

Newsletter September 2014 (1/5)
on Natural Resource Management in Marsabit

JICA ECoRAD Project (for enhancing community resilience against drought In Northern Kenya)



The ECoRAD project started in February 2012 and is implementing activities for "Natural Resource Management", "Livestock Value Chain", "Livelihood Diversification", and "Peace Building" in Marsabit County. This newsletter is a summary of Progress Report-4.

Natural Resource Management

The Project has constructed the following water facilities under natural resource management program in order to facilitate pastoralists to utilize pasture and water effectively.

Facilities	Places, Communities	Status
Rock Catchment	Ngurunit	Completed
Pipeline System	Arapal	Completed
Water Pan	Hurry Hills, Turbi, Dirib Gombo, Gar Qarsa, Halo Girisa	Completed
Solar Power Pumping System	Korr, Kubi Qallo, Shurr	Completed

Water Pan Operation: There were only a few rainy days in the long rainy season (Mar-May) in 2014 in Marsabit, which affected operation of several water pans made by the Project. However the following 2 water pans received enough water, and could serve water to a great deal of livestock which came from not only nearby places but also remote areas.

Facilities	Usage and Beneficiaries
Yaa Gara water pan in Hurri Hill	(i) Long rainy season (rainwater in Mar.-May '14): Reservoir This pan was the only one which held enough water in this season. Thereby an extra number of livestock which are not used to come visited the pan. Livestock 702,000 head-day approx. (cattle 1,400, shoats 8,700, camel 1,600, 11,700 head-day approx. for 2 months) Human 252,000 man-day approx. (420HH, 2,000man for 4 months)
Dololo Dokatu water pan in Dirib Gombo	(i) Short rainy season (rainwater in Oct.-Dec. '13): Reservoir The pan held water at about 85% of the capacity. Livestock 764,400 head-day approx. (cattle 500, shoats 12,200, camel 40, 12,740 head-day approx. for 2 months) Human No use (ii) Long rainy season (rainwater in Mar.-May '14): Reservoir Rain was not enough there, but the pan held water fully due to the remained water in the last rainy season. Livestock 955,500 head-day approx. (cattle 500, shoats 8,600, camel 80, 9,180 head-day approx. for 3.5 months) Human No use

Due to facilitations given by the Project, the pastoralists gradually started to understand the significant role of planning use of water pans and rangelands nearby. They therefore are willing to keep livestock out of rangelands around the pans during rainy season for the sake of utilizing such rangelands in dry season with water of the pans. They started to revive their traditional way of rangeland management with new water pans.



→ Dololo Dokatu Pan and livestock

↓ Shurr solar power pumping system and camels



Solar system

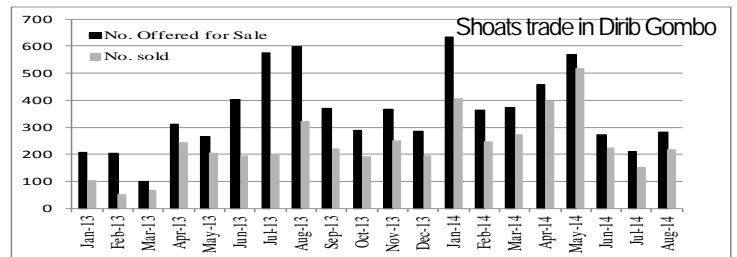
New Establishment and Reactivation of Livestock Market

The pastoralists rely on stock raising as the major mean of subsistence. Thus the Project has been trying to revitalize livestock markets, and provide easy market access; the pastoralists can be helped to sell and buy livestock by the demand in the markets. Through such market transactions, they could improve their preparedness against drought by means of increasing number of livestock or cash savings. By the Project, the 3 livestock markets (Dirib Gombo, Jirime, and Korr) were well developed and increased the number of livestock traded. The following table shows the offer/sold records of shoats in the 3 markets. There is a growth trend of shoaat trade in the Dirib Gombo market.

(unit: heads)

Place (periods of record)	offered	sold
Dirib Gombo Livestock Market (Jan13-Aug14)	7,137	4,710
Jirime Livestock Market (Jun13-Aug14)	8,105	6,268
Korr Livestock Market (Jan13-Aug14)	25,973	18,089

It is noted that there were no any livestock trades in Dirib Gombo and Jirime markets before the Project supported.



Jirime Market →
Livestock gathered in the market



Fattening in Feedlot

Kalacha Feedlot has been established by the Project to cultivate pasture with spring water using gravity irrigation system, and to improve body weight with the pasture cultivated in the feedlot for increase of market values of livestock. With 20 goats, the first trial fattening activity was successfully completed with big profit. The second trial is in progress with 20 goats currently in the feedlot.



Fig: Weight/head 24.3kg → 27.7kg

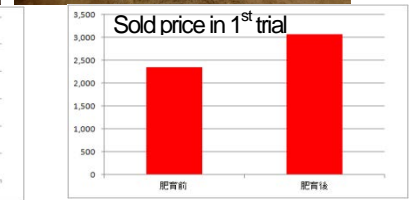
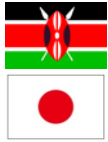


Fig: Price/head Ksh2,414 → Ksh3,070

The average increase of body weight and sales price after 6 weeks of fattening scheme were remarkable: +3.4 kg (+14%) and Ksh. 656 (+31%) respectively. Besides fattening activity, the members have also started to harvest and sell hay by their own initiative.



Newsletter September 2014 (2/5)
on Livelihood Diversification Program in Marsabit

JICA ECoRAD Project (for enhancing community resilience against drought In Northern Kenya)



Almost one and half year have passed since the program commenced, and this livelihood diversification program is in the last stage. In this newsletter, current progress, preliminary evaluation, and future schedule are reported.

Summary of Livelihood Diversification Program in Marsabit

As already reported before, in the livelihood diversification program, there are two types of "JICA's ECoRAD Approach": namely the livestock utilization type (goat and chicken), and the local resource utilization type (salt, and resin and honey). As shown in the table below, four kinds of Sub Projects have been implemented with 27 target groups in six locations since its inception in February 2013.

Sub Project Sites	Contents of Sub Project	No. of Groups	Main input from the Project
North: Kalacha	Salt Business	1	Entrepreneurship/VICOBA training and mentoring activities
North: Kalacha	Goat Merry-Go-Round	4	Goat technical/VICOBA training and mentoring activities
Central: Dakabaricha/Jirime	Chicken Merry-Go-Round	8	Chicken and poultry houses (only representative), chicken technical /VICOBA training, and mentoring activities
Central: Gar Qarsa	Goat Merry-Go-Round	9	Goat technical/VICOBA training and mentoring activities
South: Arapal	Goat Merry-Go-Round	2	Goat technical/VICOBA training and mentoring activities
South: Ngumit	Resin Honey Business	3*	Entrepreneurship/VICOBA training and mentoring activities

*: Individuals, who participated initially, formed one group later.

Main Progress of Sub Project

Goat Merry-Go-Round Sub Project:

As of August 2014, kids born were 32 (male: 18, female 14) with increase from the data of February 2014, 21 kids (male 10, female 11), and eight subsequent members have received female kids (three increased from February). In general, kids multiplication and distribution has taken longer than expected due to environmental challenges (long dry spell, plants withering) leading to under-nutrition as well as frequent abortions, probably due to infections from breeding diseases.

On the other hand, some womens groups (e.g. in Arapal) have been empowered and their group cohesion has been strengthened through our mentoring activities. There are unplanned indirect impacts observed in addition to the goat system itself.

Chicken Merry-Go-Round Sub Project:

The current condition of chicken multiplication is 60 live chicks including 13 chicks transfer to 9 subsequent members. Unfortunately these figures are smaller than 95 chicks live including 25 chicks transferred to 10 members as reported in the February newsletter. During this period, number of eggs laid increased, however chick mortality was high as well. This is because our project guidance focused too much on laying and hatching, not taking care of chicks to maturity. Marsabit area is very cold especially for chicks; thus there should have been some specific emphasis on chick care.

On the other hand, it was reported that one member successfully acquired all the techniques of handling Sasso and plans his expansion of the chicken business. As such, though there are huge variations on capacity. It is observed



Subsequent member who newly received a female kid (left) and charity (right) (Arapal)



New invention of chick house by a member (Jirime)

that some members who understand the benefits of Sasso are capable enough to positively make their efforts to maximize the benefits obtained through this chicken system.

Salt Business Sub Project:

The 1st cycle of salt business that started since last year, sold 296 bags (38 bags increase from the last reported 258 bags), and earned about 350,000 as estimated gross sales.

For this monitoring period, additional business training and mentoring activities have been implemented to prepare for the 2nd business cycle. Referring to the business result of the 1st cycle, they were able to make a plan of bags to be collected. They also discussed and decided the benefit-sharing principle that net profit from the 1st cycle be shared after deducting necessary costs for the 2nd cycle. As such, their business capacity has been developed gradually through our on the job training with training and mentoring activities.

Resin and Honey Business Sub Project:

As for honey business, which previously used coca cola bottles, the new provided containers have been almost sold out now. By this introduction of new containers, it can be estimated to double members' net profit per year.

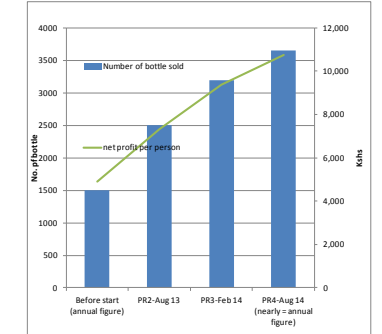
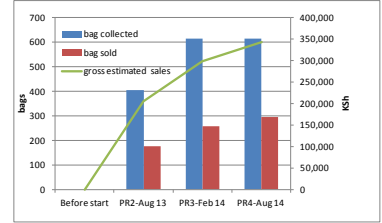
The members have started buying raw honeycomb mainly from this dry season. Already, some of the capable members have purchased containers. Even other members, have decided to procure new containers by themselves from this 2nd cycle, and now they are contributing money to send one representative member to Nairobi to procure containers as a group.

Preliminary Evaluation and Further Schedule

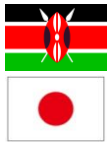
For two sub projects under the livestock utilization type, it can be said that the progress has not been as planned because of technical issues, specifically goats' physiological problems (abortions) and long time taken to obtain technical skills to keep improved chicken breed. On the other hand, group savings have somehow gradually been developed and such groups are expected to utilize their savings to cope with drought impact.

Most of the members in the sub projects under the local resource utilization type have been able to improve some points in their business cycle to raise their group/individual income. Since these sub projects were designed to reflect their current capacity and environment, sustainability is expected leading to diversification of their livelihood contributing to enhancement of resilience against drought.

From now on, monitoring activities are going to be minimized, and the target community people will be informed of completion of the sub projects. And, lesson learned of the sub projects will be drawn and compiled to be referred to by future similar activities. The above activities are not the only ones when the donor agency is with them, but they are expected to be continued by the community people themselves (= *Kujitengea* spirit) to contribute to enhancing resilience against future drought. We, as the team which implemented the sub projects, sincerely hope that such situation will be realized.



A member who sells both resin and honey (Ngumit)



Newsletter September 2014 (3/5) on Anthropological Study in Marsabit

JICA ECoRAD Project (for enhancing community resilience against drought In Northern Kenya)



In July 2014, the Project dispatched an anthropologist who has experience in Marsabit to several pilot communities for a month for the sake of understanding traditional pastoral social system and its relations with the Project. The study summary is as follows:

+++ Abstract of Anthropological Survey on Marsabit Communities +++

Social Structure and Decision Making System in Pastoral culture

First of all, it should be emphasized that there are quite a wide diversity of cultures among "pastoralists in Marsabit County". There are three major pastoral groups: the Borana, the Gabra, and the Rendille. In terms of sedentary pattern and decision making system, for instance, there is a big difference between those of the Borana and the Rendille as discussed below.

The Borana live in the middle of Mt. Marsabit; they raise cattle, and shoats, and cultivate on the eastern slopes of the mountain. In their farms, they cultivate mainly rain-fed maize and beans.



Elders meeting under a tree

Decision making system: Generally, elders have a central role in decision-making of the community. Heads of village (*Abba Olah*) and heads of the homestead (*Jars Moga*) have responsibility to organize an elders meeting if there are any issues. The decision made in a certain meeting should be followed by all community members. However as most of elders are illiterate, it is difficult for them to discuss current development issues or government policies. Thus new groups, such as youth group, women group, and committees are invited to join the discussion with elders. Once a decision is made, the new groups are expected to be the main players to implement it.

Decision on Movement of Herds: The decision on movement of herds is not made by the herders. When herders find the natural condition is hard for livestock, they first report it to livestock owners. The livestock owners then report the situation to the local chief and ward representative in case there is no place to go within their community land. If chief and ward representative receive many reports from livestock owners, they call for an elders meeting to confirm the situation and collect information. When they get enough information, they hold a meeting again to make a decision on the destination to move to. Then local administrators and elders will visit the place, negotiate with local chief and community elders there, and ask for permit to move in. Finally, the decision is sent to herders so that they can start moving.

Relations between Traditional leaders and governmental officers Basically, the local chief is appointed by the national government as an administrative leader. His responsibility is to maintain security and social order in his area. Meanwhile, in some areas, local chiefs perform actively in development issues, education program, and other social events. Another important political leader is the new ward representative, who is elected by local community to represent the ward at County Assembly. The responsibility of a ward representative is to present the real situation of the ward and needs of their local community to the county government, as well as lead development activities in the ward. People agree that good relationship between such local officials and community elders is important to maintain security and public order. But friction may happen when the judgment made by local officials and community elders is different. Since this new political system just started recently under the new constitution, the relations between the new leaders and the elders are not stable and not fixed yet. Such relations in the pastoral society will be changed and developed depending on the transformation of pastoral social system in coming decades.

The Rendille inhabit in the semi-desert of southern part of Marsabit County. Recently, under the influences of government sedentarization policy and various development projects, most of Rendille settlements have settled in areas close to towns on the main road, and towns in the semi-desert area.

Decision Making system: There is a senior chief for the location and two assistant chiefs for each sub-location in Korr location. Korr and Ngumit are recognized as one ward, and one ward representative is elected. However, in comparison with the Borana society on the highland of Marsabit, government administration and political influences are relatively low in Rendille area. Both the descent system and age system establish social relations and structure daily life and livestock management in the Rendille society. Elders meeting is the general way to solve problems both within and among settlements. Similarly in the Borana for the development matters, new organizations or groups are invited to join the discussion with elders.

Decision for Movement of Herds: Different from the Borana where community elders and local administrators are involved in decision-making on livestock management, in particular the migration of herding camps, the Rendille leave most of responsibility to herders. Camel and cattle camps are usually big and all animals from a same settlement or clan are gathered. Young men of warriorhood are in charge of such camps.

Application of CMDRR Approach: Several Drought Risk Reduction (DRR) committees have been launched in different locations by this project based on the CMDRR approach. These committees are expected to take leadership not only in disaster response but also in community development. DRR committee should practice as an "umbrella" of all other specific committees of development projects. However, by investigating the organization, responsibility, and function of some DRR committees, it seems that none of the committees functioned as expected after termination of support activities. Several reasons can be given:

(1) DRR committee officials are usually educated people who live in the town. Although some of them have working experience for other projects, most of them are not recognized as representatives by the local community. Some community elders are involved in the committee, but they are not actually aware of the responsibility and activities as a committee member. Also, the relation between the DRR committee and government administrators at the local level is not clear. Therefore whether a DRR committee has the authority to take a leadership or not is unknown.



Women Leaders in Elders meeting

(2) As accumulation of long history of assistance brought from outside, (i) members of DRR committee tend to pursue their own benefit through DRR activities; (ii) beneficiaries get used to receive free support from others, and their self reliance is somewhat deteriorated, and (iii) NGOs works for CMDRR become a mere formality without follow-up or future supports.

(3) The DRR committee is expected to be independent and take the initiative to manage the project sustainably. However, no committee has a fund for activities. The committee is recognized as the "eye of the elders". It means their status in the community is not high enough to encourage them to act aggressively. To keep the motivation of active members is so difficult as they all work on a voluntary basis.

Communal Money: One of the main challenges in community's activities comes from the new concept of "communal money" in their operation and maintenance works of water pump facilities. It is so difficult for them to understand this new concept. The reality is that the committee officials make a decision by themselves. Both the committee and local people are facing the same questions of who has the right to benefit from this money and who should be involved in the decision-making process to use the money. Similar cases were also found in other pilot projects. Hence this kind of "communal money" is considered to be a latent problem in local societies. + + + + +



Cash box with 3 keys which are kept by 3 persons (Rendille)

Further Study for Improving the Project

Methodology: As mentioned above, it is so important to understand the characteristics of the societies; such as social structures, decision making system, key persons, etc.; and to apply activities to fit to the people and society accordingly. To seek such methodology, it could be simplified, in terms of decision making and relations between local officials and the elders, into 2 types: namely. (i) Type-1 where the local official and the elders are relatively close to operate, which is observed in the Borana; and (ii) Type-2 where the individuals and elders have more powers currently, which is observed in the Rendille. However it seems each community's condition is not always classified into one of 2 types precisely, most of communities fall somewhere in a range where the conditions are gradually changed between those 2 types. We are going to seek, in the rest of the project period, a way to evaluate the status of community properly, and to apply an appropriate method to maximize the project benefit in the activities.



Newsletter September 2014 (4/5)

on Natural Resource Management & Livestock Value Chain in Turkana

JICA ECoRAD Project (for enhancing community resilience against drought In Northern Kenya)



The ECoRAD project started in Turkana in April, 2013, and is implementing activities for "Natural Resource Management", "Livestock Value Chain", and "Livelihood Diversification".

This newsletter is a summary of Progress Report-4.

Targeted 11 Pilot Communities

The Project selected the following 11 pilot communities in view of water resources, rangeland condition, traffic accessibility, security and equitable balances between 6 sub-counties.

Sub-county		Sub-locations:	Location
North	1	MILIMATATU	YAPAKUNO
	2	KANGAKIPUR	KAERIS
West	3	LORITIT	LETEA
	4	LOKICOGGIO	LOKICHOGGIO
Loima	5	LOKIRIAMA	LOKIRIAMA
	6	LORENGIPPI	LORENGKIPPI
Central	7	ELIYE	KANGATOTHA
	8	KERIO	KERIO
South	9	LOCHWAANGKAMATAK	LOCHWANGKAMATAK
	10	LOKICHAR	LOKICHAR
East	11	LOPII	KOCHODIN

Sustainable Natural Resource Management

In the natural resource management sector, the Project is implementing the following activities to improve drought resilience.

Water Pan	Community	Type of work
Kabilkeret Water Pan	Milimatatu Sub-location	Improvement
Nakisira Water Pan	Mogila Sub-location (Lokichoggio Location)	Improvement
Edukon Water Pan	Nanam Sub-location (Nanam Location)	Improvement
Kaalale Water Pan	Lorengippi Sub-location	New construction
Nachuro Water Pan	Nachuro Sub-location	New construction
Kasuguru Water Pan	Milimatatu Sub-location	Improvement
Boreholes	20 sites	New construction

Drilling new Boreholes A project team has developed 20 successful boreholes out of 27, which is a 74% of overall success rate of the works. In particular, the team attained a 97% (12/13) success rate in 3 sub-counties, i.e. Turkana West, Turkana North, and Loima, where there is high potential of good rangeland with abundant pasture for livestock. Since those boreholes include 3 sites near existing dry boreholes (failed borehole without water) made by other donors, villagers were excited to have water from the new boreholes.



↑ Photo) Handpump in Lochawa-angikamatak

In order to cope with mechanical problems and periodical replacement of spare parts of hand pumps, the Project has been advising villagers to join a maintenance insurance scheme operated by an NGO. As of today, 11 communities have already collected Ksh.7,000 by themselves, and then insured their pumps for 2 years. Thereby all the expenses for repairing and maintenance works on the pumps, including technical services, shall be covered under the

insurance scheme. It is highly expected that sustainable usage systems for hand pumps will be established in another communities soon.

Water Pan Construction: The construction of water pans started in June, 2014. Although, progress of the works slowed down due to unforeseen rainfall in August, the contractor has been rushing to complete their works before the next rainy season.



↑ Photo) Left: Bulldozer in Nachuro pan, excavating soil. Right: Nasikiria pan has standing water due to rain during construction.

Livestock Value Chain

The Project is trying to improve the drought resilience through the following activities in livestock value chain improvement.

	Activities	Communities
1	Kerio livestock market improvement	Kerio
2	Livestock market linkage and revitalization	Lodwar, Lokichar, Kakuma, Kerio
3	Reseeding programme	Lokichoggio, Loritit

Kerio Livestock Market improvement: In Kerio, the quietness of the pastoral village is always broken by the vigor of many merchants/customers who sell/buy commodities as well as many pastoralists who sell livestock at the regular livestock markets on every Tuesday. To utilize this market effectively, Kerio Livestock market has been rehabilitated and upgraded by the project.

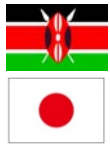


↑ Photos) Left: commodity market with nearby the livestock market Right: Livestock market under construction, making loading lump.

Reseeding farm: Reseeding program provides rainfed growing field for pasture, which is surrounded by spiny twigs in order to prevent animals from grazing inside during the growth period, in particular, in the rainy season. In Lokichoggio, community people are trying to establish a reseeded farm by themselves.



↑ Photo) Reseeded farm training in Lokichoggio



Newsletter September 2014 (5/5)
on Livelihood Diversification Program in Turkana

JICA ECoRAD Project (for enhancing community resilience against drought In Northern Kenya)



The livelihood diversification program in Turkana is now in its last stage of implementation after about 10 months since its commencement in October/November 2013. In this newsletter, current progress, preliminary evaluation, and future schedule are reported.

Summary of Livelihood Diversification Program in Turkana

In the program of Turkana, there are three ways to diversify their livelihood under "JICA's ECoRAD Approach": namely livestock utilization (IGA<livestock trade>, and dry meat), local resource utilization (small scale rain-fed agriculture and fishery), and provision of necessary goods and services (IGA<retail shop>). As shown in the table below, four kinds of sub projects are being implemented with 11 target groups in five sub locations

Sub-project Sites	Contents of Sub-project	No. of Groups	Main input from the Project
West: Loritit	IGA <Livestock trade>	1	Entrepreneurship training And mentoring activities
	Small scale rain-fed agriculture	1	Agriculture technical training, experimental plot, and mentoring activities
Loima: Lokiriana	IGA <Livestock Trade & Retail Shop>	2	Entrepreneurship training And mentoring activities
	Drymeat	1	Dry meat technical training
Central: Eliye	Fishery	2	Fishery technical training, Entrepreneurship training and mentoring activities
South: Lochwangamatak	IGA <Livestock Trade & Retail Shop>	2	Entrepreneurship training And mentoring activities
East: Lopii (Lopii center & Kaaruko)	IGA <Retail Shop>	2	Entrepreneurship training And mentoring activities

Main Progress of Sub Project

Sub Project of Income Generating Activities:

Selected groups prioritized livestock trade and retail shop as their IGA (Income Generating Activities; here meaning small business). These activities had already been run by the groups. Most of the group members learned and appreciated the business knowledge obtained through the training, and monitoring results show that they increased income from these business activities. The major take-away that the groups attribute to increased profit are: 1) ability to manage business operating capital, trade commodities and customers as important assets for business, and 2) investing profit accrued for expansion of business, not only for their family purpose. The improvement of this knowledge base has enabled the members to increase transaction number of livestock, procurement volume and timing for sales.



The activities of IGA are characterized depending on the locations. The size of the business activities in Lopii, located far from towns, is small. However, Lochwangamatak provides a better economic environment i.e. the location is along the Lodwar-Kitale main road, and thus their business activities are relatively good/big in size. Further, Lokiriana, close to the Ugandan border, is possibly in the economic zone of Moroto because of its proximity, and the members fully take advantage of border trade. Arguably, the ease of IGA enterprises depends on geographical economic conditions.

In addition, some members especially livestock trade groups reported the importance of mobile phone in promoting and coordinating livestock business/marketing through collection of supply and demand information, determination of prices, linkages development, and market options.

Sub Project of Small Scale Rain-fed Agriculture: In Turkana rain-fed/irrigated agriculture has been introduced in areas close to rivers with

some rain is expected. In Loritit where rainfalls are relatively high, a new technique was to be introduced at their sustainable level through the technical training and the operation of experimental plot using PFS/FFS approach. The crop used is local sorghum, and line planting with some tillage method was introduced.

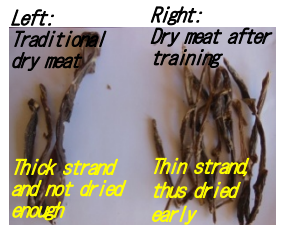


In the experimental plot, the sorghum plants by line planting are healthier than those by their traditional broadcasting planting. This was acknowledged by the members through PFS approach, and also one member has already applied this technique in her own plot as her late planting exercise expecting late rains. Further, new learning is observed to involve reduction of labor work and production increase by line planting. Inspired by the results obtained from the experimental learning, community members expect to apply the new technology of line planting at field level during the next rainy season.

Sub Project of Fishery: As for fishing activities that had been practiced, comprehensive improvement of fishery technique and fish sales was targeted by provision of technical and entrepreneurship training. After the training, members learned the importance of marketing and securing buyers. However as a whole, fish production has not yet been significantly increased; therefore there is still less surplus for further sale. On the other hand, some of the members who actively increased the number of fishing days and fished in the new areas where they did not do before, achieved increase of fish production and income.



Sub Project of Dry Meat: Dry meat had been processed in a traditional way in Lokiriana. As a preserved food, improved technique was introduced to be expected for home consumption in future drought. Previous method was to cut meat at thick strands with fat and ligament, leading to long drying process thereby early spoilage. However, the members learned improved technique that adds value to the traditional way: i.e. cutting thin strands without fat and ligament and enables faster dry and long preservation period. They said they can use it for their home consumption and also want to start IGA with this.



Preliminary Evaluation and Further Schedule

In Turkana, the program focused mainly on encouraging community people to use their local means to improve their identified activities across all three types of livelihood diversification. This was done based on their capacities through knowledge, skills and attitude change provided through training, mentoring and experiential learning. This has instilled in them empowerment, confidence development and capacity of decision making on issues of their own development. In addition, no financial grants have been disbursed to groups as the project approach worked well in building community local capacities to address their own concerns: i.e. IGA and fishery activities are expanding.

From now on, mentorship activities will continue to grow to cope with issues identified through this monitoring period. And gradually, the sub project activities are in principle going to be minimized, and the target community people will be informed of completion of the sub projects as in Marsabit.

Thereafter, lesson learned of the sub projects for possible adoption and replication within Turkana and other similar ecosystems will be developed.