except two female custodians. In Arabal, goats rearing is very important since the area is dominated by hills with little farms.*
4) Sustainability	*2*	*4*	*Taking into account the fact that 2 out of 5 bucks died in Sandai, the area as a whole may not well sustain the program. In Arabal, the high performance ensures high sustainability.*

7. Capacity Building

There are 2 female custodians out of the five in Sandai (no female custodian in Arabal). Their performance is very good as compared to male custodians as shown below, thereby they became very proud as well as self-confident.

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*

8. Impact and Outcome (others than originally expected)

Motivated by the improved offspring in weight, 10 farmers in Arabal went to Kimose and purchased total 13 improved goats mostly at their own expense at the end of September 2000. The price was 2,200 Ksh per head, which is much higher than the originally purchased one of 1,550 Ksh, but the farmers raised almost all the fund by their own initiative.

9. Verification 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. *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.*
3. *In summary, it can be said that the both 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.*
4. *People's attitude toward development is also one of the keys to success. Arabal area has been less blessed with development opportunities, while Sandai area much more blessed with those in the history. Sandai people apparently showed dependency syndrome on the course of the program while Arabal people were very keen to fully utilize the development opportunities. Cost sharing for 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. Thus, the people's attitude greatly influences the result.*

10. Way Forward

1. *Arabal can be expected to develop to be an important improved goat breeding area, while Sandai, until a significant attitude change for the better is effected, will not develop as the breeding area.*
2. *The Chief of Arabal introduced "transect approach" to allocate the 5 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.*
3. *As Arabal farmers bought additional bucks individually, the program may tend to be individual basis in its nature. Taking into the buck price, 1500 to 2200 Ksh 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 back should be assisted by the program.*

5+6-2 Livestock Improvement: Dip Improvement (Sandai&Arabal)

1. Background

The Study area is blessed with large number of livestock; 62,000 cattle, 230,000 goats, and 55,000 sheep. One of the critical areas of this livestock sector development should be adequate health control measures because tick-borne diseases are taking a great toll of livestock population. Dipping system can be seen at many paces over the Study area, serving the livestock's health control and improvement. However, very often observed are just dormant or already abandoned dipping systems.

2. Subject to Verify

1. *To examine if farmers can manage a dip system sustainably after receiving very minimal start-up inputs and training from donors.*
2. *To find out any differences in trying the sustainable operation of the dip through carrying out the program in two different locations; Arabal and Sandai.*

3. Input

Sandai Location	***Arabal Location***
1 Pump set (37,749 Ksh) *1 Hand sprayer (12,200 ksh)* *Training (dip management + leadership)*	*1 Pump set (37,749 Ksh)* *1 Hand sprayer (12,200 ksh)* *Training (dip management + leadership)*

4. Implementation Process

Sandai Location	***Arabal Location***
1. *There was a poorly performing dip committee in place before the verification project started. The community was asked to elect a new one. But this took very long time – due to power politics in the community; the Chief kept on postponing the elections.* 2. *Water in the dip sump was replaced even before the verification project started. The community hired a water bowzer that ferried water from Marigat at the cost of 9,250 Ksh.* 3. *Acaricides was managed on July 4, 2000 in an opaque way from an institution.* 4. *Dipping done fortnightly since July 2000, but it has not been accurately recorded despite the repeated advice by the Team.* 5. *Committee meeting not held in most of the cases.*	1. *A very active dip committee was elected in May 2000, facilitated by the Team.* 2. *Removal of dip spent was done on May 14 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.* 3. *Acaricides was purchased on July 13 2000 with a loan of 30,000 by the Team (total cost 42,000 Ksh).* 4. *Since July 2000, dipping has been done weekly and until September 2001, 2,747 cattle and 2,964 shoats have been dipped.* 5. *Committee meeting held regularly and monthly.*

5. Output (originally expected/programmed)

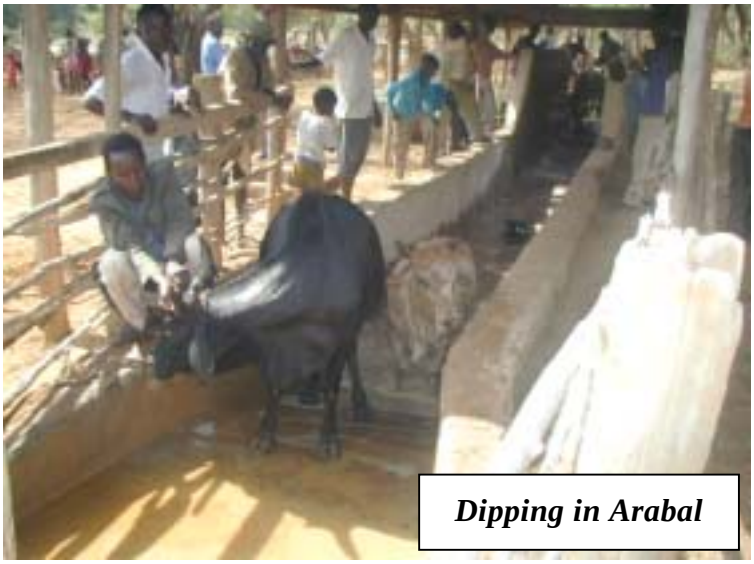
Item: *No. of dipped livestock*

Sandai:

Not recorded despite periodical advice by the Team. However it is estimated at about 300 cattle and almost same or little more number of shoats per month.

Arabal:

2,747 cattle and 2,964 shoats from July 2000 to September 2001 (about 230 cattle and 250 shoats per month)



Dipping in Arabal

6. Evaluation (in a rating of 1-5)

Aspect	*Sandai*	*Arabal*	*Description*
1) Efficiency	*2*	*2*	*Though input required for re-activating the dip system was small, the number of the dipped livestock was not big either taking into consideration the total livestock number in both areas; 4,500 cattle and 17,500 shoats in Sandai and 4,000 cattle and 20,000 shoats in Arabal.*
2) Effectiveness	*2*	*2*	*Though the dip solution of Acaricides works very well, livestock brought to the dip was not many, thereby the effectiveness is not high.*
3) Relevance	*2*	*2*	*Though dipping is effective, it is very difficult to bring animals to the dip especially during dry season since they are herded far away. Hand sprayer may be applicable under this condition.*
4) Sustainability	*2*	*2*	*To sustain dip at the present fee of 10 Ksh/cattle and 2 Ksh/shoat, considerable number of cattle, say 300 cattle and 500 shoats, have to be kept on dipping monthly. It is difficult to sustain these number.*

7. Capacity Building

Record keeping has been well done in Arabal, through which the secretary and the treasurer have cultivated the capacity in accounting and general administration.

8. Impact and Outcome (others than originally expected)

Not observed.

9. Verification Result

1. *To sustain the dip with the present fee of 10 Ksh/cattle and 2 Ksh/shoat, at least the number of livestock shown in the table below should be dipped monthly (raising the fee cannot get villagers consensus).*

Cattle	*Shoat (goat and sheep)*
405	*0*
400	*25*
350	*275*
300	*525*

2. *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.*
3. *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 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.*
4. *Why they do not bring many livestock to the dip, despite the large number in those areas (see table below) 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.*

Reference: Estimated livestock number in the Areas

Location	*Cattle*	*Shoat*
Sandai	*4,500*	*17,500*
Arabal	*4,000*	*20,000*

10. Way Forward

1. *In both cases, the program indicated that the dipping system is very difficult to be sustainably operated. Though 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 adapted in that situation.*
2. *In Sandai, 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.*

7. Rainfed Agriculture（Partalo → Chemelongion and Kapkune)

1. Background

Severe drought occurs once every ten to fifteen years in the Study Area and emergency relief food has been chronic. Land has also been deteriorated without soil and water conservation, limiting the vegetations to secure food for human and livestock. In hilly Arabal location, people have been trying to crop with only rainwater and have got harvest once or twice in five years. It is considered that technique of rain water harvesting could stabilize the rain-fed agriculture, which in turn results in securing food, and soil and water conservation.

2. 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.

3. Input

1. *Seeds and pesticides (drought resistance maize, millet, pigeon peas etc.): 43,180Ksh (Partalo: 9acre, Ckemelongion: 10acre, Kapkun: 10acre) (100% borne by community)*
2. *Labor: 300 man-day in each site*

4. Implementation Process

1. *Training of farmers on construction of on-farm water harvesting structures was conducted in April 2000.*
2. *Introduction of crop husbandry technology with quality seeds and operation and maintenance of the water harvesting structures was carried out in April 2000.*
3. *Survey works were done by the Study Team in April 2000.*
4. *Study Tour to Machakos and Kitui with 18 Partalo villagers was conducted in May 2000.*
5. *A large run-off discharge destroyed diversion and lateral channels as well as some Fanya Juu embankment (Partalo). Installment of brush dams in run-off streams and other soil conservation works were made.*
6. *Severe prolonged drought disturbed construction of the structure and land preparation works.*
7. *Pests of wild animals and diseases damaged the crops.*
8. *The verification project was expanded to other two sites of Chemerongion and Kapukun according to community request. People knew about the project in Partalo through inter-location monitoring and information of divisional officers.*

Rainwater flowing into farm

5. Output (originally expected/programmed)

1. *Crop yield with rainwater harvesting technique increased by 2.4times as compared to the maize yield without the project as an average in Chemerongion, with applying quality seeds and diversified crops like pigeon pea, green gram and cowpea.*
2. *Food security is improved because the stabilized rain-fed agriculture increased crop production.*
3. *The rainwater harvesting structure promote soil and water conservation by nature especially in case of construction of Fanya Juu terraces.*

6. Evaluation (in a rating of 1-5)

1) Efficiency	*4*	*Crop yield improved with small inputs from outside. The entire earthwork for rainwater harvesting were done by community themselves with the technical advice of GOK officers.*
2) Effectiveness	*5*	*Crop yield increased by 2.4times as compared to the maize yield without rainwater harvesting as an average in Chemerongion. Also cropping was diversified as growing pigeon pea, green gram and cowpea. The rainwater harvesting technique is proved to be very effective.*
3) Relevance	*5*	*The rainwater harvesting is needed in the area where irrigation is not available. Utilizing rainwater is the only way of improving farming especially in the hilly side to secure and diversify the opportunity of getting food in ASAL.*
4) Sustainability	*5*	*The rainwater harvesting technique has been extended in almost whole Partalo community and other communities of Chemerongion and Kapukun. This program is very promising and manageable by community.*

7. Capacity Building

1. *At the beginning, Partalo community could not understand the labor supply without payment. The Study Team repeatedly explained about the cost sharing system until the community understood. It was the process of bringing about sense of ownership for Partalo community.*
2. *After the people of two villages showed their interest in the rainwater harvesting, a series of study tour among the concerned people was carried out to exchange the knowledge and experiences. Through this activity, people in Partalo proudly explained their experiences and knowledge, which was a process of capacity building of Partalo people.*

8. Impact and Outcome(others than originally expected/programmed)

1. *Concerning negative impact, owner of the women group's plot in Partalo asked the group to return the land by next year. Therefore the women group has to acquire other land. Benfefit of the project raised the issue of communal land, which is not registered as private property.*
2. *Through inter-location monitoring, villagers in Chemelongion in Arabal and Kapkun in Kimalel were interested in the rainwater harvesting technique and requested GOK officers to introduce the same technique in their areas. With the technical assistance from the GOK officers, the villagers in the above two villages applied the technique and got good harvest.*

9. Verification 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.

10. Way Forward

1. *Technical assistance to community by GOK officers especially in surveying catchment area, layout of farm and supervising will be needed to extend the rainwater harvesting technique.*
2. *Technique for rainwater harvesting should be transferred to other GOK agricultural officers to further extension of the rain-fed agriculture beyond the Study Area.*
3. *Though the farming can be practiced as a group, the size of the water harvesting system should not be too big. As the system becomes bigger, there will be more disparity between upper part and lower part of the farm in allocation of water collected from the catchment area. Area would be better not more than 10 acres, though it will depend on the conditions of the site.*

Maize grown in the rain-fed farm

8. Rehabilitation of Pan (Rugus)

1. Background

Excavation of the Pan has ever been implemented in and over the Study Area with the assistance of NGOs/GOK to alternate the source of safe drinking water (Groundwater along the Rift Valley does not suite for domestic purpose due to high fluoride content). It is, however, observed that most of the pans have been left silted up without any maintenance, instead of that, new pans have been repeatedly constructed.

2. Subject to Verify

To examine whether the pan could be sustainably maintained by the community beneficiaries rather than investing in new pan elsewhere.

3. Input

1. *Materials (cement, wood, wire etc.) required for Pan rehabilitation: 47,570Ksh (10% borne by community)*
2. *Three days renting of bulldozer: 80,000Ksh (10% borne by community)*
3. *Materials (cement, wood, wire etc.) for water tank: 62,580Ksh (10% borne by community)*
4. *Transportation of materials: 33,000Ksh (10% borne by community)*
5. *Skilled labor: 20,000Ksh (10% borne by community)*
6. *Tools for earthwork (wheelbarrow, mattock, Jembe etc.): 23,220Ksh (Grant by the Study Team)*
7. *Unskilled Labor: 660 man-date (59,400Ksh) (100% borne by community)*

4. Implementation Process

Lekiricha Pan after Desilting

1. *Desiliting of Lekiricha Pan for 0.5 - 1.0 m depth with 60 – 70 m diameter was initially planned to do by manual work from the viewpoint of establishing sustainable maintenance. But after trial, the community and Study Team agreed to use heavy machinery with 90% subsidy to the community because the soil was too compacted to dig by manual. Desilting operation by bulldozer was completed in three days in the middle of Apr. 2000.*
2. *Excavation of silt trap of 10m x 10m with max depth 1.5m by bulldozer was completed at the same time of desilting operation.*
3. *400m fencing around the pan and silt trap with thorn bush and Rapai plant was done by the community. Community decided to fence off the pan and silt trap with locally available resource and completed in one months (Jun. 2000)*
4. *Outlet with filter, well and watering place for animals by community labor and skilled worker. It took about eight months (from Jul. 2000 to Feb. 2001) longer time than expected to complete due to low turnout of community members for earthwork and disturbance by ethnic conflict.*
5. *Grass planting on pan embankment by community women was done during rainy season in Aug. 2000, but the grass withered during dry season.*
6. *Tree planting in the catchment area was agreed to be undertaken by the District Forestry Office, but it has not been done.*
7. *Roof catchment water tank with 15 cum at Rugus Primary School was constructed as to support non-beneficiaries of Lekiricha Pan and 100 pupils of Rugus Primary School. Water tank was completed in two months (Oct. and Nov. 2000) by the community and skilled worker.*
8. *Pan maintenance group was established with 13 committee members and the beneficiaries of four villages.*

5. Output (originally expected/programmed)

Communal Work for Outlet

1. *By Sept. 2001, rehabilitation of Lekiricha Pan was completed except for tree planting in the catchment.*
2. *Retention of water in the pan extended from two (2) months to more than four (4) months throughout a year and people can now fetch water even from the silt trap.*
3. *Pan committee was not active and the leadership was taken over by the location Chief.*
4. *The installed filter/well is effective. Through the filter, water becomes transparent and content of colon bacilli reduced much. However, water level of the well gets low as the water level of the pan lowers, making it difficult to fetch water from the well. Although the filter/well is effective, people do not drink the water from the well because they say water smells and tastes strange and there even occurred a rumor that their ethnic opponent poisoned the water. The smell could be attributable to concrete dust in the well and it is expected to disappear after rotations of water.*
5. *Water tank was completed in November 2000 and well functioning. It serves 100 pupils of Rugus Primary School as well as nearby residents.*

6. Evaluation (in a rating of 1-5)

1) Efficiency	*3*	*Rehabilitated Pan was immediately used when the rainy season came, though the earthwork by community took longer time than expected.*
2) Effectiveness	*2*	*Although the pan can retain water longer than before the rehabilitation, the output was still lower than the beneficiaries' original expectation, leading to discouraging them to pay the cash contribution.*
3) Relevance	*4*	*Although the pan dries up during dry season, there are no other options in this area than excavating pan for supplement safe water since the groundwater contains much fluoride and the nearby rivers are seasonal. Therefore the relevance of the project is judged to be high.*
4) Sustainability	*2*	*Although the pan is very much needed as a BHN in this high fluoride content area, it is very difficult to sustain the regular maintenance of Pan without regular input from outside. This is because the people have to diversify their activities under ASAL condition, leaving pan unattended especially during dry season that is suitable for desiltation.*

7. Capacity Building

The community by their own initiative started digging a channel to divert water from Mukutani River to utilize the pan more effectively. It can be said that the community was motivated for further improvement of the pan by seeing the rehabilitated Lekiricha Pan. People leaned how to use tools such as wheelbarrow and folk jembe during the rehabilitation work and they look more confident in achieving the digging work.

8. Impact and Outcome (other than originally expected/programmed)

1. *Output lower than their original expectation may have both positive and negative impacts. In case of Rugus, people showed positive attitude to further improve the pan by their own initiative, namely diverting seasonal river water into the pan. On the other hand the lower output might become a factor to discourage people to take further action for development.*
2. *With respect to negative impact, the community refused to pay cash contribution. The reason, they said, was that the output was less than their expectation (water smelt and taste strange). However it might be a strategy to reason their nonpayment. Arrangement for cash contribution without any payment until the end might have retained their dependency.*

9. Verification 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.*

10. Way Forward

1. *Though we could see the positive attitude of the people toward the improvement of the pan, diversified activities of the people for survival will still dominate their interest. It is, therefore, difficult to sustain the regular maintenance of Pan by community themselves under Semi-Arid conditions, though it should not be over generalized. Therefore periodical intervention such as food for work or cost-sharing on heavy machinery by GOK/Donor will be needed for the sustainable maintenance of the pan.*
2. *Health promotion in association with water project will be necessary for better communication with community and for better understanding on safe water. For example of the smell of filtered water, health staff can support the community to understand the effectiveness of the filter/well in longer term.*

Outlet Well: Pan Water is filtered

3. *Women had important role during the implementation in such a way of contributing labor. Women had worked for fencing and grass planting and even for earthwork, which basically should be men's work. Gender issues should, therefore, be coordinated in the community-based project.*
4. *As the water tank is functioning well, this facility can be installed where the wide roof to catch enough rainwater is available.*

9. Strengthening of Marigat Youth Polytechnic (Marigat)

1. Background

"Youth polytechnics", which were referred to as "Village polytechnics" at the beginning, were started so as to provide training with a view to assist the youth to become self employed or even secure employment. Many "Youth polytechnics" receive substantial support from the GoK and other sponsors, but MYP was a purely a community owned institution with no more regular support from the GoK or other sponsors. Also there is a high demand in the community for better quality products, and for skill training.

2. 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.

3. Input

1. *Technical assistance to develop short courses for beginners and short upgrading courses for experienced artisans*
2. *Provision of electrical equipment, materials such as timber and tools for the carpentry workshop*
3. *Training of trainers and a study tour for the management committee, trainees and instructors*
4. *Hiring a carpentry instructor to assist in training in the use of the new equipment and in production of more advanced products*

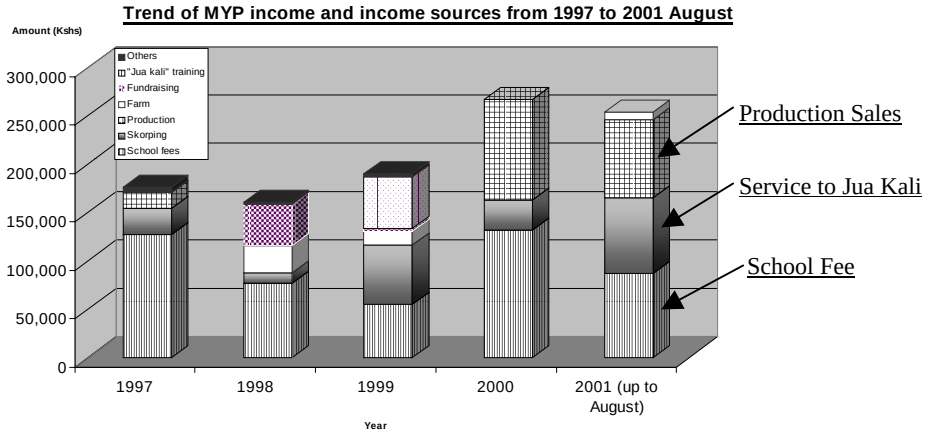
4. Implementation Process

1. *MYP started short courses in June 2000 and forty men and women joined the courses, however, only two registered with money for registration and they transferred to the full 2-year course. For the moment, short courses have been put on hold.*
2. *MYP started renting the equipment to Jua Kali artisans and Kokoto women group from summer of 2000.*
3. *MYP opened a showroom in the town to sell their products in February 2001.*
4. *Relationships between the carpentry instructor and the manager turned sour and the contract for the carpentry instructor was not renewed.*

Provided Equipment

5. Output (originally expected/programmed)

1. *The carpentry workshop was re-organised and is functioning very well although a saw blade was broken and long left unchanged.*
2. *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 and financial status of MYP improved.*
3. *A showroom was opened to sell and display furniture and clothes produced at the polytechnic by trainees and instructors.*
4. *Enrolment increased from 14 and 17 trainees in 1998 and 1999 respectively to 33 and 34 in the year 2000 and 2001. However, MYP still registered relatively low enrolment for its two-year courses, and a very poor response to its planned short courses.*
5. *Total income of MYP increased from Ksh150 thousands to more than Ksh250 thousands.*



6. *Awareness of MYP in the Study Area has increased significantly.*
7. *New designs of furniture have been made, though to a limited scale.*
8. *A machine operator and an accounts clerk were hired to serve clients and to streamline activities in the workshop.*

6. Evaluation (in a rating of 1-5)

1) Efficiency	*3*	*Procurement of equipment for the carpentry workshop was relatively too large compared with institution development portion of the verification project.*
2) Effectiveness	*4*	*Income of MYP and "jua kali" artisans increased significantly by the verification project.*
3) Relevance	*4*	*MYP, a community owned institution, could be a hub of community networking.*
4) Sustainability	*3*	*Unless more parents can afford paying school fees, it is not so easy for MYP to sustain with present enrolment rate, production sales and "jua kali" services.*

7. Capacity Building

1. *MYP instructors started to prepare detailed training plans that include lesson plans and timetables.*
2. *MYP workshop became cleaner with instruction and safety measures on the wall.*
3. *MYP management board became to have meeting regularly with attendance of the senior chief of Marigat. He had never been to MYP before the verification project started.*
4. *In the past, record keeping in general was poor, but this has improved since the beginning of the verification project. In particular, the records in the carpentry workshop are very well kept and updated on daily basis.*
5. *MYP instructors started to prepare updated balance sheets of MYP.*

8. Impact and Outcome (other than originally expected/programmed)

1. *Improvement of record keeping has brought transparency and accountability of MYP management.*
2. *Large-scale production of "jua kali" artisans, such as orders for school desks and benches, can now be undertaken competitively and swiftly.*
3. *Hiring of the carpentry instructor brought in salary differentials, confusion in the line of reporting, authority and eventually poor relationships.*
4. *Although conflicts among the management board members have arisen in the past, it seems that they have accumulated to reach an unprecedented high level in 2001.*

9. Verification 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.

10. Way Forward

1. *Like many other polytechnics in the region, it is difficult to achieve the sustainability of the polytechnic on training only. Some form of sponsorship, fund-raising, subsidisation and income generation activities are necessary to achieve this financial sustainability. 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.*
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.*
3. *In order to streamline the work of the management and the executive committee, and to guard against misuse of authority, it is necessary to formulate a constitution and to develop clear procedure and systems.*

Visitors to MYP

10. Strengthening of Marigat Health Center (Marigat)

1. Background

PHC is a strategy to achieve "Health for All" as the ultimate goal. Past PHC was weak in 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.

2. Subject to Verify

To examine if the comprehensive PHC concept can be achieved with effective mass media.

3. Input

1. *Provision of equipment for laboratory enforcement: binocular microscope, water quality multi-parameter kit etc.: 2.5millionKsh*
2. *Motorbike: 350,000Ksh*
3. *Information Billboards 110,000Ksh*

4. Implementation Process

1. *Equipment for laboratory was provided in June 2000.*
2. *Information billboards to send the health information to community were put up in 20 sites in September 2000.*
3. *4 kinds of slides for health promotion were developed by the collaboration of MHC staffs from different sections (Clinic, Laboratory and Public Health) and the Study Team.*
4. *Health promotion slideshow in order to motivate health staffs to communicate people was carried out in 11 sites in June and November 2000.*

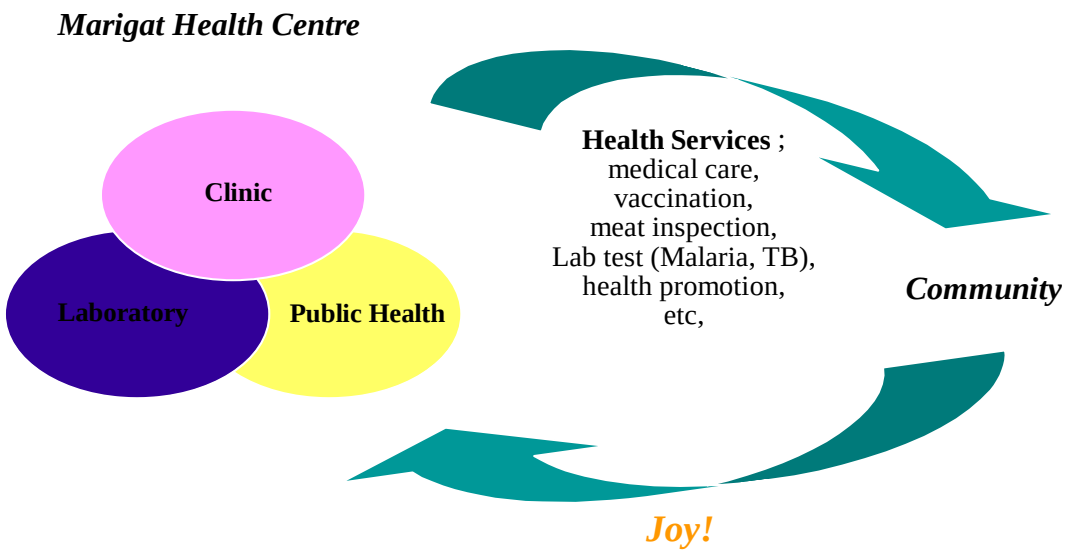


Figure: conceptual overview of PHC interaction

5. Output (originally expected/programmed)

1. *11 slideshows have been performed. 4 slideshow programmes have been developed.*
2. *People's health knowledge enriched (40% of154 interviewee answered that they saw the slideshow and among those who saw the slideshow, 55% acted something like boiling water more frequently than before.).*
3. *Diarrhoeal diseases reduced.*

6. Evaluation (in a rating of 1-5)

1) Efficiency	*4*	*Laboratory is functioning well after development. Cost of slideshow is as small as 500 prints of health promotion poster.*
2) Effectiveness	*4*	*Strengthened laboratory is more contributing to people's health and with slideshow people have got more knowledge about health.*
3) Relevance	*4*	*Because the Study Area has a lot of cases of cholera, malaria, yellow fever etc., PHC strategy is possible way of stopping outbreak of above diseases.*
4) Sustainability	*3*	*Financial stability of Government will constrain MHC activity.*

7. Capacity Building

1. *Incubator was missing in the laboratory, but finally MHC staff improvised an unused refrigerator to function as incubator. Through this improvisation, MHC staff became more confident.*
2. *Through the development of health promotion program and holing the slideshow, multi-sectoral collaboration (clinic, laboratory and public health) was promoted. (Picture on right hand is the preparation of slideshow in a village.)*

8. Impact and Outcome (other than originally expected/programmed)

Not observed

9. Verification 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.*

10. Way Forward

1. *Maintaining PHC policy with emphasis on the comprehensive PHC concept will be needed.*
2. *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.*
3. *Collaboration with Ministry of Water will be needed for both health promotion and water resource development.*

11. Rural Water Supply (Upper Mukutani)

1. Background

Delineation of the territories between Il Chamus and Pokots in the north edge of Upper Mukutani has been a cause of strife between the two ethnic groups. They share the natural resources around the border including an unprotected spring located at the side Il Chamus territory, which is one of the main water sources of domestic use and livestock for both ethnic groups.

2. Subject to Verify

To examine if the development can contribute to social stability where two tribes compete for the same source.

3. Input

1. *Materials (pipes, cements, Sand, culverts, plumbing accessories etc.): 1,200,000Ksh (10% borne by community)*
2. *Tools (Mattock, Shovel, Pipe cutter, Hand saw etc.): 60,000Ksh (Grant by Study Team)*
3. *Skilled Labor: 240 man-day: 216,000Ksh (Grant by Study Team)*
4. *Unskilled Labor: 1,210 man-day (100% borne by community): 109,000Ksh*
5. *Transportation: 254,000Ksh (Grant by Study Team)*

4. Implementation Process

1. *Construction started from July 11, 2001 and completed on September 22, 2001.*
2. *The community completed digging work for the pipeline trench (from July 11 to July 21, 2001).*
3. *Pipe-carrying by the community was completed (from August 1 to August 2, 2001) and pipefitting by skilled worker was completed by mid of August, 2001.*
4. *Training to 35 community members in organizing self-help operation and maintenance group by Department of Social Services was conducted on August 6, 2001.*
5. *Construction of intake structure and cattle trough by skilled worker was completed on August 11, 2001.*
6. *Outlet was completed on September 7, 2001 (earthwork by community from July 28 to August 3, construction by skilled worker from August 4 to September 7).*
7. *Appurtenant work by skilled worker was completed (from September 18 to September 22, 2001).*

Water Source (Spring)

5. Output (originally expected/programmed)

1. *Construction of water supply system completed (intake, pipeline, storage tank and out let, stand pipe and taps, two cattle troughs.*
2. *The spring located in IlChamus territory has been well protected and clean water is available from the outlet located at the Mukutani center (territory of Pokots).*
3. *Some 80 households or 400 people were estimated to be drawing water from the two water supply taps daily with two villages cutting water fetching distance by 2 Km.*

6. Evaluation (in a rating of 1-5)

1) Efficiency	*3*	*Construction was completed with little delay due to much rain. Long distance from town raised transportation cost. Otherwise the water supply facility has been used immediately after the completion of the construction.*
2) Effectiveness	*3*	*Community people can fetch cleaner water from the outlet and distance for fetching water was shortened by 2km.*
3) Relevance	*4*	*Because the project is related to BHN, the relevance of the project is rated high.*
4) Sustainability	*3*	*Since the project only recently was implemented, it is too early to make a conclusion.*

7. Capacity Building

1. *Organization of newly established operation and maintenance group still seems weak.*
2. *Sense of ownership of the community is challenging like other verification project sites. Although at the first time 50 men participated in the communal earthwork, the number of participants decreased and roamed around10 since they knew that the Study Team would not pay for their work.*

8. Impact and Outcome (other than originally expected/programmed)

1. *The community located near the hills would like a similar project using another spring called Lerlerai.*
2. *Competition for water with 7 irrigating farmers could rise particularly during dry season, although the community members including the farmers agreed to control water before the commencement of the project.*

9. Verification 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.

10. Way Forward

1. *The operation and maintenance group should be mobilized with the assistance of GOK and it is expected that the community members will learn some maintenance work and the Department of Water Development will transfer routine plumbing tools to the Committee.*
2. *In the area, people do not prepare cash at anytime, but save their property as a form of livestock. Therefore the operation and maintenance cost borne by the community should not be charged in a short cycle with small amount but one or two times per year with as much as the price of a goat.*

Outlet

Composition of Reports

Master Plan
Verification Study
Annex
- Master Plan
- Verification Study
- Water Source Survey for Domestic Water Supply

Manual

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ABBREVIATIONS AND GLOSSARIES

1. Related Agencies

CCF	:	Christian Children's Fund
DANIDA	:	Danish International Development Agency
DSS	:	Department of Social Services
GOK	:	Government of Kenya
GTZ	:	Deutsche Gesellschaft fur Technische Zusammenarbelt (German Agency for Technical Cooperation)
IMSC	:	Inter-Ministerial Steering Committee
JICA	:	Japan International Cooperation Agency
KARI	:	Kenya Agricultural Research Institute
KEFRI	:	Kenya Forestry Research Institute
MHC	:	Marigat Health Centre
MOARD	:	Ministry of Agriculture and Rural Development
MOH	:	Ministry of Health
MYP	:	Marigat Youth Polytechnic
NGOs	:	Non Governmental Organizations
NIB	:	National Irrigation Board
RRC	:	Regional Research Center
SIDA	:	Swedish International Development Agency
SIWUA	:	Sandai Irrigation Water Users Association

2. Glossaries

AMS	:	Agricultural Mechanization Station
ASAL	:	Arid and Semi Arid Land
BFFP	:	Baringo Food & Fodder Project
BHN	:	Basic Human Needs
BSAAP	:	Baringo Semi Arid Area Project
CBOs	:	Community-Based Organizations
DDO	:	District Development Officer
DFRD	:	District Focus for Rural Development
Div.FRD	:	Divisional Focus for Rural Development
DPO	:	District Programme Officer
FMD	:	foot and mouth diseases
IGA	:	Income Generating Activities
KRDS	:	Kenya Rural Development Strategy

KYS	:	Kampi ya Samaki
LCD	:	Liquid Crystal Display
MTEF	:	Medium Term Expenditure Framework
PCM	:	Project Cycle Management
PDDC	:	Project Design & Development Center
PDM	:	Project Design Matrix
PHC	:	Primary Health Care
PIM	:	Participatory Irrigation Management
PMC	:	Project Management Committee
PRA	:	Participatory Rural Approach
RAE	:	Rehabilitation of Arid Environment
RRA	:	Rapid Rural Appraisal
SARDEP	:	Semi-Arid Rural Development Programme
SDDP	:	Samburu District Development Project
SOFEM	:	Social Forestry Extension Model Project
SSIDP	:	Small Scale Irrigation Development Project
TOT	:	Training of Trainers

3. Unit of Measurements

mm	:	millimeter
cm	:	centimeter
m	:	meter
km	:	kilometer
sq.m	:	square meter
sq.km	:	square kilometer
ha	:	hectare
l, lit	:	liter
cu.m	:	cubic meter
MCM	:	million cubic meter
cu.m/day	:	cubic meter per day
lit/sec	:	liter per second
cu.m/sec	:	cubic meter per second
ppm	:	parts per million
pH	:	potential of hydrogen
EC	:	electric conductivity
g	:	gram
kg	:	kilogram
t, ton	:	metric ton
sec.	:	second
min.	:	minute
hr.	:	hour
yr.	:	year

ave.	:	average
min.	:	minimum
max.	:	maximum
kcal	:	kilocalories
kw	:	kilowatt
kwh	:	kilowatt-hour
%	:	percent
No.	:	number
℃	:	degree centigrade
cap.	:	capita
md	:	man-day
mil.	:	millimho
pers.	:	person
mmho	:	micromho
msl	:	meters above mean sea level
vpd	:	vehicle per day
ET	:	evapo-transpiration
N	:	nitrogen
P	:	phosphorus
K	:	potassium
Kenya shilling (Ksh)	:	Kenya shilling
K £	:	Kenya Pound (20 Kenya Shillings)
US$	:	US Dollar = 77.40 shillings = 118.80 yen (September 2001)

CHAPTER 1

Introduction

CHAPTER 1 INTRODUCTION

1.1 Objective of Verification Project

Objective of the Verification Project is to examine some hypotheses of development strategies/approaches, technologies and implementation arrangement. Through the actual implementation of several verification projects, these hypotheses are, with valuable lessons, to be evaluated and concluded into right aspects and definitions, which are considered to be more practical, more effective and more sustainable in the development of the Baringo Semi-Arid Land Area. Final Master Plan will be formulated with the outputs of the verification project.

1.2 Identification of Verification Project

Verification Projects were identified through the Phase I study conducted from August to November 1999. The study employed two major approaches of participatory approaches and conventional survey. In the participatory approaches, PRA and RRA methods were applied initially to withdraw community needs. Examining the needs rose to the surface, some five sites were selected to hold PCM workshops. These sites were presumed to be the sites of the verification Projects.

With the results of the participatory approaches and the conventional survey by the Study Team, the Provisional Master Plan was formulated, among the program of which verification projects were selected. Figure 1.2.1 and 1.2.2 show the formulation and selection process of the verification projects. Initially the verification projects consisted of four community-based projects and two institutional projects. Figure 1.2.3 shows the outline of the verification projects. Originally identified verification projects were as follows.

i) Improved Stove and Small-Scale Industries (Salabani, Kampi ya Samaki)

ii) Communal Resources Management (Participatory Irrigation Management and Livestock Improvement, Sandai)

iii) Food Security (Livestock Improvement and Rain-fed Agriculture, Arabal)

iv) Rehabilitation of Pan (Rugus)

v) Surveillance, Information and Support System Improvement of Epidemic and Endemic Diseases (Marigat Health Center, Marigat)

vi) Strengthening Marigat Youth Polytechnic (Marigat)

1.3 Implementation

The verification projects were implemented by means of the series of workshops with the community beneficiaries. Workshops that had been done were categorized with four stages including pre-selection stage of the verification projects. The categories were

defined as 1st: Prioritizing Strategies/Approaches, 2nd: Project Designing, 3rd: Monitoring and Mid-term Evaluation, and 4th: Final Evaluation. Followings are the calendar of these workshops.

1st Category
Time: August 1999 to October 1999 (Pre-selection of the verification projects)
Content: Stakeholder Analysis, Problem and Objective Analyses, Prioritizing Strategies/Approaches

2nd Category
Time: March 2000 to May 2000
Content: Project Designing (Formulation of PDM, Plan of Action)

3rd Category
Time: June 2000 to Nov 2000
Content: Monitoring and Mid-term Evaluation

4th Category
Time: September 2001
Content: Final Evaluation

During the project implementation, some components such as improved jiko and rain-fed agriculture were extended to outside the original verification project sites. Study visit to successful projects called "Learning from Best Practices" and a series of participatory monitoring activity together with the communities all in the Study Area, called "Inter-location Monitoring", contributed to the extension of the projects and some extent to capacity building of the people. Also additionally a rural water supply project in Upper Mukutani area was implemented from viewpoints of community needs and available resources in the course of the study. Implementation schedule of the verification projects are shown in Figure 1.2.4.

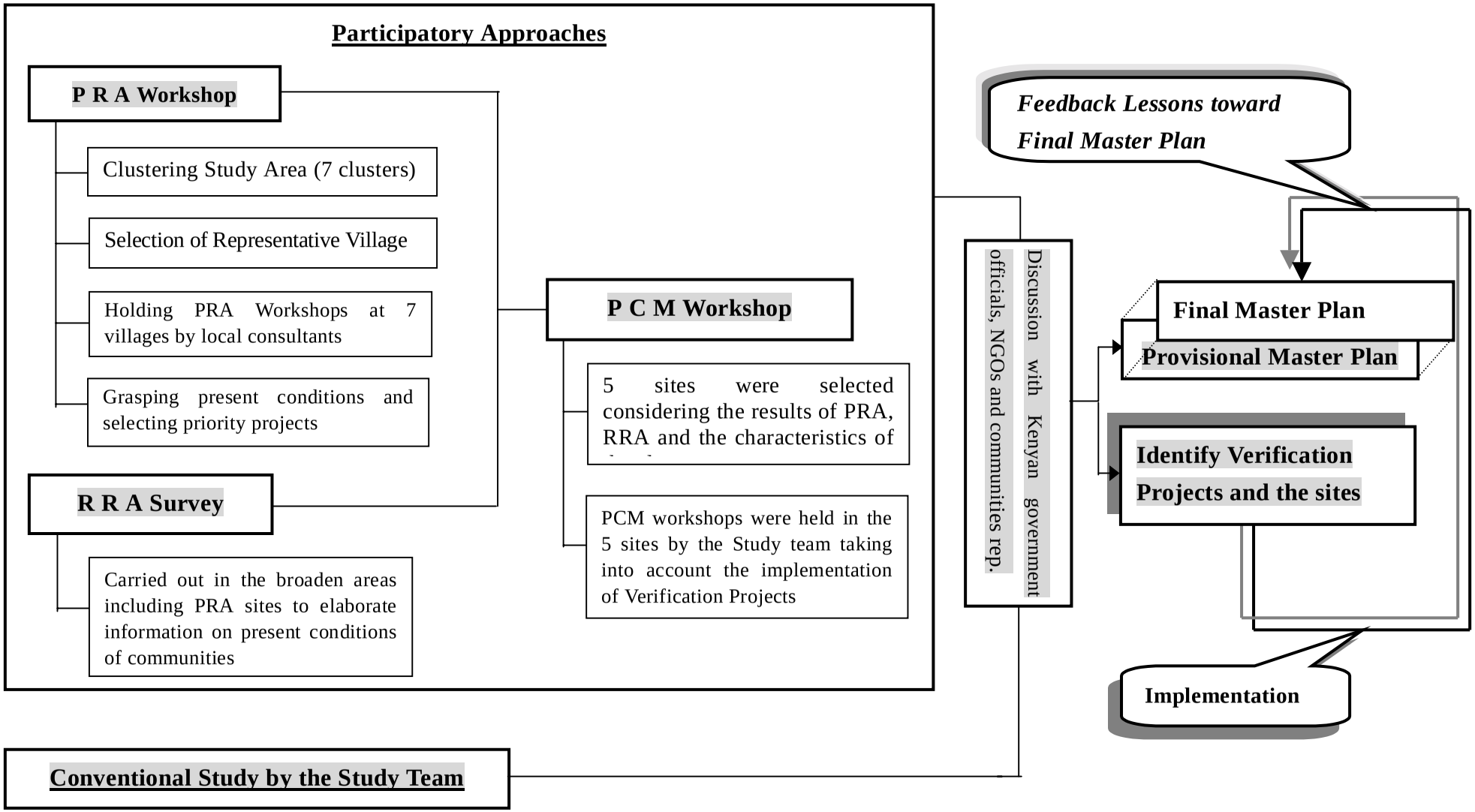


Figure 1.2.1 Formulation of Master Plan

Cluster	E, A	C	B, D	F	G
Location	**Kimalel, Marigat**	**Salabani**	**Eldume/Ngambo, Sandai/Loboi/Kapkuikui**	**Mukutani, Kiserian**	**Arabal**

Participatory Approaches

RRA

Major income source	Casual labor, agriculture, livestock, commerce(butchery, restaurant), charcoal making, bee-keeping	Livestock, bee-keeping, agriculture	Livestock, agriculture, bee-keeping, casual labor, teacher	Livestock, agriculture, fishery, bee-keeping, aloe picking	Livestock, agriculture, bee-keeping, aloe picking
Remark	Existing water tap、Cholera outbreak	longest distance to fetch firewood、Cholera	large number of livestock、Cholera、East coast fever	Large number of livestock, Cholera outbreak	Large number of livestock, Cholera outbreak

PRA

Priority Projects	Water supply(extension of existing pipe) Improvement of Kemoigut primary school Construction of irrigation dam Construction of Water Tank	Construction of borehole Expansion of Loturo dam	Construction of intake facility (irrigation) Completion of Ilnga'rua dispensary Construction of Kamaech dam Construction of dispensary	Utilization of Ngasotok river for irrigation Road improvement	Expansion of Arusin Pan Intake water from Arabal river

PCM

Place of workshop	Kampi Turukana	Kampi ya Samaki	Sandai/Loboi/Kapkuikui	Rugus	Arabal
Core problem	Villagers of Kampi Turukana do not have enough money	Low standard of living of People in Kampi ya Samaki	Villagers of Sandai/Loboi/Kapkuikui do not have enough food	People of Rugus cannot get clean water	People of Arabal have low income
Priority projects	1)Villagers can sell ballast and other products well 2)Villagers get skills	1)People access clean water 2)Peaople have enough income	1)Good yields of food crops 2)Healthy reproductive animals	1)long standing pan/people and cattle separately 2)Clean water to drink	1)Improvement of livestock production 2)Reduction of diseases
Output	1-1Organization to manage activity is established 1-2They can get enough buyers 1-3They can make different varieties 1-4They can make quality ballast	1-1More water sources 1-2Treatment of available water 2-1Favourable fish price 2-2Fair fish production 2-3Good prices for honey	1-1Irrigation 1-2Certified seeds 1-3Good farming method/Pests & diseases control 1-4Good storage 2-1Prevention of animal diseases	1-1A long standing pan 1-2Separate pan from livestock	1-1Healthy animals 1-2Good price of livestock 1-3High animal production 2-1Drinking treated water 2-2Less presence of houseflies 2-2Health services received daily

Sector Approach

- Income generation
  - Agriculture
  - Livestock
  - Small-scale industry
- Capacity building
  - Rural sociology
  - Administration system
  - Human resource development
- Infrastructure
  - Environment
  - Health and sanitation
  - Rural infrastructure

Provisional Master Plan (Short-term)

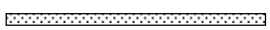
Strengthening KARI-RRC Strengthening Marigat Veterinary Office Establishment of bull/buck camps or scheme Skin and hides marketing Bottled honey Strengthening Marigat Health Centre Support to Marigat Youth Polytechnic Water supply Improved stove Household tree planting Rehabilitation of denuded and eroded land Electricity services	Bottled honey Handicraft Cultural centre Improved stove Fried fish marketing Rehabilitation of denuded and eroded land Water supply Electricity services	Water saved irrigated agriculture Land registration Modernized livestock feeding Pasture development with tree planting Bottled honey Handicraft Skin and hides marketing Rehabilitation of denuded and eroded land Telephone services	Rain water harvesting Support to pre-primary school Water supply Utilization of pan's sediment in connection soil conservation Conservation of pan's catchment	Rain water harvesting Animal disease control Bottled honey Support to pre-primary school Rehabilitation of denuded and eroded land Road improvement

Verification Project

Strengthening Marigat Youth Polytechnic	Improved stove＋Small-scale industry	Communal resource management(PIM＋Livestock improvement)	Rehabilitation of Pan(through primary school)	Food security(Livestock improvement＋Rain water harvesting)
Surveillance, Information and Support System Improvement of Epidemic and Endemic Diseases (Marigat Health Centre)				
Learning from best practices				

Note: Underline is related to Verification Projects. Strengthening Marigat Health Centre was selected as a verification project for it is the most effective way to tackle the problems of health and sanitation in the Study Area.
Learning from best practices will be carried out during the period of verification projects in order to contribute to people's capacity building through the activities for verification projects.

Figure 1.2.2 Process for Formulation of Verification Projects

Location (Administrative Boundary)	Kimalel	Marigat	Salabani	Eldume Ngambo	Sandai Loboi Kapkuikui	Mukutani Kiserian	Arabal
Cluster	E	A	C	B	D	F	G
PRA/RRA	○	○	○	○	○	○	○
PCM	○		○	○		○	○
Characteristics	Cosmopolitan, Commercial			Swamp, Crop field		Traditional, Pastoral	Livestock, Newly settled
Topography							

Verification Projects	1. Surveillance, Information and Support System Improvement of Epidemic and Endemic Diseases 2. Strengthening of Marigat Youth Polytecnic 3. Improved Stove + Small Scale Industry (Kampi ya Samaki)			4. Communal Resource Management (PIM + Livestock Improvement) (Sandai Sub-location)	5. Rehabilitation of Pan (Rugus Sub-location)	6. Food Security (Arabal Sub-location)
Concept	1. Utilization of existing Marigat Health Centre for both human and animal health	2. Creation of job opportunities through woodwork and skill improvement	3. Energy conservation together with Income generation	PIM with modernized animal feeding program etc. leading to nutrition improvement	Community pan management through Rugus Primary School	Diversify and secure the food sources
Major Activities	Utilize the laboratory of Marigat Health Centre for disease surveillance to analyze and identify the infection mechanizm. The centre will have an advisory function to inform communities to prevent epidemic and endemic diseases. Health staffs will go to visit community to support disease prevention activities.	Renovate woodworking course at the Marigat Youth Polytecnic. MYP will cooperate with Juakari artisans and local women groups by renting tools, hence contributing to local economy. MYP is amied to be one of the center to cooperate with community.	Introduce Improved Jiko to women groups. The improved Jiko can reduce consumption of firewood (environmental conservation) and labor, hence the members of the groups can spare more time to the income generating activity such as fish processing and beekeeping. New packaging and advertisment activity will be done for honey selling targeting especially tourists.	Introduce PIM (Participatory Irrigation Management) for efficient water management. This can increase cropping intensity and supply by-product for livestock feeding with improved tools, which contributes to enhancement of nutrition status and income generation with milk production in the middle term of development plan. Buck to improve breed will be also introduced.	Organize community through teachers at Rugus Primary School and rehabilitate pan for rural water supply. Desilt existing pan, construct silting basin upperside of the pan, soil protection by grass planting in the catchment area, and fence around the pan. The fertile soil excavated from the pan will be put in the farmland for better farming. School children would be good conveyers of written information.	Control animal disease by introducing hand sprayer. Use by-product of crops for fattening animals before auction. Introduce castrators for better breeding and milk production. Buck to improve breed will be also introduced. Introduce drought resistant crops such as finger millet and sorghum. Introduce rain water harvesting (prepare collecting channel, dike and ditch at on-farm level).
	7. Learning from Best Practices Visit successful projects near the Study Area with district government officers and community members.					
	Handing over the outline of Master Plan and the result of the verification projects to Location Development Committee					

Figure 1.2.3 Outline of Verification Projects

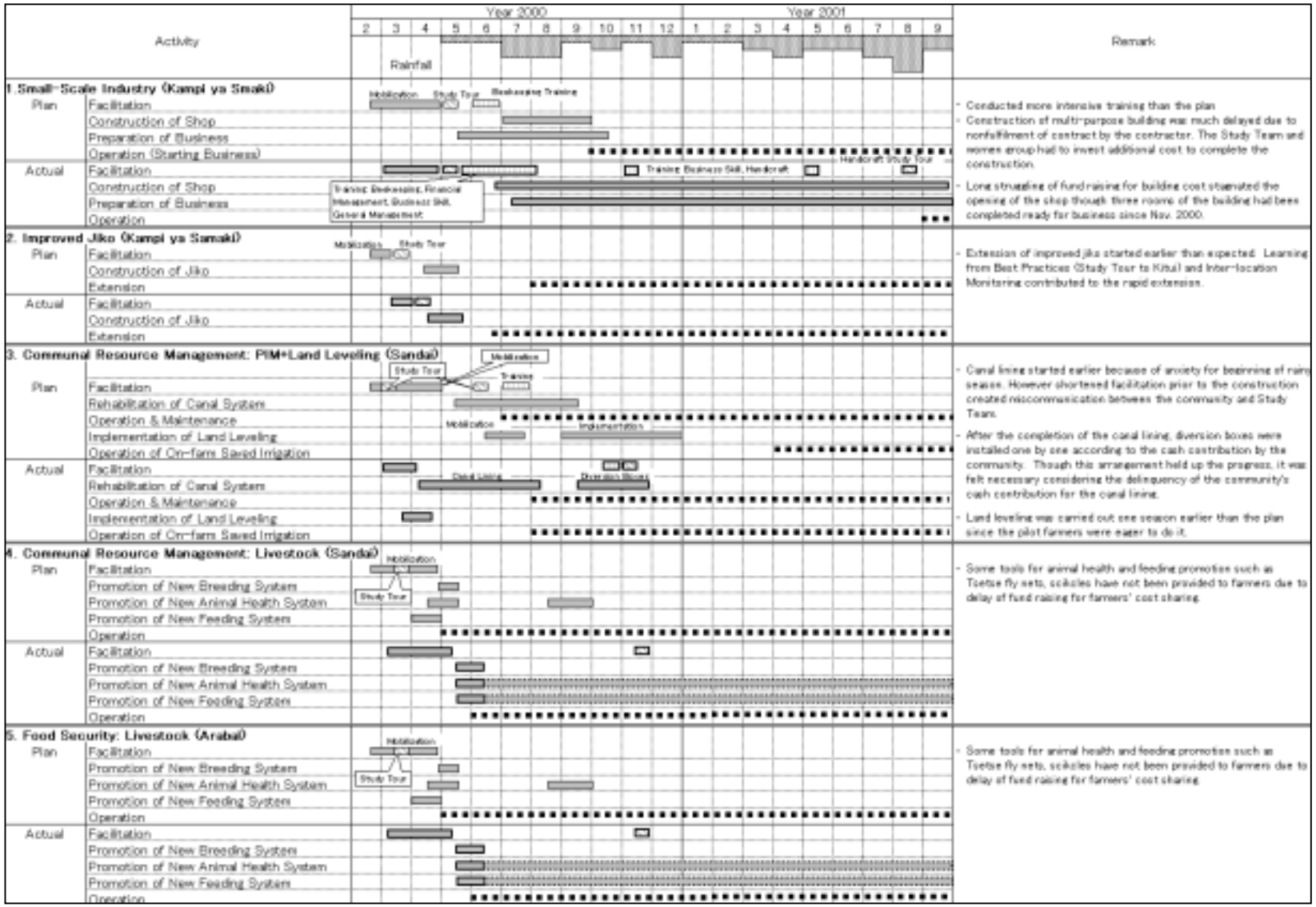


Figure 1.2.4 Schedule Change of Verification Projects (1/2)

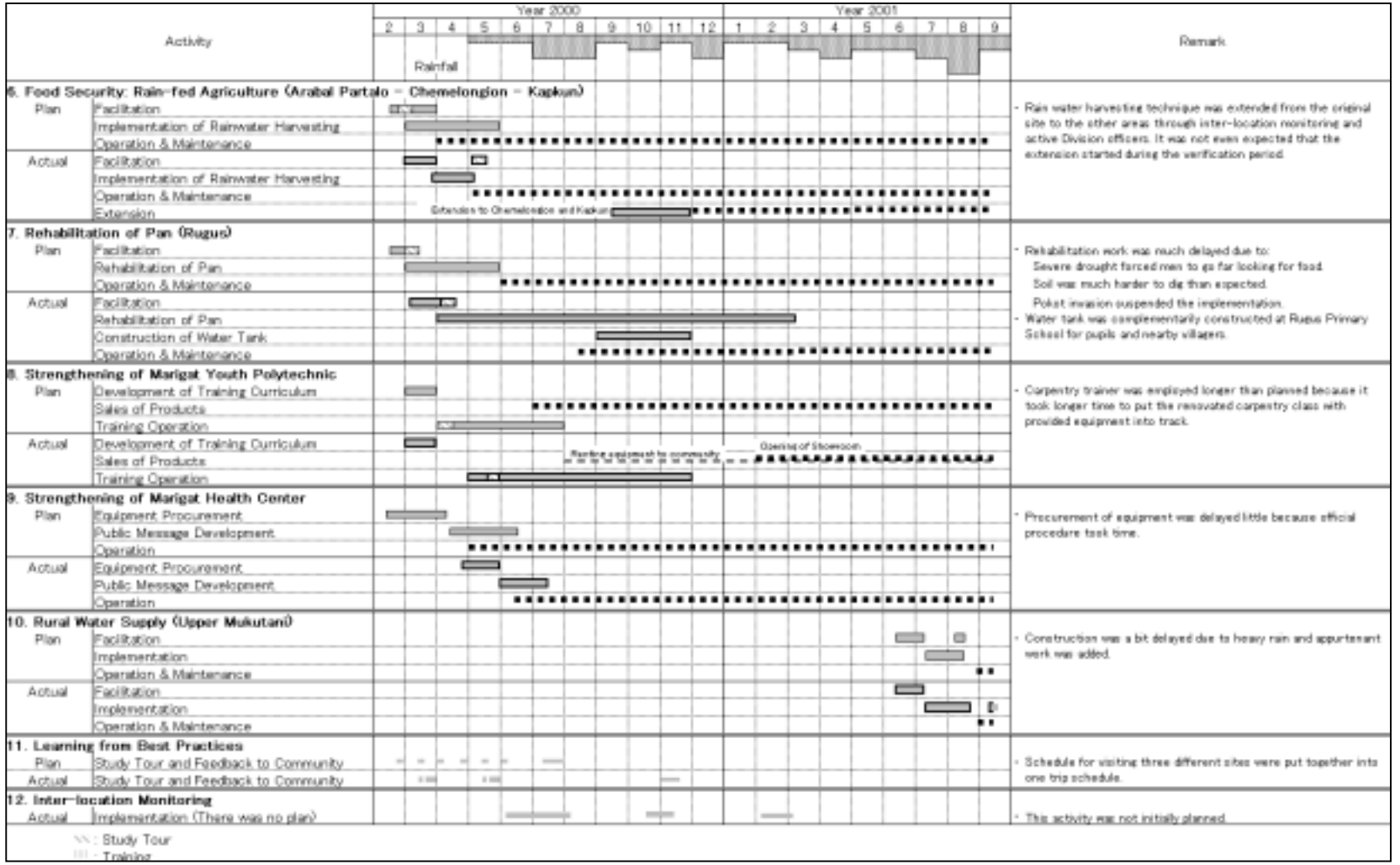


Figure 1.2.4 Schedule Change of Verification Projects (2/2)

CHAPTER 2

Record of Implementation

CHAPTER 2 RECORD OF IMPLEMENTATION

2.1 Small-Scale Industry (Kampi ya Samaki)

2.1.1 Background

1) The Project Area

Lake Baringo with numerous birds, crocodiles and hippopotamus and well-equipped hotels has been attracting tourists. Kampi ya Samaki, located lake shore of Baringo, receives about 30,000 visitors annually, among whom roughly 35% are foreigners. High potential of business chances brought many people to live from different areas and different ethnic groups. This area is called “cosmopolitan” pre-dominated by Il Chamus, Tugen and Turkana.

However, the area is not a “melting pot”, but people keep some distance from other ethnic groups. Il Chamus who came first and used to dominate in this area were pushed down to the south of Kampi ya Samaki and living together in the same villages, rather than absorbed or mixed in other unit. Turkana people are also living together in Kampi Turkana near town. Women’s groups are mostly formed with the people from same ethnicity, except for the one formed in town center.

Most of the people are still linked to their rural locations; they still select leaders linked to their original area. This makes the promotion of universally accepted groups very difficult. Leaders also tend to align themselves on ethnic groups. Their convictions, beliefs and ideas have greatly influenced the thoughts and attitude of women’s group leaders and members.

The boundary between Salabani and Partum is vague and it often becomes a cause of dispute among local leaders. Some women who live in this area are not sure to which location they belong. As a result, no matter where they live, they are linked to their original place.

2) Verification Purpose

In spite of high potential of tourism in Kampi ya Samaki area, community based and well operated business was not found in the area. One of the verification purposes was to examine if women could utilize their resources such as fish, handicraft and honey, through a group activity, to generate income sustainably.

Though many registered women’s groups are found in the Study Area, the cases are rare to find active group or well succeeded on generating income, while energetic women doing individual business are recognized in town centers. Under such circumstances, the verification project in Kampi ya Samaki was planned to examine whether the women’s

group would be activated and strengthened through the preparation process of business and multi-purpose building or venue to generate their activities, so that their own various development activities go on in dynamic way and continuously than before the program.

3) Strategies / Approaches and Project Purpose

According to the problem tree prepared during the PCM workshop held in October 1999, core problem recognized by participants was low standard of living of the people in Kampi ya Samaki, and the prioritized approaches to solve this problem were 1) People of Kampi ya Samaki keep clean water and 2) People of Kampi ya Samaki have enough income.

Fetching firewood is considered as women's work, and is time consuming activity due to the scarcity of firewood. With the combination of introduction of improved cooking stove, which can save firewood and help women to create spare time (discussed in the following section), construction of multi-purpose building and promotion of existing small scale industries were selected as a verification project. The project purpose of the verification project was to generate income of women in Kampi ya Samaki and its surrounding area.

2.1.2 Project Design

To accomplish above mentioned project purpose, five activities in the verification project at Kampi ya Samaki were identified during the workshop; namely, a) multi-purpose building is constructed and managed properly, b) handicrafts are promoted, c) honey business is promoted, d) fish processing is promoted, and e) improved Jiko is introduced. Introduction of improved cooking stove could provide women with spare time to do other activities, so that they could be engaged in income generating activities such as handicraft making, honey business and fish processing. Then the prepared products could be marketed at the multi-purpose building.

By accomplishing these results/outputs, Project Purpose of "Women in Kampi ya Samaki and its surrounding area have enough income" and Overall Goal of "High standard of living of the people in Kampi ya Samaki and its surrounding area" were expected to be realized. "There is peace and security" and "Muungano women group continue to work as one unit" are specified as Important Assumptions. Those assumptions could be the reflection of the fears they have, which might lead to the failure of the verification project. Narrative summary and indicators from PDM prepared during the workshop in April is as follows.

Table 2.1.1 Narrative Summary and Indicators for the Verification Project in Kampi ya Samaki

Narrative Summary	Objectively Verifiable Indicators (Planned)
Overall Goal High standard of living of people in Kampi ya Samaki and its surrounding area	
Project Purpose Women in Kampi ya Samaki and its surrounding area have enough income	The number of women receiving low income decreases by 30% by the end of year 2001.
Results/Outputs 1. Multi-purpose building is constructed and managed properly 2. Handicrafts are promoted 3. Honey business is promoted 4. Fish processing is promoted 5. Improved Jiko is introduced	1. Building constructed and well maintained by September 2001. 2. 200 baskets and 50 belts sold per month by September 2001. 3. 100 bottles of honey sold per month by September 2001. 4. Snacks sales cannot be predicted. 5. 15 jiko buyers per month.
Inputs 1. Plots for multipurpose building (GOK) 2. Construction of multi-purpose building 3. Five frying pans for fish frying 4. Twenty beehives 5. Other materials for hives 6. Refining materials 7. Honey jars and label (500)	

Plans of action for above listed five results/outputs were also discussed and designed. The load of labor on women imposed by domestic responsibilities was identified as an important assumption in honey group, while lack of common language (Swahili) was identified as a serious constraint in fish group.

2.1.3 Implementation Record

Following table is the summary of implementation record at Kampi ya Samaki verification site.

Table 2.1.2 Summary of Implementation Record

Year	Mon.	Presence of Study Team	Meeting (times)*	Major Activity	Building Construction	Training/Study Tour
2000	Mar			Action Plan was prepared to promote IGA		
	Apr		2-G	Muungano Women Group was organized		Leadership Training (Social Service)
				Land was acquired from Country Council		
	May					Handicraft Study Tour to Nairobi (JICA)
						Financial Management Training (JICA)
						Business skill training (JICA)
	Jun		2-C	Design of building		General Management training

				Selection of contractor	Building construction started	
				Preparation of by-laws		
	Jul		2-C	Fund raising for building		Fish processing training (JICA)
			4-G			
	Aug		2-G			Honey processing training (JICA)
						Inter-location monitoring tour (JICA)
	Sep		2-C			
			2-G			
	Oct		2-C	Discussion on business operation		
			3-G	Fund raining for electricity wiring		
				Fund raising for business		
	Nov		2-C	Election of sub-committee members for business		Inter-location monitoring tour (JICA)
			4-G	Necessary items for business purchased		Handicraft training (JICA)
				Membership registration closed		
	Dec		4-C	Signposts on road side and in front of the building placed		Business skill training (Social Service)
2001	Jan		2-C			
	Feb		4-C			Budget planning workshop (JICA)
	Mar		3-C		Toilet construction completed.	
			3-G			
	Apr		2-C	Discussion on business operation		
			2-G			
	May		1-C			Training on election (Social Service)
	Jun		2-G			
			2-C			
	Jul		1-C	Re-election of committee members		
			2-G			
	Aug		3-G		Completion of wall painting of shops	Study Tour to Handicraft shop
	Sep		3-C	Employment of shopkeepers and watchman		
				Handicraft Shop open.	Completion of building	

Note: *Number of times for the meeting, C-Committee Meeting, G-General Meeting

1) Establishment and Dynamic Changes of the United Women's Group

When construction of multi-purpose building was mentioned as a verification project during the workshop in March 2000, participants came from different women's groups all agreed including the condition of ten percent of cost sharing from the beneficiary side. Initially building design drawn by women were structured with many small rooms for each

individual women's group. As the discussion continued, three major businesses were identified and participants decided to have three shops namely honey, handicraft and restaurant where they can sell fish.

Since that day, the number of women who come to the meeting became bigger and bigger. Materialized benefit was recognized and expectation and interests for multi-purpose building moved many people including local leaders. Initially, 14 women's groups were identified as an interested group to participate in the verification project. However, as shown in the following table, the number had increased up to 19 as a result of splitting of old women's groups and formations of new groups. The number of each group members also increased due to new comers.

Table 2.1.3 Women's Groups under Muungano Women Group

	Name of WG	Activity	Ethnic Group	No. of member
1	Meisori	honey, curio	Il Chums	12
2	Tilapia	nursery, merry-go-round	Mix	29
3	Lorecho	Curio	Il Chums	24
4	Turkana	craft, second-hand cloth	Turkana	12
5	Kampi ya Samaki	craft, curio, fish	Mix	40
6	Longiron	chicken, merry-go-round	Il Chums	10
7	Kelelu	curio, craft	Il Chums	12
8	Salabani	Curio	Il Chums	22
9	Ngenyin	fish, sheep	Mix	30
10	Lontiani	curio, chicken, merry-go-round	Mix	28
11	Ilchenisirwa	chicken, goat	Il Chums	21
12	Turkana Nangolia	craft, curio	Turkana	35
13	Kokwo	Fish, craft	Il Chums	28
14	Kokweita	Curio	Il Chums	22
15	Lekiricha	chicken, sheep, merry-go-round	Il Chums	20
16	Kapsoi	honey, craft	Tugen	32
17	Kapkirwak	craft, curio	Tugen	47
18	Kipkimbirwa	chicken, craft, honey	Tugen	20
19	Tuwet[*1]	Handicrafts	Pokot	24
	Total			468[*2]

Note *1 Affiliated members were only four after the registration deadline and they were absorbed into other groups.
*2 Finally registered number was 401.

The 19 women's groups had agreed to form one umbrella organization that they named "Lake Baringo Muungano Women Self-help Group" with the aim of promoting construction of a multi-purpose building for marketing products made by the women such as handicrafts, processed fish and honey. Initially, their plan was to rent out each room to

individual women's group based on their business interest, as shown in the following figure. Later on, its structure had changed as indicated in Figure 2.1.2.

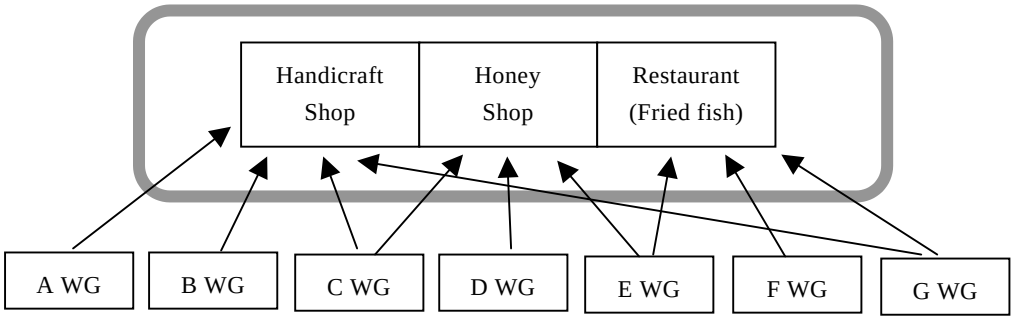


Figure 2.1.1 Structure of Shop Operation (before change)

Nineteen committee members were elected from each affiliated women's group, and five officials of Muunigano Group (chairlady, vice-chairlady, secretary, vice-secretary and treasurer) were selected among them. The procedure made to select their committee members helped them to keep balance among different ethnic groups. The Muugano group was registered with the Department of Social Services and had applied and acquired a building plot from Baringo County Council. The plot is located near the post gate considering security and future development potential, after the comparison among three proposed sites by the women's group.

Initially, number of women who showed interest was 551. However, when required membership fee of Ksh270 was announced to the tentative members of Muungano, 83 women had dropped out by realizing the necessity of cost sharing and the building was not a given present from JICA. On the other hand, many women struggled for fund raising. Some sold goat or chicken, others made charcoal, and some carried water or firewood to sell in town. Registration period was tentatively closed after about half a year from July to November, and total member became 379 as of November 18, 2000.

Severe drought of the year 2000 made women who were interested to join the group difficult to prepare this amount of money. To coop with such situation, the deadline for registration was postponed up to December 2000, given the last chance for those who were eager to start activity together, and finally total registered members became 401. Four (4) members from Tuwet women's group were absorbed to other group rather than registered as an independent affiliated group having only four members. As a result, total number of affiliated women's groups became 18.

After nine months had passed since the formation of Muungano Women's Group, they changed the concept of umbrella women's groups from the structure of Figure 2.1.1 to Figure 2.1.2 below. The idea of direct link of individual member to each shop was

introduced to keep equality among Muungano members. Basically, each Muungano member can access to any shop and business activities through committee. Registration period was terminated and it became impossible for new comers to be a Muungano member afterward, but women decided to open the door for outsiders including non-Salabani people to access to handicraft shop with higher registration fee.

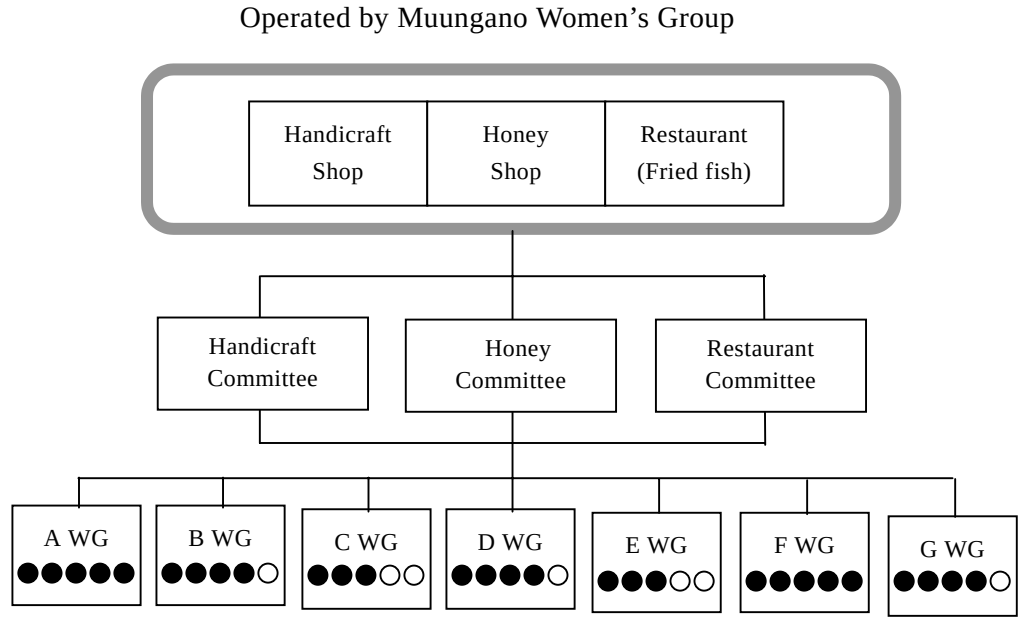


Figure 2.1.2 Structure of Shop Operation (after change)

While they waited for the completion of the building construction, continuous discussion over business preparation was made, and the group decided to form sub-committees for each business. Five members for honey business, nine for handicraft and five for restaurant were elected, and chairlady of Muungano group and each representative of sub-committee went to Nairobi and Nakuru to purchase equipments required to start shops. For the purpose of business preparation, as well as toilet construction, fencing of their plot and electricity wiring, additional fund raising was initiated since October 2000. As of September 2001, each member had paid more than 800Ksh or on the process to clear the balance.

Because of this fund raising and necessity of business preparation, committee members had gathered frequently and the general assembly was organized to discuss about various issues. Following figure shows the number of meeting held at each month with reference of period of the Study Team presence. The meeting was held frequently, as many as six times, in July 2000 for fund raising, November 2000 and March 2001 for business preparation, but basically they assembled throughout the implementation period no matter whether the Study Team was present or not. These regular meeting helped the group more united and strengthen the committee members.

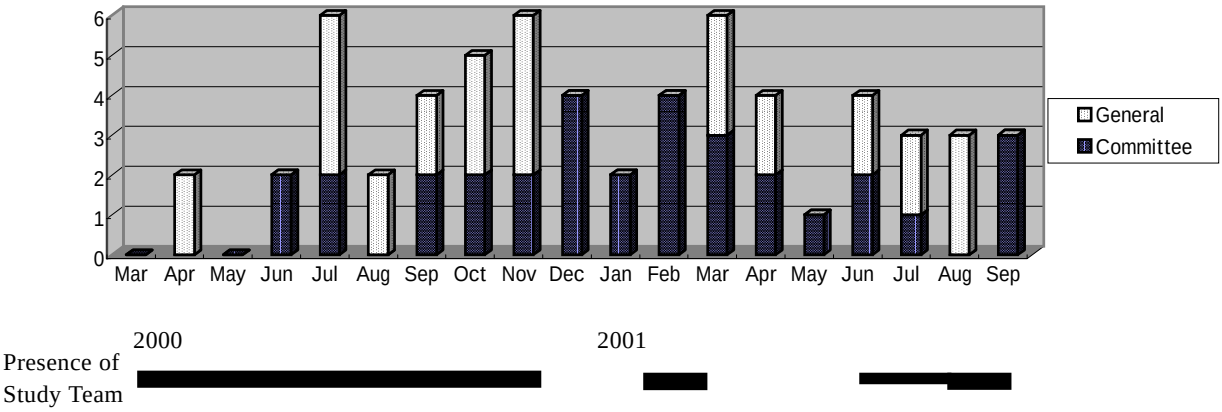


Figure 2.1.3 Frequency of the Meeting

Compared with other communities implementing other verification projects, Muungano women's group had the highest ratio of repayment, as seen in the table below. The reasons are presumed as follows.

- Group members trust each other so that they could entrust their share (some people in other community noted that they did not want to contribute their money because of no confidence in treasurer or secretary of handling their money).
- Muungano women's group was newly formed by desired and affordable women and not the group existed with members who have different needs.
- Women might be more responsible or feared for loan compared with men (many women explained that the business commencement delayed since they had prioritized repayment to JICA rather than considering about business commencement).

Table 2.1.4 Payment by Community (as of September 17, 2001)

Place	KYS	Sandai			Arabal		Rugus
Activity	S-S Industry	PIM	Water svd Agri.	Livestock	Livestock	Rain-fed Agri.	Pan
Total (Ksh)	180,398	336,066	16,632	25,890	22,786	11,862	27,765
Progress	96.9%	15.5%	0.0%	91.5%	96.6%	18.1%	0.0%

Instead of investing their money for business preparation, group spent their collected money for repayment. Delay of building construction was also a big factor for them to hesitate shop opening. The completion of building delayed for ten months because contractor did not execute the contract due to price escalation of materials and opaque management of money. Their initial plan was to start their shops in December 2000. Members negotiated with the contractor to finish up painting wall at least the front rooms

for shops. Finally, painting of three rooms was done in August 2001. To prepare for the shop opening, they reelected committee members of Muungano Women's Group. All of the members were reelected besides secretary who had moved out from the community.

The women's group employed a shopkeeper, selected from four applicants by interview, and finally handicraft shop was opened on 14th September 2001. Since then, 38 bottles of honey, two baskets, four bangles, two belts, three necklaces and one chair were sold. Ten bottles of honey were brought to Lake Bogoria hotel and one for Lake Baringo Hotel as a sample, and the group was waiting for the order.

2) Construction of Multi-Purpose Building

When the construction of multi-purpose building, where they can sell their products and promote income generating activities, was proposed from the Study Team, women all agreed on that idea. They firstly preferred to have separate rooms for each original women's group with two main structures, since they initially felt that it would be hard to work together with other groups. However, after the consideration of construction cost, which is not a free provision of JICA but 10% (135,000Ksh) had to be borne from the group, they agreed to start with one building of 210m^2 with shops for three major businesses, namely handicraft, restaurant/processed fish and honey. Women in the area decided to form one united group for the construction and following management of the building.

Design of the building was planned based on the request of women, as below.

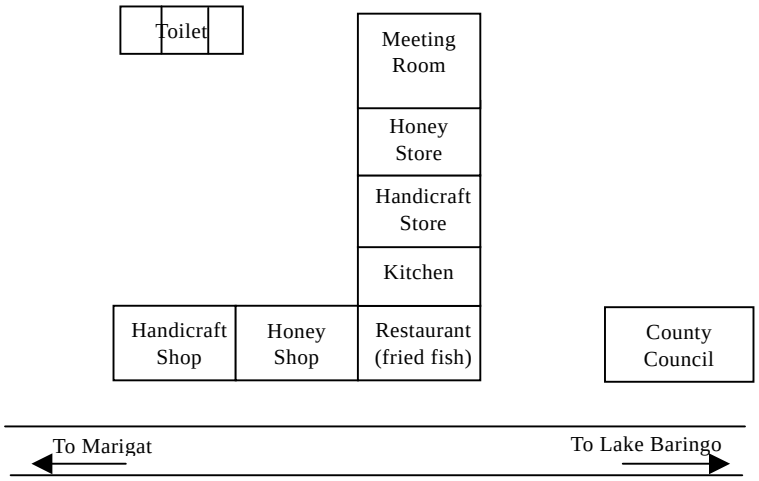


Figure 2.1.4 Design of the Multi-Purpose Building

As for the contractor for building construction, one of the contractors from Kabarnet was selected by the Study Team initially. However, women claimed about their previous work and preferred to choose the one based at Kampi ya Samaki, so that they can claim to the

contractor anytime, even after the completion of the building. The Study Team negotiated with the second contractor about the cost and he agreed to reduce the cost up to the estimated price. As a result, the contractor from Kampi ya Samaki was selected by the request of the women's group.

Contract agreement was signed with the presence of committee members of women's group on June 26, 2000. Construction work began on June 29, and personnel from Kabarnet County Council attended the first day of the construction. The foundation was completed on July 11, and as of the day of July, the wall of the building came up as high as about 2 m, showing the smooth construction up to that point.

Though the construction of the building had been smooth at the initial stage, fund raising of women started dropping sharply since severe drought made women difficult to find spare time to engage in income generating activities. To cope with such situation, an arrangement was made between the contractor and the women. It was planned for a women to be paid 10Ksh per fetching water from Lake Baringo to the construction site in order to raise the fund. Though many women have been participating, money paid from contractor did not turned out due to need of cash to buy food.

As time went by, women had managed to prepare fund for construction and it was paid to the contractor directly while 90% of the construction cost was paid by JICA. However, the construction delayed especially for the rear rooms. The construction work finally stopped in December 2000. The contractor claimed the shortage of money due to inflation and price escalation of materials. Though the issue could have been brought to court, it was agreed through the deliberation between the Study Team and the contractor that the contractor would work as much as possible with remaining payment, though the completion of the building could not be expected.

Discussion was made between women's group and the Study Team over this issue, and it was decided to finish rest of the construction work (rear three rooms) by preparing additional money. Women's group agreed to prepare 4,010Ksh while rest would be provided by the Study Team. Cost estimation was done together with the women, Home Economic Officer and the Study Team, and they looked and arranged for a supervisor and materials, rather than having another contractor. Since the work started, at least one woman was at the site to monitor it and to arrange additional necessary materials. The construction work had finished in September 2001.

3) Training

Since women in Kampi ya Samaki decided to form a united group, build multi-purpose building and start businesses utilizing the venue, series of trainings and study tours were organized to support women acquiring necessary skills and capacity. Following table is the list of training and study tour provided from April 2000 to August 2001.

Table 2.1.5 Trainings and Study Tours provided for the Women's Group

Date	Item	Trainer/Facilitator
April 2000	Leadership Training	Social Service
May 2000	Handicraft Study Tour	Consultant
	Financial Management	Consultant
	Business Skill Training	Consultant
June 2000	General Management Training	Consultant
July 2000	Fish Processing Training	Fishery Department
August 2000	Honey Processing Training	Consultant
November 2000	Handicraft Training	Consultant
December 2000	Business skill	Social Service
February 2001	Budget Planning	Study Team
May 2001	Training on Election	Social Service
August 2001	Handicraft Study Tour	Home Economic Officer

3.1) Leadership and Group Dynamics

Due to the significance of leadership quality to initiate and operate large size of group, trainings on leadership and group dynamics were provided by a Social Service Officer in April 2000 and May 2001. They were programmed before the election of committee members, so that women could select their qualified representatives, and elected members could take the responsibility of whole members.

3.2) Business Skill

It was observed that the women's group had had difficulties in accounting and bookkeeping for both; group operation and business management. The Social Service Officer and local consultants were therefore invited to conduct training to the women's group in May, June and December of 2000 and February and May in 2001. In addition to that, workshops for a budget planning of the business were carried out in February 2001.

Even though trainings to the committee members in charge of business and group management were provided, they still had difficulties to keep record. Continuous but ad hoc support would be required in on-the-job manner to run the business properly as well as the continuation of group activities.

3.3) Technical Skill and Marketing Strategy

a) Handicraft Training

Study Tour to Nairobi

Since many women have been making handicraft to market locally, promotion of curio/handicraft was identified as one of the important activities in the area. Study Tour for Handicraft and Marketing was organized with the main objectives of observing proceeding shops in terms of quality and price control and to learn marketing strategy. Study Tour to Nairobi, visiting souvenir shops, open market and Product Design & Development Center (PDDC) was carried out in May 2000, taking selected ten (10) women from each ethnic group.

Although lack of marketing had been understood as the major problem by women in the area before the tour, they realized that it is themselves to change rather than changing surrounding environment after observing high quality of products in Nairobi and were provided lecture on marketing at PDDC. Consequently, they requested the training courses to improve their product design and color. After the tour, they summarized the issues they learned as follows:

- Utilization of local materials
- Difference between their techniques and the one seen in Nairobi
- How to arrange products in the shop to attract customers
- How to contact customers

Marketing Strategy

Having seen souvenir shops in Nairobi through handicraft study tour, some of the women felt that improving their skills and design of handicrafts are necessary to market their products. One staff from PDDC, where ten women visited during the tour, was invited for resource assessment at Kampi ya Samaki. Women gathered and brought at least one item each to show him her crafts. His overall comments on handicraft improvement are summarized as follows.

- Some of the traditional items such as earrings brought by Il Chamus women are unique and preferable by foreigners.
- Visiting outside of the area is useful to know what is marketable.
- Simple design and color are better.
- Using local materials makes the products more attractive and production cost reduced.
- Hints on the layout of handicraft shop such as preparation of storyboard and shelves.

After the assessment, women selected three training courses available from PDDC, namely sisal development, soap making and candle making.

Sisal Development

The trainer, developed her skill at training course of PDDC and had been marketing the products of her group through the organization, was invited for four-day training on sisal development and marketing from November 13 to 16, 2000. Participants of this training were 20 in total; out of whom, nine were sub-committee members of handicraft under Muungano Women's Group and others were selected by the members. Lunch was prepared by sub-committee members of restaurant under Muungano. Participants and trainer were all satisfied with their service.

Participants learned how to make sisal basket, dye materials using chemical and natural coloring, and make basket using several colors. In addition to the technical training, other messages were taught such as 1) products have to be handled under clean environment, 2) natural color is preferable by foreigners, 3) marketing target can be outside of the area with their experiences of selling their products and 4) purchase materials in cheaper price, etc.

In the first day of training, about one third of participants came late and one absentee was found in the second day. Two of them were replaced by other women who intended to attend the course.

Study Tour to Mogotio

A study tour to handicraft shops in Mogotio was initiated by a Home Economic Officer in Marigat. It had been organized in August 2001, right before the handicraft shop opened, to check the price of crafts, way of layout, attitude of shopkeeper, etc. Since the aims of participants were clear, the tour was effective.

b) Soap and Candle Making

Training on soap and candle making was carried out in November 2000. Because of honey business having in the multi-purpose building, candle-making course was chosen to utilize by-product of honey. As for the soap-making course, even though the target of their business at the building was tourists, they wanted to have something for local people which might support running business during the off-season of tourism. Since this course was open to anybody who wished to attend, there were 68 participants in the first day and 128 in the second day.

Contents of the soap training were; 1) definition of soap, 2) uses of soap, 3) brief theory on soap, 4) identifying the materials used, 5) locally available material used in soap making, and 6) practice and procedure.

Candle making was taught with the contents of; 1) introduction to candle making, 2) materials used, 3) material preparation and locally available materials, 4) tools used, 5)

procedure and practice, and 6) designs and decorating of candles.

c) Fish Processing and Marketing

Fish processing and marketing training was provided in July 2000, to support for coming activity at the restaurant of multi-purpose building. The training was aimed at introducing techniques that could produce variety of fish products. Participants learned the importance of maintaining cleanness throughout the whole process of fishing through sorting, gutting, processing and marketing. Emphasis was also made on keeping the environment pollution free especially from heavy metals nuclear fail out and ocean/lake oil waste disposal.

In addition to that, they were informed the role cooperative movement can play to help in marketing by pooling efforts of individual members and soliciting for funds/credit from government and non-government organizations, and well organized cooperatives would also act as buffer to fisherman during market slump by limiting supply to maintain high price for members produce. Development of new markets was also started to work as a cooperative movement.

d) Honey Processing and Marketing

In Salabani area, some, but small number of women had been engaged in honey business such as buying crude honey and selling semi-refined one locally. Their need for training in honey handling and processing among women's groups was identified as an important intervention in small-scale industry and as an opportunity of diversifying incomes. The idea of packing refined honey into a hygienic bottle, instead of empty whisky bottle, was taken as one of the businesses of Muungano women's group. Training on honey processing and marketing was organized in August 2000.

The objectives of the training were; 1) to equip group members with the skills distinguish between good quality honey and adulterated or inferior honeys, 2) to build the skills in refining and processing honey using simple equipment, and 3) to improve the skills in refining and processing bees-wax and its products. After the training, women could pack refined honey and their bottled honey were on sale at their shop.

2.1.4 Encountered Difficulties and Countermeasures

1) The "Muungano Group" Affiliation Crisis

During one of the workshops in March 2000, the Study Team explained its readiness to collaborate with women's groups around Kampi ya Samaki in constructing multi-purpose building. This building would ease the problem of marketing women-made products and would be implemented on a cost-sharing basis. The "Muungano Group" through its affiliated women's groups would contribute 10 percent of the costs, while JICA would

undertake the remaining 90 percent.

The prospect of owning a commercial building apparently triggered a lot of excitement among the women's groups as well as among communities within and outside Kampi ya Samaki. The question of affiliation to "Muungano Group" therefore became a big issue. In a subsequent PCM planning session, women participants from Bartum location, adjacent to Salabani, vigorously objected to a card that indicated the project purpose to be: "Women in Salabani have enough income". They suggested the card should read "Salabani/Bartum" since they were members of "Muungano Group". The Study Team explained at length that the Verification Project was confined to Salabani in accordance with the terms of reference for the Study.

The issue relating to affiliation to "Muungano Group" and ownership of the "Multi-purpose Building" cropped again during a scheduled leaders' training session on 3rd and 4th May, 2000. The training failed to take place and time was spent attempting to resolve the matter.

It appeared there was a misconception regarding benefits arising from the multi-purpose building. There was a general perception that substantial direct benefits would flow from the building. The Study Team, however, explained that direct benefits were expected to be minimal and that the main benefit would arise from enhanced product volume and price obtained by using created marketing facilities. In addition, non-affiliated members, from surrounding areas, would have access to building under an arrangement that would be agreed with "Muungano" committee.

In spite of this re-assurance, women's groups from Bartum location argued strongly that they have been active in the formation of Muungano and that they saw no reason to be excluded. They expressed fears that unless they were in Muungano and contributed to the cost of the building, they were likely to be denied access to the building. To resolve the crisis, it became necessary to have a side meeting with male leaders of Salabani and Bartum location as shown in Box-1.

After the side meeting, Study/GOK Team briefed women leaders, who were already quietly assembled, on what was discussed at the side meeting with the local leaders. In particular, it was indicated that a compromise had been reached where all the 19 groups (later became 18) will remain in Muungano but no additional groups would be encouraged. However, for the sake of documentation, the project area would read "Kampi ya Samaki and its surrounding Areas". The women's group leaders were then encouraged to reflect on the new information and give a feed back.

Box-1. Side Meeting with Local Leaders

In an attempt at resolving the issue of " which groups should be in Muungano Group" a side meeting was held between JICA/GOK Team on one hand and local leaders from Salabani location (chief and councillor) and from Bartum location (assistant chief and councillor).

Giving a background to the study, the Study/GOK Team emphasized that the study was focused on Marigat and Mukutani Divisions and that from these two divisions verification sites were assigned to only five locations after a systematic screening of all the 11 locations. Salabani was one of the locations chosen. It was further indicated that when the women's groups met on 8th April, some 15 women's groups were identified as members of Muungano Group. The expansion into 19 was irregular since no other meeting had been convened to discuss and endorse the additional 4 groups. It was these additional groups that were in dispute since they are based in Bartum which outside the Study Area.

The councillor and assistant chief of Bartum location talked about their contribution to the study programme through encouraging women to attend planning meetings and in acquiring building plot from the County Council. They expressed their disappointment at learning about likely exclusion of women's groups from Bartum. They said that Bartum ought to be recognized in the planning of the Muungano building.

The chief and councilor from Salabani location said that the problem was with the leaders since they had information that some leaders were actively recruiting women's groups at night. All along, it was their understanding that the verification was within Salabani location, but at no time did they sit down to discuss exclusion of groups from Bartum. He suggested that the women's group matters should be left to women and the Study Team. The leaders should therefore desist from active involvement in the Muungano matter unless requested to do so by the women or the Study Team.

The Study /GOK Team suggested a compromise that was accepted by both sides: For administrative reasons, the certificate for Muungano ought to read Salabani while other documentation would read "Kampi ya Samaki and its surrounding Areas". All the 19 groups already represented in the committee would be affiliated but the number should be frozen at that. Hence the leaders should not encourage new groups and should instead promote cohesion among groups already affiliated to "Muungano". It was further explained that the Muungano committee would be facilitated to prepare by-laws that would guide the running of the building and other Muungano activities. Such by-laws would also include the use of marketing facilities by non-affiliated members and groups. Hence the by-laws were more important than the way the registration certificate was written.

2) Delay in Building Completion

The construction work was initiated in June 2000, but discontinued since December 2000 after the departure of the Study Team. In spite of number of discussion made between the Study Team and the contractor, he did not execute the contract claiming about the price escalation of materials. According to the information from labors under him, some mismanagement of money might be one of the causes of delay. Though the members of women's group had protested against the contractor to finish his duty during the absence of the Study Team, he never took it seriously saying employer was JICA, but not the women, since contract was made between the Study Team and the contractor.

As a result, the Study Team and the women's group beard the payment for the rest of work, and construction was resumed in September 2001, in force account bases between workers and women's group, and necessary materials were estimated, arranged and purchased by women and the Study Team. The construction was completed in the same month of 2001, delayed about ten months from the planed schedule.

Different from the previous construction work done by the contractor, the women became a supervisor to monitor the artisans' work, and they also procured the materials. At least one of the Muungano members was at site to monitor the activities and to supply necessary materials in time. In such way, project ownership of the women's group was cultivated.

3) Delay in Business Start

Because of the delay in building construction mentioned above, women had to wait until September 2001 to start their shop. Compared with the planned schedule, it was delayed about ten months. On the other hand, women tried to clear the balance before the shop opening, so it might had taken them that long time before the business actually started.

It is clear that this period was necessary for the group and committee members to be strong and united enough for the business management in a planned size and operating large scale of women's group. However, it was getting tougher for them to continue intensive activities and putting investment without realizing any benefit in terms of cash income.

Finally, the group decided to open the shop from one by one, rather than starting handicraft shop and restaurant at the same time, or waiting for the completion of the construction. The shop opened on 17 September, 2001.

4) Communication among Members

The Muungano Women's Group, consisted of 18 affiliated groups with a total membership of 401, is highly diversified in terms with ethnicity, age, education, migrant/indigenous status and business exposure. This made co-ordination work extremely difficult while members from distant places spent a lot of time traveling to the meeting venue, such as more than three hours. Some affiliated groups had not been active in convening their group meetings hence some important decisions were not transmitted to the members on time. During the workshops, it was discussed that all the members should be more punctual and to follow the rules to make communication easier and quicker.

On the other hand, there was a language problem. They basically speak in Swahili language during the meeting among members, while some of the Il Chamus and Turkana women speak only their own language. Important issues need to be translated for them.

5) Registered Members and Non-registered Women

The drought experienced in 2000 and extreme poverty among some members made it difficult for some women to raise the KSh270 of share of construction cost or registration fee of Muungano Women's Group. Women who live close to town or main road had more chances engaged in income generating activities to prepare for the share, such as selling firewood and fetching water for the people in town, while the people living in remote area had great difficulties to raise the money. As a result, some of the interested women, but

had fewer opportunities to raise fund, had to drop out. On the other hand, some men have alleged by prevailed over their wives not to join the Muungano women's group because its activities were perceived to consume a lot of time. The Assistant Chief of Salabani was assigned to consult the cases, yet some of women were not allowed to affiliate with the group. Deadline for the registration was postponed five times to wait for those, but as a result, the number of registered members dropped to 401 as compared to the initial number of applicant of 551.

Since the members had struggled for long time to organize themselves to prepare required amount of money and had been engaged in many activities, they wanted to close the door completely for late comers to be affiliated. However, considering above condition, the group agreed that the handicraft shop is still open to non-members with higher percentage of commission to be paid after selling their products. It also helps the handicraft shop to diversify its commodities to attract customers.

2.1.5 Lessons Learned

1) Capacity Building Requires Time

Training and strengthening of such a big group requires longer period, and the fact would seriously affect critical household functions (cooking, milking, fetching firewood/water). Ideally such support should therefore not be concentrated in one short period but should be spread out evenly over a 12-month period. This would allow the participants to digest whatever skills have been imparted and at the same time provide a balance between their household duties and attendance at training workshops, planning sessions etc. Meeting scheduled in late morning or early afternoon have a better chance of good and timely attendance than those scheduled for the morning time.

Leadership is strengthened through day-to-day activities, but not only by leadership training. Even for the technical or business management training, the follow up is required in a mode of on-the-job training.

2) From Involved Group to the Decision Maker

Components of the verification projects were selected and planned based on the needs of the community, and it could be said that it was initiated by a participatory manner. However, they were sometimes left out during the implementation stage. During the verification project, series of trainings on leadership, business skill, book- keeping, handicraft, etc. were provided to the women's group. For most of the courses, substances or trainers were chosen by the Study Team. Though the training cost was provided by JICA, participants could have searched for the appropriate trainer, or at least could have selected from the list of alternatives.

On the other hand, the contract for building construction was made between the Study

Team and the contractor and women's group was not officially involved even though they were involved during the selection procedure of contractor. During the absence of the Study Team, the contractor disregarded about women claiming on the discontinuing construction. Women could have been the supervisor to give artisans guidance about their needs, or even could have purchased materials by themselves. No matter how it requires technical knowledge, beneficiaries should handle challenging situation if contents and scale of the project are appropriate and it suits to the community needs.

Community people should be the one who decide what to do or chose from alternatives with the advice of supporters if necessary, rather than being an passive/involved group to participate prepared and given activities from outsiders, no matter how the activities are challenging.

3) Diversified Activities for the Survival Strategy

The area has unreliable and limited natural resources due to the fluctuating and relentless climate condition. If women were to rely on honey business only, they might collapse under the condition of drought year. Fish from Lake Baringo could supplement income source as well as food when they were hit by a drought, and honey could support their business running after the drought year in which fish production tend to be low due to the over-fishing of the previous year, while handicrafts are available if women could obtain their spare time to produce. Diversification of the business activities is required to survive and stabilize income level in this area rather than concentrating on one business in a big-scale.

4) Small Scale to Start

When building was designed, women had not yet realized the required items and capital to start businesses, and their mind was concentrated on the building which was believed to boost their business. After having enough time to think and experienced each step, they started feeling that the building was too big to start. Such feelings had been expressed during the hard time of fund raising. They were satisfied about its structure having seen its completed and finished payment for the construction. However, they had to and are going to struggle for more capital to fulfill their activities. It took them long time to reach the point to commence their businesses without realizing any profit in terms of cash income, and sometimes it made them dormant without any ready incentives. Therefore, it maybe preferable to start any activities from small scale and easier to accomplish, realizing some profit or incentives, thereby group will be strengthened step by step.

For such purpose, long term and overview plan could be discussed at the planning stage, rather than the provision of limited information on building construction, which is only a part of continuous activities. Even though the construction share from the community was 10%, future-coming management and maintenance cost will be the responsible of them

to sustain their own development activities, and in a long run, share of the total cost becomes not only 10%, but it increases year by year. In such sense, if the building is too big, burden becomes heavy. If the women's group had noticed all the future expenses more clearly, they might have chosen to scale down the building size.

When income-generating activity starts and its benefit has to be shared among the group members, its management and distribution are not easy. For the case of Kampi ya Samaki, such difficulties were not found even though the number of registered members was expanded up to 401, thanks to the longer period to build a trust as well as leadership/management capability of committee members. However, size of the organized groups should not be too big at the initial stage, so that money flow could keep trenchancy and all the members know and trust each other.

5) Establishment of Own Venue

The area is highly diversified, having five different ethnic groups and variety of businesses operated. Each group tends to be separated from neighboring groups and avoid the mixture with other tribal groups. Businesses operated in town are run mostly by individual family rather than the group bases. In such circumstances, it seemed difficult to form a community organization with the members beyond their original ethnicity, as well as to sustain its activity. Construction of multi-purpose building, however, supply them not only space to accommodate their products for market, but also provide the occasion to work together toward their future target. Long process of acquiring building helped them to develop a sense of ownership. Since the women's group obtained the plot and building, they have become more self-assured and able to initiate own activities. In addition to that, the future target/vision were discussed quite often. The provision of venue, which could be accessed and controlled by women, would strengthen their capacity, help unite the group and reinforce their steps of their own development.

2.1.6 Evaluation

1) Evaluation of Planning Stage

Size of the building might be too big, since it required long term construction period and as a result women had to wait long until realizing the first benefit of cash income. Construction and maintenance cost became high. Smaller building that could have been completed earlier and women could have utilized their money for business preparation, might be preferable. Input could be expanded step by step in accordance with the capability of the women's group.

Contract for the building construction was made between the Study Team and a contractor. However, women should have been directly responsible for it, for example artisans could be directly recruited, so that the sense of project/building ownership could have been more developed, after finding the women supervising the construction since such method was

introduced for the completion of three rear rooms. At the same time, locally available materials could be used for the construction to reduce cost.

2) Evaluation of Output and Outcome

2.1) Outputs

Existing eighteen women's groups were united to form Lake Baringo Muungano Women Self-help Group with 401 members to prepare multi-purpose building and promote small-scale businesses.

Building and toilet construction was completed by September 2001 and fencing and tree/flower planting, initiated by the women's group, were under preparation. Fund raising for fencing was completed. Though further development of skill is necessary, women obtained skills in honey and fish processing, sisal basket making and business management from the technical and business training.

Because of delay in construction and business start, little income from business operation was recognized. So far, two baskets, four bangles, two belts, three necklaces, one chair, and 38 bottles of honey out of 100 refined were sold at handicraft shop. In addition to that 22 lunches prepared for the Officers from Nairobi were sold in September 2001. These figures were recognized during two weeks monitored in September.

2.2) Outcome for the Stakeholders

The most significant change was the leadership of committee members, especially the chairlady of the group. She is now able to make a powerful speech in front of not only the Muungano members, but also about 50 audience including government officers from Nairobi. Forming united and big-scale organization, starting new business and fund raising among big number of people have required frequent meetings. During 19 months since the group was organized, 32 times of committee meetings and 29 general meetings were held to discuss various issues. She was saying, "I used to be scared to speak in front of people, but now I have the confidence." Their confidence became a impelling force to mobilize the women's group toward their future target.

The women living in and around Kampi ya Samaki area had learnt to appreciate and trust one another and showed unity toward their future target, among five different ethnic groups (Il Chamus, Tugen, Turkana, Pokot and Luo). Proof of this new development is the sitting pattern. During the initial period, the sitting pattern was on an ethnic basis whereas currently the sitting takes a random pattern. Another proof can be found in high rate of repayment for cost sharing as an indicator of trust in the group. According to the baseline survey conducted in September 2001, one of the interviewee answered that the life had become better compared to the previous year, because she had known many women and they were working hard together to improve their standard of living. Another woman

learnt the importance of teamwork and she felt the cooperation could enhance women's standard of living.

The women had become more self-assured and could take initiatives for their development activities. For example, participants of sisal development course organized the training to teach other members techniques acquired by the training. In addition to that, they set their future target such as expansion of their plot and operation of a petrol station. The verification project had thus activated and strengthened their capabilities.

2.3) Impact for the Surrounding Communities

Three women from Ngambo location visited Muungano handicraft shop to investigate the activities and were looking for the possibility of marketing their products, while beekeeping groups from outside of the area had requested divisional officers to sell their crude honey to the women's group. These interests of other communities were noticeable since handicraft shop opened in September 2001. Future possibility of networking among different communities was recognized.

2.4) Negative Impacts

Two women were refused by their husbands to join the Muungano group because of the time-consuming activities. Others noted that their husbands have been complaining about coming home late after attending the Muungano meeting. Because of the series of activities that require time, housework becomes perfunctory, and as a result it might bring domestic problems.

2.1.7 Way Forward

Continuous rather than intensive, but ad hoc support/training is required from GOK side, especially in skills of business planning, record keeping and accounting. Training courses provided during the verification period had some effect for business preparation, but additional support at the right timing helps them remember and practice the obtained knowledge.

As women expressed during the committee meeting and workshop held in September 2001, further discussion should be made in the Muungano women's group to set up business and to enhance their skills. They are expected to look for outside market for their products, especially bottled honey, with the assistance of GOK. They could also diversify their products to adopt themselves in any climate condition or seasonal/uneven visitors. Record/book keeping is the important factors to maintain the trust among members.

For future implementation of such project, small scale is preferable to start with, and scale of input could be enlarged step-by-step in accordance with the group capacity. In such way, small benefit and incentive could be realized from the earlier stage and it would

facilitate the group to continue their activities.

Contract for building construction was made between the contractor and the Study Team. Since women were involved only for the selection of contractor, the contractor did not listen to women's claim for construction delay. On the other hand, training courses were mostly planned and provided by the Study Team and degree of involvement of women's group was low, and some of the courses had a poor reputation. Beneficiaries should be involved not only in the planning stage of the project, but also all the processes of implementation stage.

For the development of income generating activities in the study areas, diversification of the business is necessary to stabilize certain level of income, considering unreliable resources. For that purpose, resource assessment is required.

Table 2.1.6 Evaluation of the Verification Projects: Small-Scale Industry in Kampi ya Samaki

1. Subject to Verify

Subject to Verify	1. *To examine if women could utilize, through a group activity, their resources (tourists, fish, honey, handicrafts) to generate income sustainably.* 2. *To examine if capacity building of women could be realized through the preparation of multi-purpose building and business, so that their various own development activities go on in dynamic way and continuously.*
Result	1. *Availability of resources to generate income, such as honey and fish, fluctuate depending on the natural condition, especially precipitation of the year. During the drought year honey production becomes low while fish production increases. On the other hand, honey production recovers in the following year if there is enough rain, while fish production becomes low due to over catch of the previous year. In ASAL areas, income generating activities should be diversified to secure certain level of income and stabilize livelihood, rather than concentrating on one business even though it has high potential of development.* 2. *Preparation process of the venue (multi-purpose building in case of this project) has strengthened, united and activated women's group and they gained self-confidence.*

2. Evaluation of Planning Stage

	Original	*Change on the course of implementation*
2.1 Situation Analysis of the Project Area	*Highly diversified with different ethnic groups and different businesses. High potential of business including tourism and fish.*	*Communities, especially local leaders, are having competing interests. Fish is not a reliable source.*
2.2 Strategies / Approaches	*Saved time created by introducing improved cooking stove is used for income generating activities.*	*Stove was extended to the limited number of members (26 in Kampi ya Samaki area), and saved time for those who adopted was not necessarily used for income generating activities.*
2.3 Project Purpose	*Women in Kampi ya Samaki and its surrounding area have enough income.*	*No changed.*
2.4 Project Design	*1. Multi-purpose building is constructed and managed properly* *2. Handicrafts are promoted* *3. Honey business is promoted* *4. Fish processing is promoted*	*1. Construction work delayed and not completed. Size could be smaller and women could have been directly responsible for building construction rather than using a local contractor.* *2. Traditional handicrafts were realized as a valuable resource.* *3. Honey is hardly available during the drought year.* *4. Fish production drops after the drought year.*
2.5 Input	*Building materials, contractor, utensils, honey bottles and labels, beehives* *Technical, leadership and business training* *Study tour*	*Extra building materials and contractor were added due to the breach of contract by the first contractor*

3. Monitoring & Evaluation of Implementation Stage

3.1 Encountered Difficulties	1. *Initial misunderstanding among the women on who should or should not be in Muungano Women's group.* 2. *Delay in building completion since the contractor did not follow the contract, rise in building material cost, ambiguous procedure of contractor selection and less involvement of women.* 3. *Delay in business start due to the construction interval and inappropriate size of the building.* 4. *Breakdown of communication among members.* 5. *Failure of some women to affiliate with Muungano member due to lack of fund and husband's request.*

3.2 Countermeasures	1. *Side meeting with local leaders and discussion among members were made and it was agreed that already registered groups could remain as members.* 2. *Remaining construction was done more direct basis between women and artisans.* 3. *Opening from handicraft shop.* 4. *Discussion was made to follow the rules.* 5. *Utilization of handicraft shop is open for non-members with higher percentage of royalty paid.*		
3.3 Lessons Learned	Community 1. *Different ethnic groups can be united and work together for various activities*	GOK 1. *Continuous rather than intensive but ad hoc support/training is required.*	JICA STUDY Team 1. *Capacity building requires time* 2. *Beneficiaries should not only be involved but also be the decision makers in any cases* 3. *Activities should be diversified for the survival strategy* 4. *Small scale is preferable to start with* 5. *Provision of venue helps women group to be more active and strengthened*

4. Evaluation of Output and Outcome

4.1 Outputs (Indicators)	1. *Building construction is about 98% completed, toilet completed, fencing, tree/flower planting under preparation* 2. *One basket, two bangles and one chair were sold* 3. *28 bottles of honey were sold* 4. *Restaurant not yet open*
4.2 Vertical Outcome (Outcome for the Stakeholders)	1. *Leadership of committee members was strengthened.* 2. *Women have become more self-assured and be able to initiate own activities.* 3. *Future target/dreams are discussed* 4. *The group consisted of five different tribes is united*
4.3 Horizontal Outcome (Impact for the Surrounding Communities)	1. *Women groups in other areas have indicated desire to have a similar project* 2. *Women in other location visited the shop to monitor their activities*
4.4 Negative Impact	1. *Husbands of some members do not prefer to have wife engaged in time-consuming activities and complained. It might bring domestic problems.*

5. Way Forward

5.1 Way Forward	Community *Further discussion should be made to set up business.* *Business skill up is required.* *Committee members keep record of their activities.* *Diversified activities are necessary. .*	GOK *Regular support and continuous training are necessary, especially in skills of business planning, record keeping and monthly accounts.* *Market information should be provided.*	JICA Study Team *Seasonal Resource balance as well as the year of drought and rain are further studied for stabilizes of income generating activities.*

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

2.2 Promotion of Improved Jiko

2.2.1 Background

A PCM workshop held in Kampi ya Samaki in November, 1999 identified their core problem being low standard of living of the people, and the priority approaches to solve this problem were 1) People of Kampi ya Samaki keep clean water and 2) People of Kampi ya Samaki have enough income. Fetching water is considered as a women's work. For most of women especially during dry season, Lake Baringo is the only source of water in this area. Even though they have known that water should be boiled before drinking, most of the women in the area do it only occasionally due to scarce firewood. Shortage of firewood was recognized through RRA and PRA conducted in 1999 as well. Women in the area feel that the firewood is becoming scarce and the time needed to fetch is getting longer.

During the PCM workshop, women noted that an improved Jiko could be installed to save time to do other income generating activities. Saving firewood would also greatly contribute to conserving the environment. Thus, the Jiko promotion was programmed as one of the components for the verification project in Kampi ya Samaki, project purpose of which is "Women in Kampi ya Samaki and its surrounding area have enough income". The rationale is that the improved Jiko could save firewood, which in turn results in reducing time of fetching firewood, and cooking time, thus creating more time the users could spend toward realizing the project purpose.

2.2.2 Record of Implementation

Dr. Kesa KISHIDA, who introduced an improved Jiko which is so called Enzaro Jiko, a JICA Expert presently based at Nairobi gave the Study Team four experts of Enzaro Jiko as contact person. Concerted effort of Dr. KISHIDA and the experts helped the Team to organize a study tour to Vihiga District and following demonstration in Kampi ya Samaki. The study tour was held on April 11 and 12 in year 2000, and four women in Kampi ya Samaki and two Home Economics Officers from district and division participated together with the Study Team.

On the way back from the tour, four experts in Vihiga District joined the bus to demonstrate how to make the Enzaro Jiko at Kampi ya Samaki area. In such way, the participants were still excited about what they saw during the tour and were eager to have one at their places or to learn how to make it. April 13, 2000 is the first day when the Enzaro Jiko was introduced in Kampi ya Samaki area. The experts had stayed for four nights, and they made four Jikos; three of normal size and a small one which suite for a lower hut-house.

Since the first Jiko was constructed, almost 17 months have passed to date (mid of September, 2001). The first two months, April and May of year 2000, had the Jikos in

only the project area of Kampi ya Samaki; eight in April and four in May. The Jikos had been continuously constructed in the project area until September of year 2000, and now the project area has 26 Jikos in total. Those Jikos, specially the first Jiko, serve as a showcase because many visitors have visited through inter-location monitoring tours. The tour intended to stimulate the participants to diffuse the Jiko.

An indication of extension beyond the project area had shown up in as early as June, 2000. Villagers in Kimarel location were invited to an inter-location monitoring tour, during which they were so impressed with an Enzaro Jiko in Kampi ya Samaki. The GOK officer in charge of the Jiko was requested to assist the Jiko construction in their area. Thus, first Jiko in Kimarel location was constructed in late June of year 2000, and second one in July. Now there are 10 Jikos in Kimarel location, among which first three Jikos had been constructed in the presence of GOK officer and JICA and the rest by the women only.

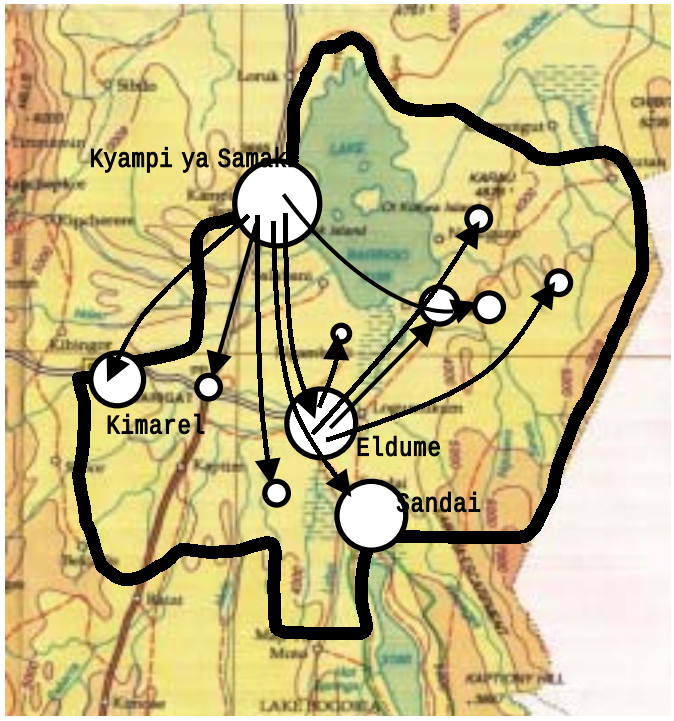


Figure 2.2.1 Dissemination of Enzaro Jiko

Another dissemination had been taken place in Eldume location. Though those Jikos in Kimarel had been assisted by GOK/JICA at the initial stage, the Eldume's ones were self-initiatively constructed. Villagers were invited to an inter-location monitoring tour at the beginning of July of year 2000 just same as the case of Kimarel villagers. A woman started constructing Jiko in her house right after the tour. Her illiteracy drove her in constructing her own Jiko before she got forgotten how to make the Jiko as heard. It took almost one day to finish the construction, and she started using the Jiko on the same day. Motivated by the woman's move, her neighbors also started the Jiko construction. Nine Jikos had been constructed in July only, and now Eldume has 17 Jikos in total.

Same case took place in Sandai location. First Jiko in Sandai was constructed in July of year 2000 right after she came back from a tour titled as "learning from best practices" to Kitui district. However, the Jiko's fireplaces were so big that source pan did not well fit. The Jiko was rectified by the GOK officer on August 25, and became the first one in use. Now there are 17 Jikos in Sandai location, latest one of which was constructed on March, 2001. The first Jiko owner is a social mobilizer trained by an NGO and very motivated to

assist her fellow. She had attended almost all the constructions.

Same construction manner of Eldume and Sandai location had further taken place in Partalo in Arabal location and Rugus in Mukutani location. Three Jikos had been constructed in Partalo and two in Rugus. They went to an inter-location monitoring tour arranged in November of year 2000. They saw a Jiko constructed in Eldume location and were told that it was constructed by the Eldume women's own initiative. Sometime after they returned back from the tour, they had started the construction of the Jiko by themselves in a way of try-and-error. The Jiko in Partalo were constructed in November of year 2000 and the ones in Rugus in February, 2001.

So as to diffuse the Jiko further to other locations, GOK officers and the Team had arranged construction of Jiko in November, 2000; one Jiko each in Kapkuikui and Kiserian locations and two in Mukutani locations. The Jiko in Kapkuikui was constructed by the concerned women with an assistance of the GOK officer/JICA, while the ones in Kiserian and Mukutani locations were assisted by Eldume women accompanied with the GOK officer. Eldume women are Il Chamus who are same as the villagers in both Kiserian and Mukutani locations. To date, one more was constructed in Kapkuikui by a friend of the 1st Jiko owner, four Jikos followed the first one in Kiserian, but no additional Jiko had been constructed in Mukutani Location.

Aside from the Jikos mentioned above which are now 84 in number, two had been constructed in Marigat town; one in Marigat Youth Polytechnic and the other in a woman's house; and one more constructed in Ngambo location. The two in Marigat town were constructed in the presence of GOK/JICA and the one in Ngambo was constructed by the owner after she visited a friend in Eldume where she was given an idea how to make it. Summing up all these Jikos, there are 87 Jikos in the Study Area as of September, 2001.

Figure 2.2.2 shows cumulative Jiko number constructed by month. Each bar in the figure is composed of four construction manners; the bottom of which means the construction was mainly made with an initiative from GOK/JICA; 2nd part from the bottom of which means the construction was assisted mainly by 1st generation Jiko expert; 3rd part from the bottom of which means the construction was assisted mainly by 2nd generation Jiko expert; and the top part of which means the construction was made by themselves without any expert. Here, the 1st generation Jiko expert means the ones trained and certified by GOK/JICA, while the 2nd generation Jiko expert is the ones who learned the construction by doing and were admitted as the expert by the communities.

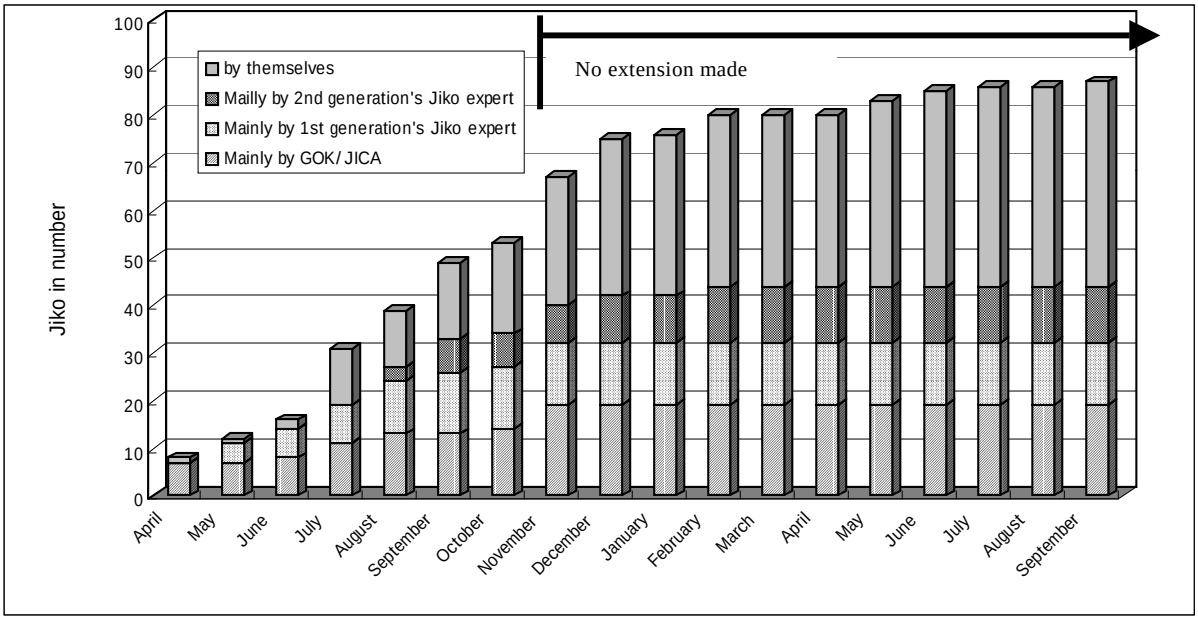


Figure 2.2.2 Dissemination of Enzaro Jiko

The Jiko had dramatically increased until November, 2000. The figure shows that the construction without presence of GOK/JICA, especially in case of "by themselves", had been gaining momentum, while the construction "with" and "assisted by" GOK/JICA has remained at a certain level. Though this, to a large extent, showed an indication of the self-diffusing sustainability, the dissemination of the Jiko got actually slow down since intentional extension had been terminated in the November. During the first eight months from April to November in year 2000, a total of 67 Jikos had been constructed, while only 20 constructed for the last 10 months from December of year 2000 to September of year 2001. Though the Jiko is still increasing even now, further dissemination would require an extension arrangement or a minimal support by GOK.

2.2.3 Encountered Difficulties

Physical difficulty is little availability of the material in some areas; namely, lack of stones, anthill soil and water. Some areas especially in Ngambo location and Salabani sub-location do not have enough stones, requiring long time to collect. Sometimes anthills are rare and water is also scarce in areas. Houses located in those areas where materials are not enough have a difficulty to have Enzaro Jiko. Ngambo location and Salabani sub-location are the place where there are little stones. Only one Jiko has been constructed in Ngambo location, and only two Jikos in Salabani sub-location though many women want to have the Jiko.

Another physical difficulty is regular maintenance. The Jiko cannot be free from regular maintenance, otherwise the Jiko, especially rim portion of the fireplaces, starts cracking

and falling down. Maintenance is done by smearing the Jiko with soil mixed with cow dung. According to observation and interviews, maintenance once a week is good enough for keeping the Jiko in sound condition, and probably at least maintenance once every two weeks is required. The regular maintenance requires, besides soil and cow dung, about five litters of water. This could be a critical impediment to carry out the regular maintenance in very water scarce areas. A Jiko in Salabani sub-location became not-in-use only about one month after the commission because they hardly managed the water. Some Jikos had been already demolished or not-in-use because of the maintenance problem associated with scarce water (6 Jikos observed).

Standard size of Enzaro Jiko is four feet wide and three feet deep. Poor people often do not have separate kitchen house, so that they cook in the living house or otherwise outside. Most often seen is a grass-thatched-roof hut house with a diameter of about 3 m. Those hut-houses cannot accommodate, apart from the dwellers, the Enzaro Jiko even if made in three feet wide and two feet deep. Poor family often accommodates more than five members in just one hut-house, giving no space for the Jiko. This is one of the reasons why the Jiko does not smoothly penetrate into poor families.

Aside from above mentioned physical difficulties, there are some socio-related ones. One is concerned to a Jiko expert who had been trained by Jiko experts from Vihiga district and GOK/JICA. The Jiko expert is expected to work voluntarily or otherwise with a kind-offer from the woman who is to have the Jiko. The arrangement is all dependent on the mutual agreement among the Jiko expert, the woman and the neighbors who participate the construction. Therefore no payment had been done from JICA to the Jiko expert as long as she worked within her community.

Then, a request for Jiko construction came from outside, which was from Kimarel. Issue of allowance for the Jiko expert came up to go outside her community to assist other communities. There wasn't time to agree about the allowance between the expert and the women in Kimarel, so that JICA decided to provide the Jiko expert with 200 Ksh per day as the allowance. This became known among the community to which the Jiko expert belongs. The community members started thinking that the expert should construct the Jiko because she was being paid.

Though the expert had been very voluntarily working within the community, she became no longer regarded as a community member but a member of JICA or at least the agent of JICA for the purpose of diffusing the Jiko. This area is actually very poor and the people are dependent on relief food or just living in a day-to-day survival. Under this condition, a sort of jealousy to the expert came up and resulted in de-motivating the community members to construct the Jiko by their own initiative with the technical support from the Jiko expert. JICA notified the community the payment was done only when she had to go outside her community. The community members must have recognized what had been

actually done; however no Jiko has been constructed since then.

Another socio-related difficulty is with merry-go-round scheme. The scheme requires several women to be grouped and the construction of Jiko can go around the members from one to the other. Construction of Jiko usually requires at least three participants if they want to finish in one day. This scheme itself is very good and they can work cooperatively. However, there are some people who think even the preparation of the material should be done by the group and not by herself alone. Of course, if all the members agree to collect materials in such a way, it may not matter at all for them.

However, if the Jiko expert, invited from outside the group, had to be involved in collecting the materials in addition to giving technical advice, she would definitely become disgusted with. This was reported in most cases in Kampi ya Turukana and three times in Meisouri sub-location. The Jiko experts thus became very reluctant to attend any Jiko construction. Though JICA actually informed that women who want to have the Jiko should call Jiko expert after all the materials become ready, some people still think merry-go-round is a way to relieve just her own burden, indicating a sort of dependency syndrome. The Jiko expert in Salabani-location had decided that minimum charge, say total 200Ksh, should be arranged and was informed to the community members. Since then, no Jiko has been constructed.

2.2.4 Lessons Learned

There are Jikos that are no longer in use or already demolished out of the total 87 Jikos. Table given below summarizes those Jikos together with the reason why demolished or not-in-use. To explore the reason gives us first-hand lessons:

- for regular maintenance. This implies the Jiko may not long survive if the Jiko Four Jikos have been demolished because they hardly managed the water required were constructed in a very water constraint area. Baringo district, an ASAL area, may be the northern limit to introduce full size Enzaro Jiko to a large extent. Beyond Baringo District toward drier area, small size firewood saving Jiko, say modified Enzaro or Maendeleo, should be explored.

- Five Jikos have been demolished since those gave a lot of smoke and/or fire did not go to the sides' fireplaces. In most of the cases, the fireplace is obviously shallow so that fire reaches to the bottom of source pan before getting to complete burning. Some are also related to small connecting hole between the side and center cooking places. So far, 43 Jikos have been constructed by themselves without any attendance of Jiko expert/JICA, among which are the Jikos already demolished. While construction by themselves is really a self-reliant activity leading to sustainable maintenance, minimal technical assistant should be always considered.

- Three Jikos have been suspended the use because they have sifted their house or are now constructing new kitchen house. Though the Jikos are not in use and already abandoned, they have an intention to construct the Jiko once again. Two more Jikos are not in use because the Jikos have been left long without maintenance. This was because of lots of faming work (this year is blessed with rainfall, implying very busy in farm work). Taking into account these situation, conventional 3 stones Jiko should not be completely abolished, rather be left to be available in cases.

Table 2.2.1 Summary of Jikos demolished/not-in-use

Reason why demolished/not-in-use	Number
Jiko demolished due to maintenance problem (mainly scarce water)	4
Jiko demolished due to technical problem (gave lots of smoke)	5
Jiko suspended in use due to migration/constructing new kitchen house	3
Jiko suspended in use due to poor maintenance resulted by lots of work	2

One reason why the Jiko does not smoothly penetrate into poor people is the size that cannot be co-accommodated in one small hut-house with the family members. Women who want to have Enzaro tend to think that they have to at first construct kitchen house apart from their living house. However, three women brought about a marvelous invention. One woman constructed two-fireplace-Jiko in her children's house (see photo), and the others constructed almost same structure but a little bigger size in their small kitchen house. This new version of Jiko should be explored if poor people would accept.

This Jiko may better survive in water constraint areas since maintenance can be done with less water. Also, two fireplaces may be enough for people who live in very dry areas. As we go to drier area, people are getting more or less dependent on milk rather than ugali. People who are mainly dependent on milk may well accept the two fireplaces Jiko so that there may be some possibilities that the new version of energy saved Jiko could be extended toward arid land.

The earlier over-reliance on local Jiko experts is a myth that can be dispensed with as

women need to see and observe the Jiko or participate once in the making and they are able to actually make them. Also, the earlier fears on labor needed to construct a Jiko led the program to believe that the construction should be handled through groups to ease burden as was done in the early stage of Kampi ya Samaki. Group work can definitely ease burden but on the other hand may create over-reliance on other members and at worst on local Jiko expert. Though technical assistance is still required to let the Jiko work properly, flexibility should always be considered, which allows women as much as possible of learning from doing and try & error approach.

Inter-location monitoring tour cannot be over-estimated. The tours have stimulated interest in Kimarel, Eldume, Sandai, Rugus and Partalo. Expansion of the Jiko beyond Kampi ya Samaki was actually brought by the tour, and currently there is an interest in Sandai that women want to visit Eldume and see the Eldume version of Jiko – a new experience of Tugen learning from Il Chamus.

2.2.5 Output, Outcome and Negative Impact

The most striking feature for the Jiko is its energy efficiency so that the users can save firewood by at least half in almost all the cases. Out of the total 87 Jikos so far constructed, 51 Jikos were interviewed how much firewood had been saved (average family member = 7.8, adults = 2.7). In average, one bundle of firewood used to last only 3.3 days with traditional 3-stones Jiko, but now the Enzaro Jiko can be in service for 8.9 days with the same volume of firewood. This means the Enzaro Jiko can save firewood by 63 percent as compared to the traditional 3-stones Jiko. Women used to fetch firewood twice per week or otherwise go fetching with their children once a week. Enzaro Jiko now requires firewood-fetching only once a week, which does not necessary accompanies their children.

Enzaro Jiko also saves cooking time as there are three fireplaces enabling simultaneous three cookings; ugali, vegatable and boiling water for example. How much cooking time was saved is a difficult question to exactly answer since they do not necessary measure the cooking time. However, 41 interviewees indicated, as their average, that they used to spend about 90 minutes for supper preparation but now can cook within 40 minutes. As well, it can said, with reference to measurements done for the opening of Jikos, that the Jiko saves cooking time for supper by at least half, say about 60 minutes. Time saving for breakfast largely depends on what they prepare. If they prepare only tea, the time cannot vary so much. If they prepare three like porage (uji), tea, and boiling water, the Enzaro Jiko can save the time by about half; say about 30 minutes.

However, the saved time is, in most of the cases, used to do women's daily duties; like mopping house, washing dishes, fetching water/firewood, working in farms (shamba), etc, but doing those is not in so hurry as compared to before. Just taking rest and talking with their spouses and children have also been reported from many women. Given extra time

to do those, they feel very happy. Children and grandparents are also the beneficiaries. Though children had sometimes been late for school, they now can be on time because the mother can feed the children in time. Small children and grandparents usually go to bed some time early in the evening so that the mothers had to start preparing supper at as early as four o'clock in cases. Enzaro Jiko is now giving enough time to starting the preparation of supper.

Women in Kampi ya Samaki often have their own businesses such as operating kiosk, tailoring, selling fishes, etc. Though several women in Kampi ya Samaki reported that they have more time to do their businesses, most of the women are enjoying the saved time by just relaxing and talking with the spouse/children rather than extending the businesses. Upon entering into the businesses envisaged in the multi-purpose building, Muungano women who benefit from Enzaro Jiko could spare the time for their business promotion such as making souvenirs and curios.

Enzaro Jiko can give health/hygiene related effects. Women who use 3-stones Jiko usually suffer from back pain because they have to bend while making fire and food. The back-pain has mostly disappeared after the introduction of Enzaro Jiko, especially for women with big body-size. A woman could not even recognize, until using the Enzaro Jiko, the pain having been caused by 3-stones Jiko. Chicken and goats are no longer messing the food that are cooked at higher place than 3-stones and placed on back-top of the Enzaro Jiko. Enzaro Jiko can also give good appetite because the charcoal, after cooking ugali at the center, can be put to the sides so that vegetable and tea/water remain hot.

Boiling water while cooking is very much hygiene related advantage. Boiled water is used for drinking, washing faces and bathing babies/small children. However, many women interviewed (say about a third) still prefer raw water and actually drink without boiling even if they have Enzaro Jiko. They, however, all know the risk of unboiled water, and said "We will start boiling water when the available water like in a pan becomes very scarce and dirty, meaning very much risky". To change the attitude in a short time is not so easy, but at least they now have a cooking stove that can easily boil the water.

One of mothers' very concerns is safety for children. Almost all mothers have an experience that children accidentally turned over tea or just put hand on a heated pan. Three mothers, out of 40 interviewed, had reported that their children got a burn on their hand that had to be treated at hospital. With the Enzaro Jiko installed, no such accident has been reported. No child turns over food because the food is placed on the Jiko. Security for children is now kept so that mother feel very happy and also elder children can help mother in cooking in much safer situation.

2.2.6 Way Forward

Expansion of Jiko beyond the originally programmed area, which is Kampi ya Samki, had started as early as June thanks to the inter-location monitoring tour. The major construction manner has shifted to "by themselves", which means Jiko is constructed without any presence of GOK/JICA or 1st generation Jiko expert. Though this shows, to a certain extent, self-sustainability of the program, the fact that the dissemination after November, 2000 has very slowed down implies still a minimal support by GOK/Donors to further extend the program.

In extending the program, training a local women as the Jiko expert should be paid very attention though this is a successive manner to extend in a western Kenya. Under a condition people are very little earning opportunity blessed and living in a sort of desperate, the trained Jiko expert may become isolated from the community just because of contact with rich outsiders (the donors), not only hindering smooth dissemination of Jiko but also causing even odds among the community members. Merry-go-round scheme was not always effective way either to extend the program. Though group work logically could reduce the burden of hard construction work and contribute to the Jiko diffusion among the women, a dependency which has deep rooted in some communities due to the long historical relief food would once again fall on the other members specially on the Jiko expert.

Taking into account above situation, flexibility should always be pursued to extend the program. Here, following mechanism is suggested to extend the Jiko over ASAL areas as a guide:

- A demonstration should be done as the first stage as we did, and this would be in most cases arranged at a relatively influential household in the area such as location chief, assistant chiefs, and existing organization leaders who can invite many observers. Though this arrangement could be allowed as the demonstration or the entry point of diffusing the Jiko, it was observed that the ordinary people hardly ask the wives of assistance to construct since there might be a social barrier between the rich and poor. Also, some wives of local leaders are working, which gives difficulty to spare the time to construct.

- Therefore, some time after the demonstration, GOK/donors shall visit villages again to facilitate several ordinary women to form a group and then construct the Jiko by themselves. The outsiders should not go beyond rather than as a technical adviser during the construction. The construction should be done in a way of so-called try and error, which in turn creates sense of ownership and also develops skills to well maintain the Jiko. Under the situation where no Jiko expert trained by GOK/donors exists, dependency could not well appear thereby merry-go-round construction would possibly well function.

- In line with regular monitoring to avoid technical error on the course of the expansion of Jiko among the group members, neighboring villages should also be visited to further diffuse the Jiko. In a very rural area like Mukutani division, women usually have a difficulty to develop an extensive network beyond her community. Therefore, GOK/donor should consider a visit for all the villages and at least one Jiko per village/community should be constructed together with them.

- In parallel with above, new version of Enzaro Jiko, two fireplaces Jiko, should be tried in order to further expand to poorer households. This small size Jiko may also be fitted even under drier areas since it requires less firewood and less water to maintain.

Table 2.2.2 Evaluation of the Verification Projects: Promotion of Improved Jiko

1. Subject to Verify

Subject to Verify	1. *To examine if the improved Jiko could well be adapted in ASAL area and then could save firewood, which in turn contributes to sustainable environmental conservation.* 2. *To examine if the improved Jiko could reduce time of fetching firewood and cooking, thereby creating more time that the users could spend for income generating activities.*
Result	1. *The improved Jiko has been well adapted in the Study area, as a total of 87 Jikos has been constructed with a minimal assistance from GOK and JICA Team. The Jiko can save firewood by 63% as compared to the conventional 3-stones Jiko (average of 83 samples), thereby it was proved that it contributes to sustainable environmental conservation.* 2. *However, as the full sized Jiko requires kitchen house separate from living house, poor people who live in a hut-house wherein kitchen is together accommodated have difficulty to install the Jiko. Therefore, a small sized Jiko (2 fire places; see photo) which could be installed in a hut-house should be promoted for poor people.* 3. *The Jiko can reduce cooking time from 90 to 40 minutes for supper and 60 to 30 minutes for breakfast as an average. The saved time is, at present, mostly spent to take rest and talk to spouses and children. Some women, though still several numbers only, invested the saved time in their farm work and businesses.*

2. Evaluation of Planning Stage

	Original	*Change on the course of implementation*
2.1 Situation Analysis of the Project Area	*Firewood is becoming scarce and scarce, and the time women need to fetch keeps on getting longer and longer. This situation makes women difficult to do income generating activities.*	*No changed.*
2.2 Strategies / Approaches	*To spare enough time to do income generating activities, an energy and cooking time saving Jiko is introduced.*	*No changed.*
2.3 Project Purpose	*Goal: Women in Kampi ya Samaki and its surrounding area have enough income.* *Purpose: Fetching firewood and cooking times are saved, thereby sparing the time to realize the Goal, and also saving firewood (environmental conservation).*	*No changed.*
2.4 Project Design	*To train local women as a Jiko expert, then merry-go-around scheme is introduced to promote improved Jiko.*	*Merry-go-around scheme did not well work in some areas so that more individual based promotion was focused.* *Training local women could invite community members jealousy, thereby just group based or more individual based promotion was focused in cases.*
2.5 Input	*Technical assistance of how to make the Jiko.* *Required materials are all locally available such as anthill soil, stones, cow dung, and water.*	*No additional input introduced during the implementing stage.*

3. Monitoring & Evaluation of Implementation Stage

3.1 Encountered Difficulties	*1. Some areas (ex. Salabani) lack the material to construct such as stones and water.* *2. Water scarcity in areas (ex. Salabani) gives women difficulty to maintain the Jiko (5 l water required per maintenance).* *3. Standard size of Enzaro Jiko (four feet wide and three feet deep) cannot be accommodated in poors' houses (hut house).* *4. Training local women as the Jiko expert invited a sort of jealously, thereby she beccme no longer a member of the women group but an agent of JICA.* *5. Merry-go-around scheme to construct the Jiko sometimes invited dependency on other members.*

3.2 Countermeasures	*1. No solution, but small sized Jiko could be constructed.* *2. No solution, but small sized Jiko could still be maintained.* *3. Small sized Jiko, say 3 by 2 feet or 2 fire places Jiko have been introduced.* *4. Just group based Jiko promotion has been done on the course of inter-location monitoring.* *5. More individual based initiatives to construct have been emphasized during inter-location monitoring, by showing Eldume case.*		
3.3 Lessons Learned	Community 1.*The maintenance should be done at least once in every two weeks, or otherwise cracks take place and became no longer usable.*	GOK 1. *Minimal technical assistance should be given in order to avoid error in the construction, giving lots of smoke and eventually abandoning the Jiko.*	JICA STUDY Team *1. Need to introduce small sized or two fire-place Jiko in order to penetrate the Jiko into poor household (their houses are very small).* 2. *Inter-location monitoring is a very good mean to extend the Jiko by their own initiatives.*

4. Evaluation of Output and Outcome

4.1 Outputs (Indicators)	*1. The Jiko intruded (so-called Enzaro Jiko) can save firewood by 63% as compared to conventional 3-stones Jiko (average of 83 samples).* *2. The Jiko can reduce cooking time from 90 to 40 minutes for supper and 60 to 30 minutes for breakfast as an average.* *3. Clean water became mostly available because the water can be boiled at the same time of cooking meals.*
4.2 Vertical Outcome (Outcome for the Stakeholders)	*1. No child turns over food because the food is placed on the Jiko. Security for children is now kept so that the mothers feel very happy and also elder children can help mother in cooking in much safer situation.* *2. Women can take rest and talk with their spouses and children thanks to the saved time, making relations better.* *3. Children now can reach school on time because the mother can feed the them earlier thanks to the fast cooking (some children had sometimes been late for school)* *4. Women who use 3-stones Jiko usually suffer from back pain, but now the back-pain has mostly disappeared after the introduction of the Jiko, especially for women with big body-size.*
4.3 Horizontal Outcome (Impact for the Surrounding Communities)	*1. Jiko has been extending to other areas; As of September 15, 2001, 26 in Kyampi ya Samaki, and 61 in other areas.*
4.4 Negative Impact	*1. Training a local women as the Jiko expert could cause the community's jealously and invite total dependency on the Jiko expert to construct.*

5. Way Forward

5.1 Way Forward	Community *Jiko owners assist women who want to have the Jiko but not yet constructed.*	GOK *Minimum extension services should be given to communities to further promote the Jiko (ex. periodical visits and technical assistance).*	JICA Study Team *Technique for constructing the Jiko should be transferred to other GOK home economics officers to further extend the Jiko beyond Baring district.*

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

2.3 Communal Resources Management : Participatory Irrigation Management (Sandai)

2.3.1 Background

1) Subject to Verify

Sandai Irrigation Scheme, which has been rehabilitated by Ministry of Agriculture under the project of Small Scale Irrigation Development Project (SSIDP) during 1979 to 1983, is located on relatively fair conditions such as topography, accessibility, soil and water, etc. And, primitive irrigated farming for planting maize mainly as staple food has been practiced based on their own experiences on water supply. These situations caused the shortage of foods for community people due to unstable crop production.

Under these situations, verification project in Sandai Irrigation Scheme was carried out to verify realization of sustainable participatory system management, which includes the possibility to extend the irrigation area, specially in the lower areas suffering from periodical water shortage, introduction of rotational irrigation water supply techniques to meet community people water demand in case of low water capacity in the Weseges River, effective water utilization at on-farm level, etc., and finally to examine if the community can sustainably rehabilitate, operate and maintain the irrigation system without GOK/Donors' periodical intervention.

2) Strategies/Approach and Project Purposes

The highest demand of community people in Sandai Irrigation Scheme is to get enough food. In order to meet this requirements, it could be considered that more effective water utilization of limited water resources could be expected by introduction of a little bit well managed water distribution techniques in this irrigation systems inclusive of minimum level of canal facility rehabilitation.

PCM workshop under the participation of community people identified the improvement of irrigation facilities, introduction of rotational irrigation methods, improvement of water distribution at on-farm level, etc.

Regarding the canal facilities rehabilitation, following works were made; namely, main canal lining of 300 m in length at upper portion, rehabilitation of division boxes with installation of gates at six sites, and provision of screen at intake site.

3) Community Situation

3.1) Local Community

The community within the Sandai Irrigation Scheme has been settled in the area since the early part of 20th century. By 1932, the community along the Weseges River was already

practicing irrigation as a countermeasure against frequent drought and associated crop failure. Technology, however, was rudimentary and featured seasonal stone and brushwood weirs, earthen canal and small flood basins. Owing to decline in soil fertility and increased weed growth, irrigation would be carried out in one area for 3-5 years and then shift to a new area along the river. Presently, the community practices a mixed economy that includes extensive rearing of livestock (goats, sheep, cattle, a few donkeys) and growing of crops (maize, finger millet, beans, vegetables) under supplementary irrigation at Sandai Irrigation Scheme as well as under rain-fed conditions. Two swamps at Kisubo and Chemongee provide dry season grazing as do the elevated areas surrounding the Sandai area.

As it has been mentioned above, the Sandai Irrigation Scheme was rehabilitated as a part of a broader SSIDP from 1979 to 1983. At the time, the rehabilitation design provided for an intake of 220 litres/sec embracing a block of 200 acres and some 200 farmers irrigating one acre each. Soon after the irrigation system was implemented, farmers were reluctant to use the new system. While the design of 200 acre block of contiguous one-acre fields was rational from an engineering viewpoint, it failed to recognize land ownership pattern in Sandai area. All land within Sandai is owned or claimed by somebody or family or clan. This is in contrast with the El Dume Irrigation Scheme that was designed and implemented at the same time.

The farmers at Sandai were therefore reluctant to use the irrigation system as designed. While they retained the main canal as originally designed, they installed new secondary and tertiary canals that led to individual land parcels. Hence what we have today is not a single irrigation block but a patchwork of irrigated plots that are widely spread out. Furthermore, the number of irrigation farmers as well as irrigation area have been increasing over the years, thus causing an imbalance between available water and irrigated land.

The change in irrigable area is summarized below;

Table 2.3.1 Irrigable Area and Farmers in Sandai Irrigation Scheme

Year	Irrigable Area (acre)	Number of Farmers (H.H)
1984	200	200
1990	500	250
2000	700	700

Farmers regard existing irrigation organization to be ineffective in allocating water fairly or in maintaining the irrigation system. Water shortage is a chronic problem particularly for farmers located at the tail end of the main or branch canals.

3.2) Existing Community-Based Organizations

Currently, there are following five main community-based organizations (CBOs) in Sandai;

- "Sandai Irrigation Group" which operates and maintains an intake, main canal and secondary distribution system embracing 700 farmers and estimated 320 acres
- "Water Users Association" which procures seed and markets grain on behalf of farmers
- "Dip Group" which operates and maintains dipping facilities for controlling ticks in local cattle, goats and sheep
- Community (Bamako Initiative) Health Clinic that procures non-prescription drugs and sells them to the community
- Animal Health Center that buys livestock drugs and sells them to local pastoralists

In the past, these organizations have received assistance from donors as summarized below;

Table 2.3.2 Existing CBOs and Their Functions

Type of CBO	Main Activities	Outside Agency Providing Support	Nature of Outside Support
1. Irrigation Group	- Rehabilitate irrigation infrastructure	- SIDP (PIU)	Survey and redesign irrigation system on a grant basis
	- Maintain irrigation system	- World Bank (BSAAP) Project	Installation of irrigation division boxes on a grant basis
		- World Vision	Construction of on-river water velocity checks on a grant basis
	- Allocate irrigation water among members	- DANIDA	Training in community mobilization
		- CDTF	Currently negotiating a grant for canal rehabilitation on a grant basis

During the implementation of verification projects, efforts were directed towards reforming, promoting or strengthening the capacity of Sandai Irrigation Group. The general status of the organizations is summarized as shown below;

Table 2.3.3 Current Status of Sandai Irrigation Group

Organization	Current Status
Sandai Irrigation Group	- Changed name to "Sandai Irrigation Water Users Association" and registered as such · A new management committee has been elected but retaining the old chairman in his position; committee expanded from 13 to 17 members · By-laws discussed by committee but not endorsed by "General Meeting" · Organization and management manual has been prepared and is currently under discussion by the committee · Committee efforts concentrated on collection of money towards payment of the community's 30 percent cost-sharing for canal lining <u>Work still Outstanding</u> - Implementation of operation and maintenance manual - Determination of association membership, membership fees and water charges as per existing by-laws - Opening of bank account and establishment of maintenance fund

4) Existing Irrigation Practices

4.1) Current Situation

Irrigation in Sandai dates back to 1930s when the farmers started shifting cultivation with irrigation by digging canals from Waseges River. In 1979 the Ministry of Agriculture took an initiative to rehabilitate the irrigation systems in the area under the SSIDP with the assistance from the Netherlands. The rehabilitation work started in 1983, while the farmers had organized themselves into a group and contributed labour free of charge for excavation of the canals and drains in the scheme. The government met the cost of the materials and logistics of implementation.

According to the original design of irrigation systems, the maximum irrigable area was 200 acre (80 ha), although a total area of 620 acre (250 ha) was surveyed. The scheme was designed to divide into 200 units with one acre, where each unit would be bordered by an irrigation channel and a drain, having 100 farmers. However, the 200 units with one acres were canceled because of land holding problems. As of May 2000, the irrigation area has increased to 710 acre (287 ha) with 263 of farmers as follows;

Table 2.3.4 Irrigation Area and Number of Farmers

Branch	No. of Farmers	Irrigation Area (acre)
1 Upper Part		
(1) Chepkotoyo	32	78.0
2 Middle Part		
(1) Kapchepkendi	42	144.5
3 Lower Part		
(1) Soteiwa	50	110.5
(2) Mokokwo	32	94.5
(3) Temberwe	25	68.0
(4) Kokchande	22	64.0
(5) Cheploach	36	87.0
(6) Sesia	24	63.5
Su-btotal	189	497.5
Total	239	710.0

Source: Sandai Irrigation Scheme

4.2) Background of Needs/Project

According to the application document on water permit, which was prepared by Sandai Irrigation Scheme Committee, the head on main canal has an intake with capacity of 1.5 m. Water depth of the intake is 40 cm at full supply level with 0.22 m^3/sec of discharge. The irrigation capacity is only 198 acre (80 ha) for maize. However, the current irrigation area has reached to 710 acres equivalent to about 3.6 times of irrigation capacity and the irrigation area is still expanding year by year. It brings inevitably various problems in the irrigation scheme as follows;

- The water shortage is severe almost throughout the irrigation systems, except for just along main canal in upper part. Throughout the irrigation area especially in middle and lower parts of the irrigation area, the chronic water shortage occurs in more than 50 percent of the branch canals area.
- The irrigation area is still expanded year by year, although there is a severe water shortage. No by-law is prepared regarding to control the illegal expansion.
- Due to lack of moisture, the unit yield of maize is as low as 1.3 to 2.2 ton/ha (6 to 10 bags/acre). These low yields may be caused by the delay in planting and no use of fertilizers and pesticides in addition to simply lack of moisture.
- The low irrigation efficiency is caused not only by silting up in the head of main canals but also by the low field application efficiency. More than 50 percent of the irrigated land are not adequately leveled, where it takes several hours to apply water in one acre.

Above problems seem to be typical issues in the semi arid area. Basically water resources are very limited there, where no sufficient crop grows without irrigation in the semi arid areas including the Sandai area. The numbers of farmers who irrigates the land has increased at the high rate in the area. To solve these constraints, irrigation management

program consisting of main canal lining and construction of division boxes was proposed under the verification project.

2.3.2 Project Design

1) Project Design Matrix

In the verification project in Sandai, as for agriculture, three results/outputs, which are a) irrigation facilities are improved, b) rotational irrigation is realized, and c) on-farm irrigation is improved, will contribute to Verification Purpose in 18 months of "selected farmers get enough food." And together with d) villagers learn from verification project," Project Purpose of "People of Sandai get enough food" and Overall Goal of "People of Sandai are well nourished" are expected to be realized. Two external factors of "Drought conditions in Sandai do not worsen" and "No outbreak of notifiable diseases" are specified as Important Assumptions.

Table 2.3.5 Narrative Summary and Indicators for the Verification Project in Sandai (abstruct)

Narrative Summary	Objectively Verifiable Indicators (Planned)
Overall Goal People of Sandai are well nourished	
Project Purpose People of Sandai get enough food	
Verification Purpose in 18 months Selected farmers get enough food	Yield of water saved irrigation land increases to 18-20 bags/acre from 10-15 bags/acre.
Results/Outputs 1. Irrigation facilities are improved 2. Rotational irrigation is realized 3. On-farm irrigation is improved 4. Sandai villagers learn from verification project	1. 60% of farmers get water 2. Less complaints from previous usage of water 3. Irrigation water is 75% less than before
Inputs 1. Materials for canal lining (cement, wood, equipment for concrete mixing etc.): 270,490Ksh (30% borne by community) 2. Materials for diversion boxes (steel gates, cements, wood, ballast etc.): 260,715Ksh (30% borne by community) 3. Skilled labor for canal and diversion boxes: 141,400Ksh (30% borne by community) 4. Transportation for canal and diversion boxes: 448,000Ksh (30% borne by community) 5. Tools for canal and diversion boxes (mattock, jembe, wheelbarrow etc.): 43,720Ksh (Grant by the Study Team) 6. Unskilled Labor or canal and diversion boxes: 1,480man-date: 133,200Ksh (100% borne by community)	

2) Plan of Action

Plans of action for six results/outputs were designed during the workshop in May 2000. The participants for the group work were:

a) Irrigation facilities are improved. 14 people (Male: 7, Female: 7)

b)	Rotational irrigation is realized.	10 people (Male: 7, Female: 3)
c)	On-farm irrigation is improved.	11 people (Male: 7, Female: 4)
d)	Goats become fatter.	15 people (Male: 6, Female: 9)
e)	Animal health is improved.	13 people (Male: 8, Female: 5)
f)	Villagers learn from verification project.	13 people (Male: 4, Female: 9)

3) Project Design Changes

3.1) During Workshop

It was realized during the workshop that they have a lot to do to manage Sandai Irrigation Scheme properly. Even though, the application for water permit is only for 200 acres, there are about 700 acres of irrigated land in the Scheme at the moment. Yet people think more about increasing the intake, and not much about decreasing his/her acreage. There was a card "Each farmer decreases his/her acreage," but it was ignored completely by the other participants. The purpose of the activities related to the scheme is to increase the efficiency of the irrigated water taken from the Waseges River, and there is no magic to irrigate all the area sufficiently.

3.2) Participatory Irrigation Management

Project purpose, components, executing agency, contribution systems and ratios of cost sharing are basically same as previous study mentioned in the Interim Report. To formulate an adequate participatory irrigation management in the scheme, rehabilitation works of main canal with masonry lining and division boxes were planned in the verification project as a first step. Implementation components for these works consisted of survey work, construction work of canal and it's structures.

Following major changes were identified through the process of workshop and discussion with community people, namely construction methods, structure types, numbers of workers, materials, skilled workers and construction experiences at implementation stage.

a) Lining Method of Main Canal

Lining method of main canal were changed from concrete lining to wet masonry lining due to the following reasons, though community people had no experiences for both of them.

- To make good use of local materials. There are so many stones around the site.
- Wet masonry method is economical and easy to construct lining work.
- It is easy for community people to get technology.
- Repairing work is also easy for community.
- Few environmental impacts to forest in case of no uses of timbers for concrete

form-works.

b) Construction of Stock House

Canal lining works requires many tools and materials such as hoes, shovels, wheelbarrows, cement and etc. And as their works will take a long time, some stock house during construction period should newly be provided. This stock house would be used for maintenance office in future. Size of stock house is four meter wide and five meter long with waved thin steel plate at roof and wall.

c) Project Costs

Total project cost is estimated at 1,164Ksh thousand as shown below;

Table 2.3.6 Project Cost

Item	Project Costs (Ksh)	Remarks
1. Store House	36,750	
2. Transportation	448,000	
3. Skilled Labor	141,400	
4. Cement and Materials	230820	
5. Material for Conrete Mixing	2,920	
6. Tools	43,720	
7. Gates	260,715	Six gates
Total	1,164,325	

2.3.3 Implementation Record

Earth work such as digging and trimming the existing earthen canal was started on April 10, 2000 and the masonry lining work on April 20, 2000. A meeting was held on June 5, 2000 with 211 participants, during which majority of the community people evaluated the progress of the construction as fair and degree of community participation in the construction work as good. The people felt however the cost that has been spent so far was very high. Therefore the community decided to change the way of payment to the skilled works from per day basis to per output basis. The agreement was that the lining work to cover the first canal section of 300 m, should be completed by July 27, assuming five meter output per day. The work was actually completed on August 3, 2000 because of water coming into the canal caused by rainfall during the 3rd week of July.

Community members occasionally participated in digging and trimming the existing earthen canal, while 11 full time participants joined the three skilled masonry workers who are paid of lining the canal. The full time participants were supported 50 Ksh each per day by the skilled masonry workers and by the councilor, who had provided the transportation at a cost of 4,500 Ksh/day, in order to furnish the work. The leader of the

masonry workers supported four participants, two junior masonry workers one each participant and the councilor supported the remaining five.

Upon completion of the 300 m lining, next step was to provide six diversion gates. The design of the division boxes was completed by GOK staff on July 24, 2000 and this was distributed to selected engineering firms to enable them participate in the quotations. On July 26 and 27, 2000 the Study Team and the GOK Irrigation Officer went to Nakuru to invite quotations for the fabrication of the division gates and spindles, and ordered them to an engineering firm that provided the lowest quotation. The gates were fabricated by August 7, 2000.

The way of cost allocation among beneficiaries (allocating the cost either by household or by acreage of the land) has been intensively discussed during a PCM workshop held on July 25, 2000 and they had agreed upon acreage bases. The costs to be borne by the beneficiaries was tentatively set at 364,431 Ksh (506 Ksh/acre or 1,735 Ksh/HH on an average household basis). Although the community generally appears reluctant to make cash contribution, an instalment was agreed during the PCM workshop, namely, 21,000 Ksh on August 3, 2000, 51,000 Ksh on September 10, 2000, 73,440 Ksh on December 10, 2000, 73,440 Ksh on March 10, 2001, 73,440 Ksh on July 10, 2001, and 72,111 Ksh on September 10, 2001, respectively. The first instalment of cost contribution was done on the date.

After the completion of the 300 m canal lining, the next step was the rehabilitation of six division boxes including fixing gates. The Study Team supplied materials and tools, and provided technical advice for the works. The design of the division boxes had been completed by GOK staff in July and the gates had been also fabricated in August. The installation of gates was started on November 4, 2000 and out of these six gates, three division boxes with gates had been completed during the verification period.

In the rehabilitation of division boxes at three sites, community members participated in collecting materials such as sands and rough stones using a tractor provided by them as a preparation work for the rehabilitation of division boxes. In particular, the arrangements for other materials estimated by a GOK officer, namely cement, timber, reinforcement bar, transportation, etc, was done by the Chairman of Sandai Irrigation Water Users Association (SIWUA) as a representative of the community without any intervention from the Study Team.

Sandai community, however, had no skilled worker such as masonry and concrete mixing worker, so that they hired two such persons from Roboi located near Sandai, then, the gate installation work itself was done by these skilled labors. The community decided to pay them Ksh 14,400 (two persons, 400 Ksh/person/day, three days/site, six sites).

Regarding the remaining rehabilitation of division boxes, however, reactions from the community, particularly poor repayment for canal rehabilitation, were glaring in the area. So that a series of discussion on these gate installation was made among community, the Study Team, GOK officers, etc. According to the final discussion held on February 24, 2001 at Sandai center, the Study Team explained following two alternatives to the community regarding rehabilitation of division boxes and cost contribution. The community replied that their final decision would be announced to the Study Team at the beginning of March 2001.

Case-1: Collection of repayment as already specified in installment plan and already decided in getting consensus again among communities, and installation of remaining three gates.

Case-2: No more installation of three gates and reduction of repayment

During this study period, Sandai community paid Ksh 4,000 for their due of canal lining and diversion boxes. Their payment has been far much delayed from the agreed repayment schedule. Although the beneficiaries were addressing the benefit of irrigation improvement, it seems that they have put the priority in raising money for school fees for this time. The community did a harambee and they managed to send three children to secondary school, that would have cost around Ksh 50,000. It is also observed that there was still a communication gap between the community leaders and other villagers. The leaders would have to face the villagers to collect their due with sound explanation for the payment.

Under the situation mentioned above, rehabilitation of three division boxes are not yet implemented as of September 2001.

Besides the above-mentioned works, the community did cleaning of canals. On October 16, 2000, 53 members of SIWUA from Sesia and Cheploch villages participated in clearing of canals leading to their farms from the main canal. This increased the flow and reduced the losses.

The community requested the Study Team to install an intake protection screen. And then, the screen material supplied by the Study Team has been ordered to fabricate by the community in Marigat. Also, they want to improve the Chepkwenion canal, namely raising of the existing flume running 15 m, and revetment of the 10 m unlined portion. But these improvement works were not implemented.

Weseges River, the source of water in the Sandai PIM project, has dried up since beginning of February 2001. Subsequently there were no irrigation activities taking place in Sandai during the period of dry month until June 2001. After July 2001, enough run-off water of Weseges River made it possible to plant crop in large areas with good yield under the rehabilitated canal systems, although some rehabilitation of irrigation facilities will be

needed.

2.3.4 Encountered Difficulties and Countermeasures

1) General Difficulties

- In the past, the Sandai Irrigation Scheme had been the target of several donor initiatives mostly in the grant form. There has therefore been considerable resistance from community leadership to the Study Team's approach that place emphasis on community self-reliance. For instance, de-silting of the main canal has been slow, 50 percent of short-term plowing loans have not been paid, members failed to turn up for an goat inspection tour while encouragement to restructure existing community-based organizations have not succeeded.
- It seems that every member of irrigation scheme got a clear understanding of the project necessity and were working hard on the project. However maintenance of the canal systems was poor.
- Although Sandai area has an irrigation system, production of crops in some villages is very low due to serious drought and the villagers have actually run out of food. They come to work without breakfast and could not actively work at full time. They requested food for work. Food for livestock was also in short supply.
- Although the villager has several internal meetings about progress of the earthwork after Easter, the number of workers and working time has decreased week by week.
- Sandai village has a piped water system but piped water is not available due to some troubles. The villagers spend much time to get drinking and/or domestic water. Water for construction is also difficult to get.
- Most of the farmers even the agricultural extension field assistant have a strong donor dependency attitude. Actually it takes much time for the farmers to participate in the self-reliant verification project appropriately.

2) Cost-Sharing Difficulties

A PCM workshop was held on November 7, 10, and 11, 2000 with about 40 participants. The major issue discussed was cost-sharing as again expected. The people thought that the cost that had been spent so far was very high. In particular, there were still some people who were demanding their labor that community members participated in digging and trimming the unlined canal should had been included within the 30 percent of the total cost.

The way of cost allocation among beneficiaries had been discussed during a workshop and they had agreed that they would pay on an installment dividing five times from August to September 2001. The first installment was done on the due date but the second installment has not been paid completely yet. Up to October 30, 2000, 9,060 Ksh was paid out of the due of 51,000 Ksh.

Accordingly, the Study Team had held the installation of division boxes in abeyance and had been waiting for the sign from the community. Then, the community paid 10,000 Ksh as a part of the second installment on November 10, 2000. On the account, the Study Team had decided to start the construction of only two sites out of six. There were meetings with the community together with the Study Team and it was agreed to renovate six division boxes according to the payment of the cost-sharing from that time.

2.3.5 Lessons Learned

Sandai community was used to implementing donor-supported projects without any cash-contributions. For instance, a SIDA funded water project that is currently being implemented in Sandai requires the community only to provide labour and local materials. As a result, the approach taken by the Study Team requiring the community to provide 30 percent cash contribution over and above labour and local material contribution was questioned and resisted by the community.

In this situation, the donor has to declare consistently donor's own method at first. Moreover, it needs to explain the method perseveringly to get comprehension of the community - what is cost sharing or what is participation. Then, both the community and donor will be able to build up mutual trustworthiness between them.

For the rehabilitation of division boxes, community people participated in preparation works. In particular, for the supply of materials, the Chairman of SIWUA did it himself. Accordingly the cost of transportation became cheaper by his negotiation; it was 8,000 Ksh per day for rental fee of truck. This is an interesting thing, because the transportation cost using truck is normally from 10,000 to 14,000 Ksh per day in case of negotiation directed by the Study Team. In short, the community negotiated with their own way without an intervention from the Study Team and the Study Team was treated as a transient.

2.3.6 Evaluation

1) Outputs

Canal liming of 300m was completed in August 2001, and as a result of the improvement made on the main canal, the discharge has increased and in turn the conveyance losses reduced, which enabled the farmers whose plots are located at downstream to get water to those plots that previously were not being irrigated. In 2001, with the increase of irrigation efficiency and rotational irrigation, 90% of the irrigation farmers got sufficient water as compared to planned target of 60%. Crop area for cash crops such as tomatoes and watermelons were increased and French beans were newly introduced in 2001.

However lining of canal covers the first 300 m reach only, and this alone does not give noticeable effect over entire area of the Sandai irrigation. Another physical intervention is the installation of gates, which enables equal water distribution by carrying out rotational

irrigation. The rehabilitation of division boxes was not completed yet, so that rotational irrigation was not fully practiced yet.

2) Outcome for the Stakeholder

According to the results of workshop held in participation of Sandai community people, they expressed their satisfaction for working together with community people to excavate irrigation canal of 300 m, in order to provide canal lining, although those works were so hard for them without any assistance of food for works under shortage of food due to drought. These feeling of satisfaction could be considered as the most important valuable outcome for the stakeholder in the verification study in Sandai.

Although the project was successful in terms of efficiency and effectiveness, there was no significant evidence about people's capacity building. People's attitude of dependency still remains and most of the community members were reluctant for the cash contribution (only 17% of total due had been collected). However, it was observed that the Chief of Sandai location showed positive attitude and discretion in organizing community and one beneficiary of land leveling expressed on his future vision not to depend on donors. Expect for few community members, they might have learnt little from the project.

3) Impact for Surrounding Communities

By the implementation of participatory irrigation management in Sandai Scheme, following impacts for surrounding communities have been observed; namely, the community people living in left bank area of the Weseges River being located in the outside of the verification project area started voluntarily canal cleaning of their own irrigation canal in order to divert irrigation water smoothly from the Weseges River.

Furthermore, at the most lower reaches of Sandai Irrigation Schme, which have been unofficially expanded as beneficial area by the rural people immigrated from other areas, community people energetically excavated small irrigation ditches by themselves to introduce the water to their farms, because canal facility improvement in the system made it possible to reach irrigation water to these lower reaches, although relative big amount of rainfall was observed in this rainy season.

4) Negative Impacts

Followings were identified as a negative impact through the implementation of the verification project in Sandai;

- A community member was benefited largely from construction works, and this fact causes the inner opposition among community people,
- Community contribution was discouraged by insufficient transparency of construction costs to all member of the beneficially.
- Beneficiaries between right and left banks of the Weseges River stood in opposition, due to unequal water distribution.

2.3.7 Way Forward

Although the project was effective, people's dependency still seems remaining, e.g. at the first week of canal lining work, 80 to 100 people joined the earthwork and the number decreased to 10 after they know there was no payment for the work from the Study Team. Finally six youth remained but in fact the contractors who were hired by the Study Team were unwillingly giving them pocket money. The approach by Donors to count community labor as their part of cash contribution may have promoted the dependency, diminishing their sense of ownership. Rushing implementation bound to the administrative/budgeting condition may also have curtailed people's initiative. Unless otherwise GOK/Donors change their approach to the community and vise versa, sustainable participatory irrigation management, including the rehabilitation, is very difficult due to the deep-rooted dependency replenished in the long history of external assistances (Their behavior of getting assistances from donors is even sophisticated).

For the subsidy arrangement, community should be involved in cost estimation and budgeting from the initial stage and be given notification for the project cost at the earliest stage. In addition to that, a certain part of project cost may be required as the community's commitment prior to the project commencement so that they drive their initiative and motivation.

By the improvement of irrigation facilities such as lining of canal of upper 300 m, rehabilitation of division boxes with gate installations, effective water utilization under the limited water resources is tend to be realized gradually with participatory water management. In order to expect more effect of participatory water management mentioned above, followings would be essential, although rehabilitation of other three division boxes with gate installation are still reaming.

- Mutual agreement among communities on consensus to introduce rotational irrigation systems with rehabilitation of reaming three division boxes with gate installation.
- Introduction of diversified crops such as French beans, onion, tomatoes, etc. to meet requirement of high return of benefits in the irrigated land
- Cohesiveness of irrigation groups after election of chairman of the group, and the transparency of cash flow should be cleared, in order to avoid opposition each other caused by individual distrust.

Table 2.3.7 Evaluation of the Verification Projects: Communal Resource Management - Participatory Irrigation Management (Sandai)

1. Verification Purpose:

Verification Purpose	*To examine if the community can sustainably rehabilitate, operate and maintain the irrigation system without GOK/Donors' periodical intervention.*
Result	*Although the project was effective, people's dependency still seems remaining, e.g. at the first week of canal lining work, 80 to 100 people joined the earthwork and the number decreased to 10 after they knew there was no payment for the work from the Study Team. Finally 6 youths remained but in fact the contractors who were hired by the Study Team were unwillingly giving them pocket money. The approach by Donors to count community labor as their part of cash contribution may have promoted the dependency, diminishing their sense of ownership. Rushing implementation bound to the administrative/budgeting condition may also have curtailed people's initiative. Unless otherwise GOK/Donors change their approach to the community and vise versa, sustainable participatory irrigation management, including the rehabilitation, is very difficult due to the deep-rooted dependency replenished in the long history of external assistances (Their behavior of getting assistances from donors is even sophisticated.).*

2. Evaluation of Planning Stage

	Original	*Changes in the course of Implementatio*
2.1 Situation Analysis	*1. Irrigation water use efficiency is low because of high seepage losses, poor maintenance of water channels and lack of sound water allocation and distributions.* *2. The community at Sandai is united and will co-operate with GOK/JICA Study Team in promoting improved water management and maintenance methods*	*1. No change* *2. JICA Study Team later became aware of the complex nature of Sandai community with its diverse resource base (Livestock, Kisubo & Chemongee swamps, highland grazing lands, rainfed and irrigated agriculture), long history of donor support and well differentiated social power structure.*
2.2 Strategies/Approaches	*1. PCM workshops* *2. Committee/GOK&JICA Study Team meetings* *3. Shared responsibility between community and GOK/JICA Study Team in implementing project works*	*No Change*
2.3 Project Purpose	*Sandai Community have enough food*	*No Change*
2.4 Project Design	*1. Community to provide free labour during implementation; Community/JICA Study Team to share cost of implementation on the basis of 30%: 70%* *2. Lining of main canal using locally available materials*	*Cost sharing ratio between community and JICA Study Team was requested by community to change the ration of 15%: 85% towards the end of the study period.*
2.5 Input	*1. Lining of main cana,l*	*No Change*

	2. Division boxes with gates *3. Other concrete structures* *4. Labor* *5. Technical expertise* *6. Materials & materials transport*	

3.Monitoring and Evaluation of Implementation Stage

3.1 Encountered Difficulties	*1. Low turn out of community members in providing agreed free labour during canal lining* *2. Late attendance to workshops and communal labour* *3. Inability of irrigation committee to mobilize farmers for communal labour and payment of cost sharing* *4. Misunderstanding between community and GOK/JICA StudyTeam on contract for materials transport* *5. Conflict among community leadership* *6. Reluctance of community to pay agreed 30% of material costs* *7. Inability of committee to oversee operation of gates, clearing of channels and equitable allocation of irrigation water* *8. Severe drought and food shortage during works implementation period*		
3.2 Counter Measures	*1. Several meetings were held with the community as well as with irrigation Committee members* *2. Installation of three remaining gates suspended until outstanding cost sharing dues are paid* *3. Community's cost sharing proportion is requested to be down from 30% to15%* *4. Relief food provided by GOK to community*		
3.3 Lessons Learned	*Community*	*GOK*	*JICA Study Team*
	- Given the critical role played by management committee in the scheme, the community have realized the need for regular elections in order to change or endorse leaders. They have learnt that without change the community as a whole will lose (eg delayed installation of gates).	*- There is need for a motivated front-line extension staff (Agriculture and Social Services) to give technical and institutional support to community based organizations such as "Water Users Association".*	*1. Farmers' organization and institutional reform at the community level is extremely challenging and require considerable time and patience.* *2. Good communication and clear understanding of implementation procedures by all involved parties is crucial.*

4. Evaluation of Out-put and Outcome

4.1 Out-puts (Indicators)	*20 farmers which is less than 10% of the scheme farmers did not get enough water, implying that 90% of the farmers got sufficient water as compared to plan target of 60%.*
4.2 Vetical Out-come (Outcome for the stakeholders)	*With irrigation water being more assured, farmers feel more confident to take risks and try new crops such as French beans and tomatoes which require expensive inputs and sophisticated marketing arrangements.*
4.3 Horizontal Outcome (Impact for the surrounding communities)	*The neighboring community using the Kamaech canal on the left bank of the Weseges River would like to duplicate Sandai experience by lining their canal.*

4.4 Negative Impact	*1. Project triggered latent leadership conflicts particularly with regard to contracts for materials transport* *2. The community operating the traditional Kamaech canal on the left bank are worried because the Sandai Group has now a more efficient water abstraction and conveyance system. They feel the improved Sandai System is likely to deny them water during the dry season when the river flow is available.*

5. Way Forward

5.1 Way Forward	Community	GOK	JICA Study Team
	1. Committee and community to co-operate and complete the remaining works *2. Community to contribute remaining cost sharing.* *3. Management committee to work out, in consultation with local frontline extension officer, rotation schedule aimed at more equitable allocation of irrigation water to the farmers* *4. The management committee to put more efforts aimed at obtaining cohesion of the irrigation farmers and adherence to the irrigation by-laws*	*1. Department of Social Services to arrange for election of new committee and subsequently give follow-up support in leadership and management training.* *2. Ministry of Agriculture to post a highly motivated frontline extension worker with experience in irrigation.* *3. Divisioaln Programme Officer and Divisional irrigation Officer to provide regular back-stopping support to the irrigation scheme.*	*1. For the subsidy arrangement, community should be involved in cost estimation and budgeting from the initial stage and be given notification for the project cost at the earliest stage.* *2. A certain part of project cost as community's commitment prior to the project commencement may be required, so that they drive their initiative and motivation, lowering their dependency on GOK/Donor.*

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

2.4 Communal Resources Management: Water Saved Agriculture (Sandai)

2.4.1 Background

1) Subject to Verify

1.1) Current Situation in Verification Site

Irrigation in Sandai dates back to 1930s when the farmers started shifting cultivation with irrigation by digging canals from Waseges river. In 1979 the Ministry of Agriculture took an initiative to rehabilitate the irrigation systems in the area under the Small Scale Irrigation Development(SSIDP) with the assistance from the Netherlands. According to the design, the maximum irrigable area was 80ha (200 acres). The scheme was designed to divide into 200 units of one (1) acre, where each unit would be bordered by an irrigation channel and a drain, having 100 farmers. However, the division of 200 units in one (1) acres were canceled because of land holding problems. As of May 2000, the irrigation area has increased to 287ha (710 acres) with 263 of farmers as follows.

1.2) Background of Needs/Project

According to the application document on water permit, which was prepared by Sandai Irrigation Scheme Committee, the head on main canal has an intake with capacity of 1.508 m^3. The depth of water supply of the intake is 40 cm at full supply level with 0.22 m^3 of the estimated discharge. The irrigation capacity is only 80 ha (198 acre) of maize. However, the current irrigation area has reached to 710 acres, about 3.6 times of irrigation capacity and the irrigation area is still expanded year by year. It brings inevitably various problems as follows ;

- The water shortage is severe almost throughout the irrigation systems, except for just along main canal in upper part, in middle and lower parts of the irrigation area. The chronic water shortage occurs in more than 50 percent of the branch canals area. The irrigation area is still expanded year by year, although there is a severe water shortage. No bylaw is prepared regarding to control the illegal expansion.
- Due to lack of moisture, the unit yield of maize is as low as 1.3 to 2.2 ton/ha (6 to 10 bags/acre). These low yields may be caused by the delay in planting and no use of fertilizers and pesticides in addition to simply lack of moisture.
- The low irrigation efficiency is caused not only by silting up in the head of main canals, but also by the low field application efficiency. More than 50 percent of the irrigated land) are not adequately leveled, where it takes several hours to apply water in one acre.

Above problems seem to be typical issues in the semi arid area. Basically water resources is very limited there, where no crop grows without irrigation in the semi arid including the Sandai area. The numbers of farmers who irrigates the land has increased at the high rate in the area. The water saved irrigated agriculture is needed in order to increase the field

application efficiency as well as increase crop yield. Theoretically the land leveling reduces irrigation loss and increases crop yield with uniformly distributed water to each hill. Most of the irrigation land has uneven topography, where it takes too much time to irrigate at present.

2) Local Community

The community within the Sandai Irrigation Scheme has been settled in the area since the early part of 20th century. By 1932, the community along the Weseges River was already practicing irrigation as a countermeasure against frequent drought and associated crop failure. Technology, however, was rudimentary and featured seasonal stone and brushwood weirs, earthen canal and small flood basins. Owing to decline in soil fertility and increased weed growth, irrigation would be carried out in one area for 3-5 years and then shift to a new area along the river. Presently, the community practices a mixed economy that includes extensive rearing of livestock (goats, sheep, cattle, a few donkeys) and growing of crops (maize, finger millet, beans, vegetables) under supplementary irrigation at Sandai Irrigation Scheme as well as under rain-fed conditions. The number of irrigation farmers as well as irrigation area have been increasing over the years, thus causing an imbalance between available water and irrigated land. The change in irrigable area is summarized below;

Table 2.4.1 Irrigable Area and Farmers in Sandai Irrigation Scheme

Year	Irrigable Area (acre)	Number of Farmers (H.H)
1984	200	200
1990	500	250
2000	700	700

Farmers regard existing irrigation organization to be ineffective in allocating water fairly or in maintaining the irrigation system. Water shortage is a chronic problem particularly for farmers located at the tail end of the main or branch canals.

3) Existing Community-Based Organizations

Currently, there are five main community-based organizations (CBOs) in Sandai i.e.;

- "Sandai Irrigation Group" which operates and maintains an intake, main canal and secondary distribution system embracing 700 farmers and estimated 320 acres
- "Water Users Association" which procures seed and markets grain on behalf of farmers
- "Dip Group" which operates and maintains dipping facilities for controlling ticks in local cattle, goats and sheep

- Community (Bamako Initiative) Health Clinic that procures non-prescription drugs and sells them to the community
- Animal Health Center that buys livestock drugs and sells them to local pastoralists

2.4.2 Project Design

The verification sites were selected from the whole irrigation area of Sandai Irrigation Scheme (right bank). Originally only one representative branch canal would be chosen from the mid of the irrigation area. However, the participants of workshop proposed to select each one site from upper, middle and lower areas of irrigation area. The seed supply of maize and beans was removed because all farmers will be supplied with seeds from Water Users Association (the cooperative societies). Following technical aspects were changed during workshop;

1) Use of Leveler from Bulldozer

Originally it is proposed that the land leveling would be operated by bulldozers, where the compacted soil by the land leveling may require to be softened by applying ripper. The operation costs of the land leveling must be very expensive and the compacted soils may disturb the growth of crops. As it was found a land leveler is available at KARI, Perkerra. Then the work on land leveling machine was changed from bulldozer to leveler after discussion with the verification farmers and technical supporting personnel of National Irrigation Board (NIB) and Agricultural Mechanization Station (AMS), Baringo District. The use of machinery in land leveling was designed as follows;

- Applying disc plowing individually by mobilizing customary service tractors
- Using KARI land leveler drafted by NIB tractor (75 HP with two oil hydraulic tubes)
- Ridging individually by tractor by mobilizing customary service tractor.

2) Cost sharing for leveling operation

The whole plowing cost was shouldered by farmers, while the share for other operation cost by 30 percent for the farmers, which might be paid by the farmers after harvesting of crops. Originally the plowing cost was included into the land leveling cost. However the plowing cost had no subsidization because every farmer paid the plowing costs to tractor operators in cash.

3) Second Plow

Reflected by severe drought, the large clods were exposed during plowing and were left in the farmland after leveling operation, while some plots had shallow top soils because a lot of soils were removed under leveling operation. Therefore second plowing was applied for three acres out of nine acres.

2.4.3 Implementation Record

1) Implementation Process

The verification site of Water Saved Irrigated Agriculture with 3.3 ha (9 acre) area was identified during the PCM workshop for each three acres respectively in the upper, mid and lower parts of the Sandai Irrigation Scheme in the right bank of Waseges river. The verification project consists of the following three components;

- Land leveling
- Improvement of on-farm irrigation management
- Improvement of farming practices

The topography and area were surveyed for the farmers group. The process on land leveling operation was designed as follows;

- Disc plowing at farmers side
- Land levering with KARI land leveler drafted by NIB tractor (75 HP with two oil hydraulic tubes)
- Ridging by tractor through mobilizing customary tractor service

The unevenness without land leveling was estimated at more than 10 cm based on the topography survey result. After land leveling, the land was presumed to have the unevenness at less than 5 cm. There were four plots which had to be subdivided into smaller plots according to the topographic condition.

The severe drought damage affected badly for the implementation of verification projects. The participating farmers requested for the Study Team to pay the plowing cost for farmers at the credit basis. The cropping plan was formulated by the farmers for both long and short rain seasons. In the leveled land, the following improvement on farming practices was proposed to pursue in the verification project;

- Application of top-dressing to maize cultivation,
- Farm operation to keep evenness of leveled farm,
- Timely and adequately application of irrigation water.

Any chemical and organic fertilizers had not been applied in the Sandai Irrigation Scheme area so far, as the land shifting was practiced to keep soil fertility in the former time. However, it is recommendable to apply fertilizer or manure when farmland is exhausted and no new areas available for shifting cultivation. In the verification project the application of chemical fertilizers at 25kg/ha of nitrogen were designed with using ammonium sulfate. The application area of ammonium sulfate would be limited to 50%

of maize area, although it was designed to cover full areas in the original plan. And some pesticides would be needed to apply with proper observation on the population of major insects.

2) Study Tour on Learning from Best Practices

During workshop the Sandai community requested for about 50 people to have a study tour on learning from best practices with cost sharing at 65 percent by the community. The one day study tour was planned to visit the Kimose Farm in Mogotio and the SARDEP area. However, it was postponed for the time being due to the difficulty in cost sharing, affected by the drought.

3) Sandai Land Leveling Group

The irrigation committee and the local chief were requested by the Study Team to select seven farmers who would participate in the land leveling trial. The seven farmers then formed an informal group with their own chairman in order to facilitate collaboration with the Study Team and GOK staff. The objectives of the land-leveling group were;

- Collaborate on land leveling trials with Study/GOK Team
- Act as focus group for technical advice on in-field irrigation water management at Sandai Irrigation Scheme
- Provide demonstration on better crop husbandry practices

Collaboration procedures for the land leveling trial are summarized below;

Table 2.4.2 Collaboration Activities on Land leveling

Collaboration Activity	Participation	Facilitation
1. Meeting to discuss land leveling	- Irrigation Group Committee - Study Team/ MOARD	Chief Sandai Location
2. Meeting to discuss formula for cost sharing in ploughing, leveling and sharing as well as various verification activities; farmers to handle ploughing, ridging, sowing weeding crop protection and harvesting; Study Team to handle leveling.	- Land Leveling Group of 7 Farmers - Study Team/ MOARD	
3. Signing of agreement between Study Team and the seven farmers regarding cost responsibility	- Land Leveling Group of 7 Farmers - Study Team/ MOARD	

4. Meeting to discuss farmers request for a Ksh 1,200 short term loan to enable timely ploughing prior to land leveling and ridging operations; signing of a loan agreement providing for granting of the loan that would be re-paid on 20th April	- Study Team - Leveling Group Members	
5. Meeting to evaluate status of short-term repayment since only one farmer had paid by the due date. The six defaulting farmers cited drought as the reason they had not paid and gave an undertaking to pay in a week's time	- Six Leveling Group members - MOARD	MOARD
6. Meeting to discuss the case of defaulting farmers on the short- term loan. Discussion centered not on the amount of money involved but the negative impression the study team will get regarding farmers' attitude towards credit.	- Irrigation Committee - Chief Sandai Location	District Program Officer

The leveled lands were consisted of seven plots. Each one plot per member was distributed from the upstream to the downstream in Sandai irrigation system. With rendering the service on the aerial and topographical survey, the group members are involved in the Verification Project. The technical and financial supports on land leveling were provided to the group by the Study Team, including the advance payment for first ploughing. The first ploughing was made prior to land leveling under the condition that the full cost shall be repaid by May 17, 2000.

Out of seven members in the group, four members planted maize seeds in August and one farmer planted the seeds on September 15. The other remaining two, who have farms in the downstream had not cropped maize in that year due to water shortage. These farmers grow other crops like finger millets, field beans, onion, watermelon and tomato. The farmers had not harvested any of these crops including maize except for finger millet due to late planting.

2.4.4 Encountered Difficulties

1) Dependency Attitude of Farmers

Most of the farmers even the agricultural extension field assistant have a strong donor dependency attitude. Actually it takes much time for the farmers to participate the self dependent verification project appropriately. During the land leveling operation, the group members tend to rely on the Study Team. For instance, few farmers supervised their own land. In the evaluation on the action plan of the Verification Project, the group members raised the following problems on the progress of the project;

- Logs and stones were left in the sites, therefore most of the lands were not ready for the first ploughing as well as land leveling,
- The operation of ploughing and land preparation were not done well due to lack of participation on supervision by most of group members,
- Mechanical ridging was applied by only one farmer, out of seven farmers,
- The operation of ridging and planting of seeds delayed until late July due to the prolonged severe drought.
- Logs and stones were left in the sites, therefore most of the land were not ready for the first ploughing as well as land leveling,
- The operation of ploughing and land preparation were not done well because of lack of participation on supervision by most of group members,
- Mechanical ridging was applied by only one farmer, out of seven farmers, and
- The operation of ridging and planting of seeds delayed until late July due to the prolonged severe drought.

2) Availability of Land Levering Equipment

Although the land leveler are available at KARI, Perkerra, the operation efficiency of leveler was low because the leveler are suitable only in the large scaled farm. No other leveler was found in the Agricultural Mechanization Stations in Baringo and Nakur districts.

3) Drought Disturbance

The occurrence of drought affected severely their farm management in preparing money of ploughing and procurement farm inputs. Only three farmers could afford to pay for the cost of customary tractor services.

2.4.5 Lessons Learned

During the workshop on the midterm evaluation of the Verification Project, the following issues were raised for the lessons learned or better way;

- There is a need to study about smaller machine for lowering leveling cost,
- Ploughing of the land should be done twice to plough even hard pan of cut soil portion, and
- The cost of leveling should be lowered in future.

During the field survey the following observation was made;

- There is a large potential to increase the irrigation efficiency through land leveling because most of the farms have unevenness, and

- Communities need early and regular discussion on all expenses and disclosing to the communities about the arrangement of expenses.

The following items were raised as the lessons learned from the verification project during the workshop for final evaluation (September in 2001).

- Uniform distribution of water in leveled farm
- Improved crop yield in leveled farm
- Less time to irrigate leveled farm
- Expansion of irrigation land in the farms closer to leveled farms

2.4.6 Evaluation

1) Evaluation of Mid Term Stage

The community identified the impact that the people of Sandai had gotten enough food and were well nourished in the workshop on mid term evaluation. And following two items were pointed out as benefits of the project.

- Less complain from previous usage of water,
- Intake water is less than before.

Between “with” and “without” land leveling for group farmers, the average number of irrigation per week decreased from 1.8 to 1.5 times with average irrigation hours per time from 3.9 to 2.3 hours. It means that the weekly irrigation hours with land leveling is only about 50 % of that without land leveling. In ASAL areas, the water resources are very limited and the water shortage is very severe due to expansion of irrigation area regardless the limited water resources. Water saving is one of the practical ways to share the limited water among the many farmers in such areas.

2) Evaluation of Output and Outcome

2.1) Outputs

The outputs of the verification projects are summarized as follows;

Table 2.4.3 Production of Major Crops

Year	Major Crops	Verification Area	
		Area (ac)	Yield (kg/ac)
2000	Maize	3.7	1,362
	Finger Millet	0.8	413
	Beans		26
2001	Maize	5.3	1,851
	Finger Millet	0.8	530

Remarks: The maize unit yield in 2001 is forecasted because the crop was not harvested as of 18th September, 2001(The yield data exclude the upstream two farmers)
Source: Agricultural Office, Marigat and Mukutani Divisions

The maize yield in the verification were collected in the Baseline Survey conducted by the Study Team, and it was from 15 to 20 bags. The yield with land leveling was higher than that without land leveling one by about 30 %. The reduction of irrigation time is estimated at about 57.1 hours per acre (3.57 hour per acre x 16 times of irrigation per cropping). The increase of irrigation area was made by 30 %, based on the data in the downstream area (refer to Figure 2.3.1).

2.2) Outcome for the Stakeholders

Although the land leveling farmers were significantly benefited in term of increase of yield, reduction of irrigation time and increase of irrigation area, there was no farmers who applied land leveling outside of the verification area. However, all participant farmers agreed to pay the sharing cost, which would be dependent upon their satisfaction to the benefit.

2.3) Impact for the Surrounding Communities

There was no farmer who applied land leveling in the surrounding communities, which means the horizontal outcome of the verification project was not observed. However, many farmers as well as attendants of the workshop had quite positive opinion on the need of land leveling. Then it is requested to conduct a research on reduction of land leveling cost. One of the option on the trials is adoption of scraper instead of leveler. The land leveling by scraper is very popular in Egypt. As the land leveling by scraper is not efficient in the large size of farms, it may be applied in smaller sections of farm after division of ordinal sized farms.

2.4) Negative Impact

No significant negative impact was reported during the workshop on the final evaluation except for the high leveling cost and the complain of the upstream two farmers. They had larger sizes of plots with high incidence of unevenness with many large stones. Because

of unfavorable land condition, the two farmers did not cooperate with execution of leveling works.

2.4.7 Way Forward

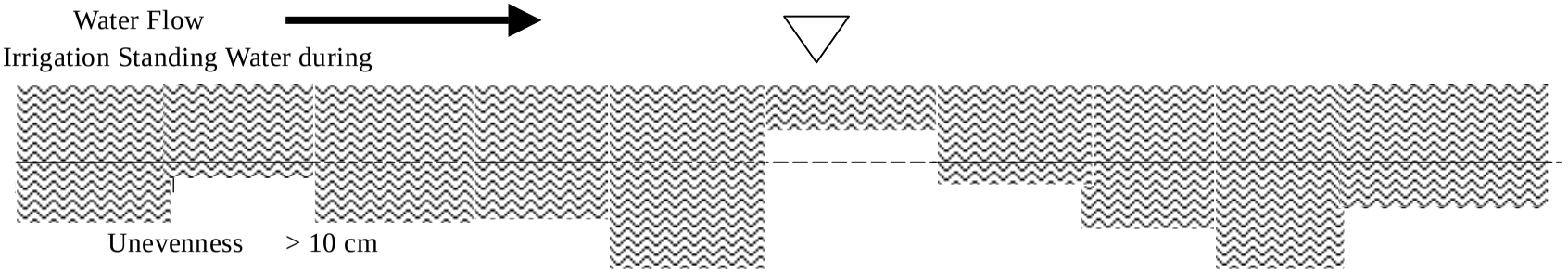
During the workshop on the final evaluation, the attendants raised the need to conduct research on less cost land leveling with smaller and cheaper machines as indicated in the followings;

- Seeking the less cost land leveling (Community)
- Extension of land leveling area (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)
- 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)
- Conduct research on less cost land leveling
- Provision of technical advice and support (GOK)
- Facilitation and source funds (DDO, MOARD, NGOs)
- Community mobilization (Social Services, Civil Societies, NGOs)
- Provision of enabling environment for development, security and infrastructure (Provincial administration, Public Works and DDO)
- Continuation of training and awareness workshop for farmers (GOK)

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.

WITHOUT LAND LEVELING

1.8 Times of Irrigation X 3.9 Hours=7.02 Hours /Week



WITH LAND LEVELING

1.5 Times of Irrigation X 2.3 Hours=3.45 Hours /Week

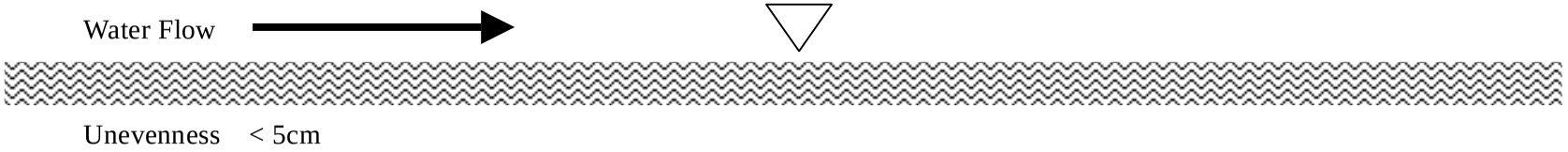


Figure 2.4.1 Reduction of Irrigation Time by Land Leveling

Table 2.4.4 Evaluation of the Verification Projects: Water Saved Agriculture (Sandai)

1. Subject to Verify

Subject to Verify	*To examine if the land leveling practice as on-farm water management can be built in the irrigation system to contribute to water saving in a plot and thereby making it possible to distribute water into wider areas.*
Result	*The water saved agriculture can reduce irrigation time by about 50 % as compared to that without land leveling (average of five sample farmers of water saved agriculture group in 2001).*

2. Evaluation of Planning Stage

	Original	*Change on the course of implementation*
2.1 Situation Analysis of the Project Area	*Water shortage becomes very severe in Sandai irrigation area year by year, which is caused largely by inefficiency of on-farm water management.*	*No changed.*
2.2 Strategies / Approaches	*To apply land leveling for improvement of on-farm water management.*	*No changed.*
2.3 Project Purpose	*Goal: Sandai and its surrounding irrigation area have enough food.* *Purpose: Increase on-farm irrigation efficiency to realize the Goal, and also improve farm management.*	*No changed.*
2.4 Project Design	*To train farmers on land leveling, on-farm water management, and improved crop husbandry technology. .*	*The verification site is selected in each site in the upper, middle and lower part of irrigation area(right bank)* *The design of land leveling was changed from bulldozer to leveler driven by tractor after discussion with NIB and AMS.*
2.5 Input	*Technical assistance of how to improve on-farm water management.* *Land leveling is operated by a leveler owned by KARI, which was operated by NIB tractor.*	*Short term credit was provided regarding to operation cost of ploughing by contractors .*

3. Monitoring & Evaluation of Implementation Stage

3.1 Encountered Difficulties	*1. Leveling cost was high because only large scaled machinery was available and the transportation cost of machinery was high.* *2. Operation of land leveling in the upper part was disturbed by uneven and stony land and poor collaboration of farmers.* *3. Severe prolonged drought disturbed operation of land leveling and land preparation.* *4. At the beginning time, Sandai community could not understand the cost share on land leveling ..*
3.2 Countermeasures	*1. There is a need to conduct a technical and economical research on reduction of leveling cost.* *2. Division of farms to smaller size of plots will make easy the land leveling operation.* *3. No solution, but food could be stored for in preparation of calamities as drought.* *4. Just cost sharing system has been explained.*

3.3 Lessons Learned	Community 1.*The maintenance of leveled farm should be done periodically or otherwise or land is not kept level .*	GOK *1.Continuation of training should be given in order to improve on-farm water management..*	JICA STUDY Team *1. Need to support GOK for research on reduction of leveling cost .* *2. Inter-location monitoring is a very good mean to extend water saved agriculture by their own initiatives.*

4. Evaluation of Output and Outcome

4.1 Outputs (Indicators)	*1. The land leveling increases on-farm irrigation efficiency by about 50% as compared to the irrigation hours without land leveling as an average for five sample farmers in 2000.* *2. The land leveling increases crop yield by 30 % to compare with the yield without leveling (average of five sample farmers) .* *3. The irrigation area expanded in the close area of the leveled farms.* *4. Food security is improved because the water saved agriculture increases crop production..*
4.2 Vertical Outcome (Outcome for the Stakeholders)	*1. The land leveling not only increases irrigation efficiency, but also increases the crop yield and expand irrigation area.* *2. In the lower area, the farm management is quite improved by increase of crop yields and expansion of irrigation area.* *3. The water saved agriculture has increased crop production and food shortage will be alleviated especially in the lower area in 2001.* *4. 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 not yet extended to other communities due to high leveling cost and also the calamity of drought .*
4.4 Negative Impact	*1. No negative technical impact is reported except for high leveling cost .*

5. Way Forward

5.1 Way Forward	Community *Community should keep observation and awareness on water saved agriculture.*	GOK *A research should be conducted to reduce leveling cost.*	JICA Study Team *Technical assistance shall be provided for the GOK to conduct a research on economical leveling operation.*

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