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
MANUAL

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Introduction

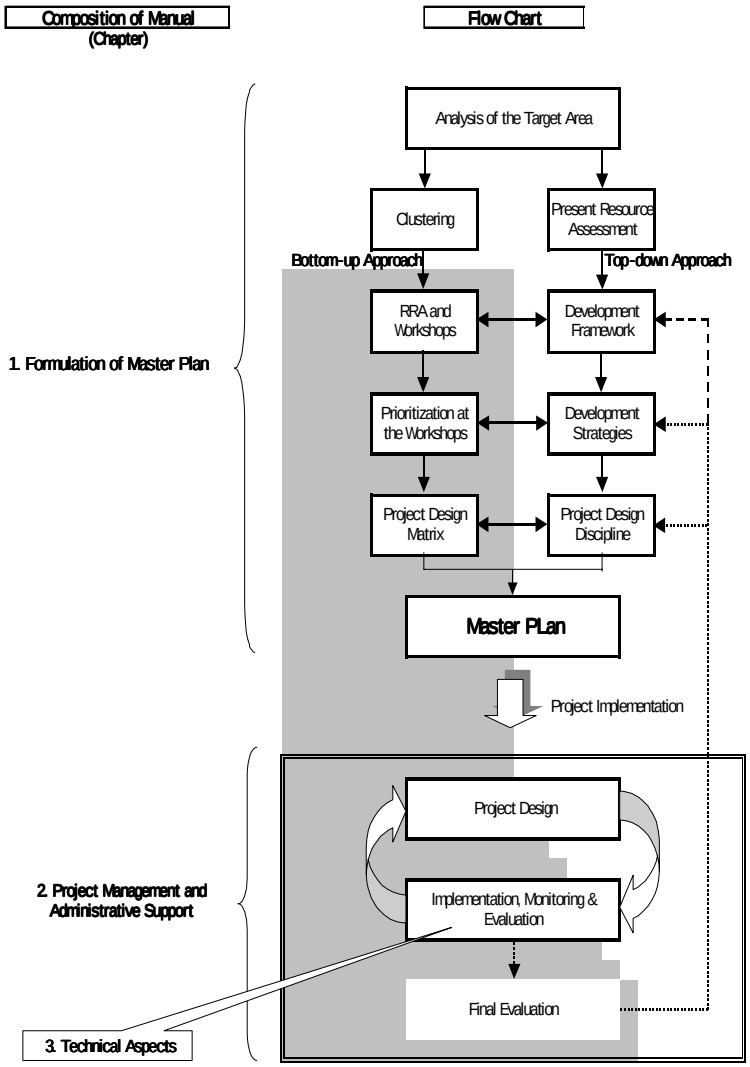
This Manual is prepared as a reference for those who are involved in the rural development in ASAL area. Ideas incorporated in this Manual are fully based on the experiences of the Master Plan Study in Baringo Semi-Arid Land Area (Marigat and Mukutani Divisions), which included the implementation of verification projects to examine some development hypotheses, conducted from August 1999 to September 2001.

The above Study was carried out with the fusion of top-down approach and bottom-up / participatory approach. The Study especially tried out various hypotheses on participation methodology through the verification projects and came up with some remedial measures in improving rural living standard and thereby reducing rural poverty. Though the measures resulted in the Study should not be over generalized, they are expected to be tools of practical application to further extend similar programs to other ASAL areas.

This Manual is structured with three steps that are “Chapter 1 Formulation of Master Plan” – defining overall goal, strategy and project / program components, “Chapter 2 Project Management and Administrative Support” – some practical recommendations in implementation, and “Chapter 3 Technical Aspects” – specific references of sector-wise projects. Figure below shows the overall structure. Readers for Chapters 1 and 2 are to be the Government officials or development practitioners and Chapter 3, written both in English and Kiswahili, will be utilized by community people as well as above stakeholders.

We expect the readers to utilize this Manual in fit of each circumstance, but also to try out the disciplines asserted throughout the text in practice. Being still humble enough for over

generalization, experiences in the Study are illustrated as much as possible corresponding to the general description of the ideas to indicate where the ideas came from. However we also believe that the actual experience is the living source of the text to be conveyed from its origin to various contexts.



Flow Chart of Master Plan Formulation and Project Implementation

Contents

CHAPTER 1

Formulation of Master Plan

Chapter 1 Formulation of Master Plan

1.1 ASAL Area

A Framework for Situation Analysis in ASAL Area

About 80 percent of Kenya is classified as Arid and Semi-arid Land (ASAL) with less than 1,000 mm annual precipitation and more than 2,000 mm annual evaporation. About 30 percent of Kenya's total population lives in the ASAL area. Due to the fact that there is little precipitation in the area, land productivity is low. Population growth of both human and livestock has given the pressure on land management aggravating environmental problems such as deforestation and desertification. All these problems contribute to a standard of living, which is lower than the national average. Following description attempts to draw a framework for situation analysis in ASAL area.

1.1.1 Unstable Resource and People's Diversified Activity

ASAL climate is characterized with not only the meager rainfall but also the wide range of its fluctuation. Drought periodically comes as well. An average rainfall should not be counted more than only a statistical estimation and does not mean it probably takes place once every two years. Wide range of fluctuation associated with periodical drought is the environmental nature in this ASAL area.Following figure shows last 32 years wet season's rainfall (April-September) in Marigat division in Baringo district, giving us the wide range of fluctuation at the average of 414mm with its standard deviation of 141mm (34% against the average).

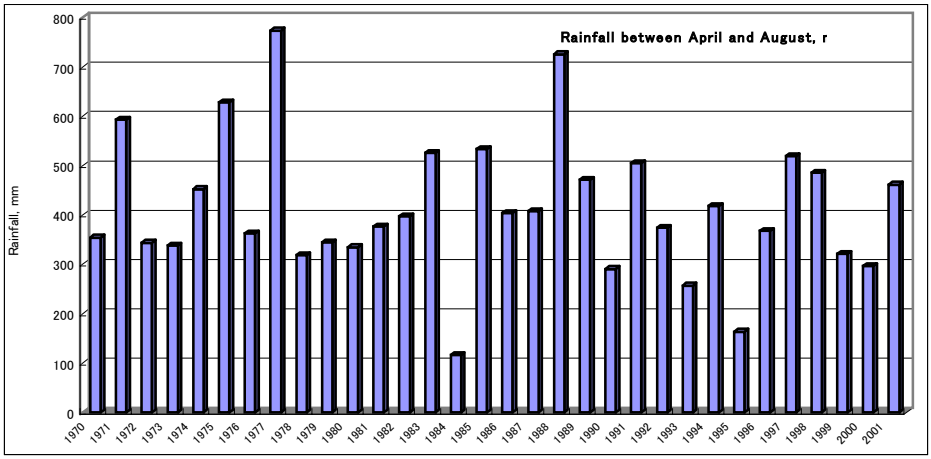


Figure 1.1.1 Rainfall in Marigat Division in Baringo District

Families are large and often polygamous to accommodate the extensive livestock production system. This is a response to the environmental constraints and a way of coping with risks. Activities seeking for income, or just making ends meet, should also be diversified in order to survive under the harsh semi-arid climatic condition. Diversity could be a risk hedge and may be the best survival strategy, which is very much different from the living strategy for people blessed with stable environmental condition. One may see; more diversity and less profit oriented strategy, less concentration in a activity, to live in ASAL versus less diversity and more profit oriented strategy, concentration in a activity, in environmentally stable area (See the Figure below).

Though diversity is their strategy to survive, the community structures are often loose and are geared towards mutual assistance in meeting the local needs only rather than suited to project implementation. The strategy in turn makes opportunistic behavior their way of living. This kind of behavior gives difficulties in gathering all the people together and in forming consensus made by directing all the concerned people. One should have in mind that diversity, leading to opportunistic behavior, is the strategy

of the people who live under the harsh environmental conditions, thereby flexibility should always be pursued rather than sticking to the original project plan, so called blue print.

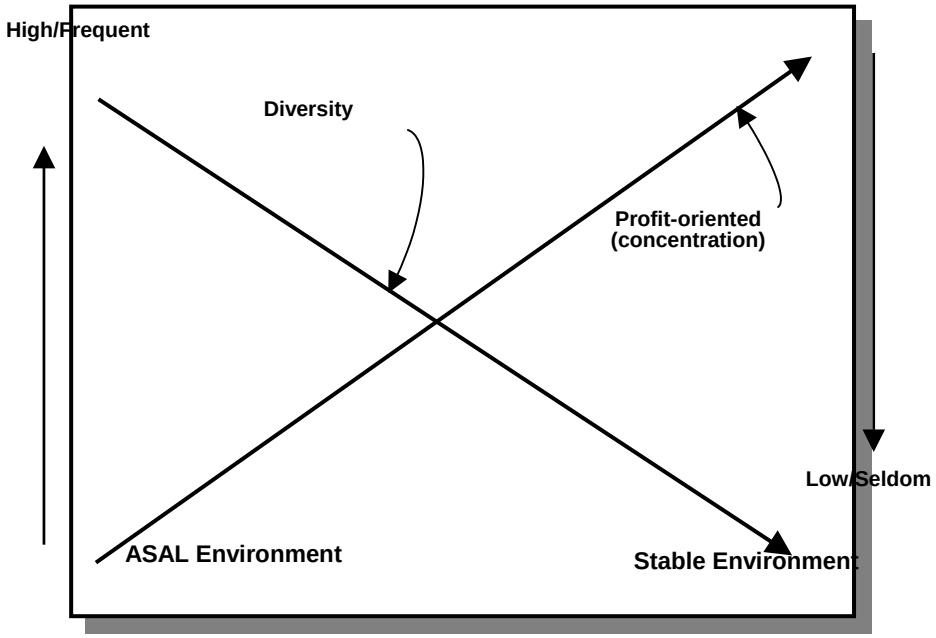


Figure 1.1.2 ASAL Environment versus Stable Environment

1.1.2 Pastoralism and Agriculture

Most of the people in ASAL area are basically pastoralists, who depend upon the livestock as a basic source of livelihood (milk as food and savings in exchange for cash and for dowry) and value the livestock especially cattle as status of wealth.

Pastoralism, once widely practiced in the area, is sustainable way of life as long as they could move following available pasture. Today, however, the area is rather diminishing because of population congestion. Thus, most of the balancing mechanism has gradually lost their dynamics with the many socio-economic changes taking place. Consequences of soil erosion, land degradation and deforestation in ASAL area are now

posing a serious threat to the environment.

Farming activities have been also getting momentum as a supplement or being the mainstay in the areas wherever water for farming is available. Thus, those people, being engaged to farming, can be called “Agro-Pastoralist”.

Major earnings of living for the people in ASAL area are categorized with above livestock, agriculture and commerce (normally small-scale business like kiosk, handicrafts, carpentry, tailoring etc. run in town areas). The category of earnings would orient people’s behavior, such as profit oriented for commerce, cooperate oriented for agriculture and moving oriented for livestock. These orientations have opposite direction as self-sufficiency against profiting, cooperation against individuality and moving against settlement. These orientation aspects can be structured in a triangle below.

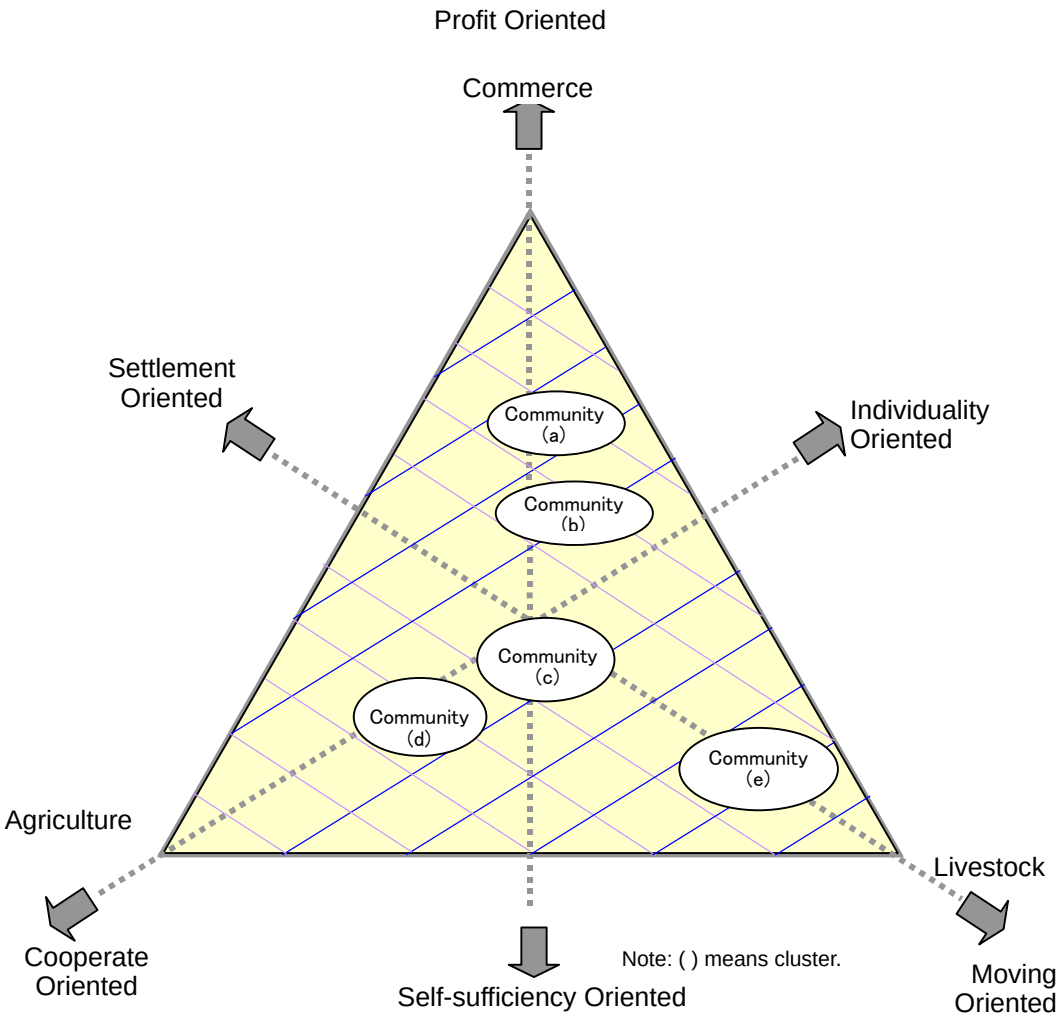


Figure 1.1.3 Orientation of Livelihood

Box: Erratic Participation in communal work

The strategy in turn makes opportunistic behavior in their way of living. This kind of behavior gives difficulties in gathering all the people together and in forming consensus made by directing all the concerned people. To a large extent, this explains the erratic participation that was observed during the large operations for such verification projects as excavation of Sandai canal, construction of Upper Mukutani water supply system, and rehabilitation of Pan in Rugus. Also, the behavior may push away fairness and equitable distribution of burden required for any group work. Participants in those operations are often the same personnel other than taking rotational turn.

Social cohesiveness structured under such situation may not be well developed to meet smooth project operation as planners or GOK officers think. Institutional and organizational intervention may be stressed in developing the social cohesiveness toward smooth project implementation.

1.2 Classification of Area

To classify an area especially in ASAL, which is envisaged for development, following items categorized into 5 aspects, that are natural resource, living resource, social/financial resource, human resource and physical resource, will be the useful information. These survey items will be incorporated with the framework described in “1.1 ASAL area” in analyzing and classifying the area.

Category	Survey Item for Area Classification
Natural resource	• Trend of precipitation • Trend of temperature • Water resource • Environmental specific • Confirmation of natural reserve • Confirmation of rivers and swamps • Altitude and topography • Groundwater • Land use • River water discharge by season • Flood in rainy season • Drainage condition • Soil fertility • Energy resource • Natural disaster • Natural resource (wild life, vegetation, trees, grass, fruits etc.)
Living resource	• Cultivated area by crop • Crop yield and production • Number and kind of Livestock • Forest • Fish catch • Farm economy (inputs, crop production, number of livestock)

	Settlement in the Village Family Composition Education Status / Occupation Incase husband has another wives Land Use Grazing Land (Distance from House in dry season and rainy season) Cultivated Land Irrigated Land and Rain-fed land Income Crop Production (Irrigated/ Rain-fed)/ sold to who Livestock and Poultry (Adult male, adult female, kids)/ sold number and price, milk consumption Number of animals died of drought Bee-keeping (type and number of beehive, yield crude or refined, number of harvest per year) Fishing (Average fish catch per month and sale) Survival strategy Household Expenditure (food, clothes, medical care, education, etc. be aware of seasonality)
Social/Financial resource	• Ethnic groups and religions • Rural finance • Specific custom • Specific gender issue • Income source • Migrant work • Land management by community • Way of selecting leaders • System of decision making • Traditional organization

	• Non-traditional organization • Role of men and women in work • Residential form • Movement of residence • Savings • Finance within community • Opportunity to access to Finance outside community
Human resource	• Population by sex, age, occupation, education level • Mortality rate • Literacy rate • Diseases • Infants mortality • Nutrition status
Physical resource	• Scale of nearby city and mean to access • School • Health clinic • Water supply facilities • Housing quality • Electricity • Communication mean (telephone, postal system) • Road condition • Transportation

Note: This category is referred to a study of “Forum for African Rural Development” run by JICA HQ.

Box: Clustering of the Study Area

The Study Area gives broad transformation, despite the smallness of just about 1,200 sq. km, as one moves between the north and the south and descends from the hilly sides down to the Floor. The transformation can be seen over the people living there, the agro-ecology, the topography, the socio-economy, etc. Looking at these transformations together, the Study Area can be demarcated in several clusters.

Of 11 locations, Eldume and Ngambo locations can be put in a same cluster considering similarity in terms of ethnicity, land use, and topography (Cluster B). Same can be done among three locations of Loboi, Sandai, and Kapkuikui, specially taking into consideration their major economic activity of irrigation (Cluster D). Also, Mukutani and Kiserian can be grouped in one cluster as the two locations resemble in view of traditional way of life; the pastoralism (Cluster F). Thus, all these lead to getting the 11 locations grouped in seven clusters, the character of which are summarized in the following table

Clustering of the Study Area (from 11 locations to 7 clusters)

Location	Kimalel	Salabani	Marigt	Eldume Ngambo	Sandai Loboi kapkuikui	Mukutani Kiserian	Arabal
Cluster	E	C	A	B	D	F	G
Ethnicity	Tugen	Il Chamus (Tugen)	Tugen (Il Chamus)	Il Chamus (Tugen)	Tugen	Il Chamus	Tugen
Land Use	LM-5	IL-6			LM-5	IL-6	LM-5
Topog'hy							
Character	Hilly	Cosmopolitan, Commercial		Swamp, Crop field		Traditional	Livestock

Note: LM-5 Lower Midland Livestock-Millet Zone, IL-6 Inner Lowland Ranching Zone

1.3 Participatory Approaches

1.3.1 Public Involvement and Participation

1) Background

All of public programs and projects are definitely "**for the people**" by their own definition, unfortunately however; this has not been always true. Many programs and projects have failed, because they could not fulfill the minimum requirement "**for the people**." Planners stayed and planned in comfortable offices in big cities and did not listen to the people well enough. Also there was criticism that large-scale socio-economic surveys cost too much money and take too much time, and therefore could not make an effective contribution to project planning.

A reaction to these shortcomings was **Rapid Rural Appraisal (RRA)**, a technique to analyze the needs of rural communities quickly, cost effectively and with little disruption to everyday life. RRA was developed in the late 1970s and 1980s. RRA is still for "learning by outsiders" just like conventional survey tools, but **Participatory Rural Appraisal (PRA)**, which was developed in the late 1980s and 1990s, was a tool that had evolved to become a "**by the people**" approach where the people are the main actors. PRA can be characterized by multi-disciplinary teams, careful observation, semi-structured interviewing and focus groups, and is for the empowerment of local people, in other words it is designed to enable rural people to share, enhance and analyze their knowledge of life and conditions, to plan and to take action. ("Whose Reality Counts? Putting the first last" by Robert Chambers, 1997, Intermediate Technology Publications)

In project management, the United States Agency for International Development (USAID) introduced a logical framework in 1969, but this logical and scientific framework did not work well if it did not respond to the needs of the people. Therefore, the German Technical Corporation (GTZ) combined this logical framework with Objectives-Oriented Project Planning (ZOPP), a participatory planning method. ZOPP is a co-determination and power-sharing tool to work "**with the people**." **The Project Cycle Management (PCM) Method**, which was developed by the Foundation for Advanced Studies in International Development (FASID) in the early 1990's, is a set of tools to manage projects throughout their running from planning, implementation, monitoring to evaluation.

2） Process

The level of public involvement depends on what kind of public programs and projects are going to be implemented. In community-based programs and projects, participation of the ultimate beneficiaries including decision-making process is a must, however, in conventional infrastructure or public service programs and projects, public involvement to understand the needs of the ultimate beneficiaries might be good enough.

The level of public involvement also varies by stages of project cycle. At the early stages of planning, the participation of the ultimate beneficiaries definitely comes first, and the Study Team remains in the role of observer. However, at the project design stage, implementation agencies and the Study Team usually need to contribute more. In implementation stage, participation of the ultimate beneficiaries for implementation is essential in community-based programs and projects, however, not so much in conventional infrastructure and public service projects. Participation is necessary for monitoring and evaluation in any programs and projects to assure transparency and accountability.

A Case in Baringo

In Baringo study, three types of participatory approaches were added to conventional survey tools. 1) RRA to work "for the people," 2) PCM to plan projects "with the people," and 3) PRA for development "by the people." However, since the purpose of the Phase I Study is to formulate a pilot master plan and the first field study is limited to three months, it was necessary to choose specific sites and processes to apply the participatory approaches. The Study Team did not introduce the advanced form of PRA "by the people" which is also called Participatory Learning and Action (PLA), but instead the PRA and PCM Method "with the people" in which the Study Team, the people, the representatives and other stakeholders are partners.

In the Study, PRA Workshops were conducted by local consultants specialized in community facilitation together with the ultimate beneficiaries; RRA was conducted by the Study Team together with the ultimate beneficiaries; PCM Workshops were carried out by GOK representative personnel, the Study Team and the ultimate beneficiaries. Moderators / facilitators of PCM Workshops were mainly divisional officers with the help of community leaders such as chiefs, leaders of associations and schoolteachers.

1.3.2 Participatory Approach and a Project

1) Background

It is ideal from participatory development point of view if the ownership of the project is in the community from the beginning, and the project is designed, implemented, monitored and evaluated by the community. However, it is difficult and also it usually takes a lot of time to be ready for this kind of participatory development. Of course it is better if we have enough time to

work with the community to be ready to do that by the community, but we might need to start a project soon to solve urgent problems. And if we use a participatory approach such as PRA simply assuming community is ready for participatory development, we might end up with non-participatory infrastructure projects.

2） Process

Unless the community is ready to own certain projects, it needs intervention from the outside at least at the beginning. On the other hand, if the community still needs input from outside at the end of the project period, it is not sustainable. Therefore, it is necessary to strengthen community's ownership and then participatory development through the project.

At the planning stage, it is easier and safer to use **"with the people"** tools such as **RRA** (could be also defined as **"for the people"** with public involvement) and **PCM Method** than to use ideal **"by the people"** approach such as **PRA**. Then through implementation, monitoring and evaluation process of the project, we need to move to **"by the people"** step by step. That means, implementation, monitoring and evaluation also have to be done in participatory way, and at the end of the project period, the ownership of the project is expected to be 100% by the community.

At the beginning, the word "project" must be used very carefully also. "Project" could be mistaken to mean a large construction project, even though the Team repeatedly explained about community-based projects.

A Case in Baringo

In Baringo study, five-day PRA workshops at seven sites were introduced first. The priority projects chosen at the PRA workshops were basically non-participatory infrastructure projects such as construction of a dam, construction of a water tank, upgrade of primary school, completion of dispensary and improvement of the road network. It was obviously too early to introduce “by the people” approach. Villagers simply see us as “Santa Claus.”

During three-to-five-day PCM workshops at five sites, which followed the PRA workshops, the Study Team explained again and again that the Team cannot develop the villagers but can help the villagers only a little bit to develop themselves. Also when projects were prioritized, the Team asked the participants to consider “what the villagers can do with little input from outside” as one of the most important criteria.

The priority projects selected at the PCM workshops are as follows:

Kampi Turkana

(1) Villagers of Kampi Turkana can sell balast and other products well.

(2) Skill development.

Kampi ya Samaki

(1) People of Kampi ya Samaki keep clean water.

(2) People of Kampi ya Samaki have enough income.

Sandai / Loboi / Kapkuikui

(1) Good yields of crops.

(2) Healthy reproductive animals.

Rugus

(1) A separate long standing pan/dam for people and cattle.

(2) People can get clean water to drink.

Arabal

(1) Improvement of livestock production.

(2) Reduction of diseases.

1.3.3 Selection of Workshop Sites

1) Background

It seems like planning always needs two opposite approaches, **macro vs. micro** or **top-down vs. bottom-up**. Macro or top-down approach can be defined as an approach to start from the whole area as one plane, on the other hand, micro or bottom-up approach is to start from each point or individual of the area. Two approaches start from the two ends of a string and it is very difficult to decide where to start from in micro or bottom-up approach.

Another aspect is who should be involved in the workshops. Since we cannot have workshops at each and every point of the area, we need to define certain boundaries in the area. Those boundaries may vary by type of problems we are dealing. If irrigation is the target, all the members of the communities within the same basin are the stakeholders. However, if the focus is on a certain local problem, participation of that community might be good enough.

2） Process

To determine the sites for bottom-up workshops, macro or top-down analysis of the area beforehand is essential. The area needs to be tentatively classified first and further analysis using participatory analytical tools is necessary to check the tentative classification. Then several sites representing each classification can be selected for having workshops.

As same as classification, it needs a flexible and repeating process to determine who should be involved in the workshops. As analysis and the workshops go on, more people from surrounding areas may be necessary to participate the workshops.

A Case in Baringo

In Baringo study, the Study area was classified into seven clusters by natural and social characteristics mostly using conventional top-down approach.

Cluster A: Marigat Location

Cluster B: Eldume and Ngambo Locations

Cluster C: Salabani Location

Cluster D: Sandai, Loboi and Kapkuikui Locations

Cluster E: Kimalel Location

Cluster F: Mukutani and Kiserian Locations

Cluster G: Alabal Location

Then a five-day **PRA** workshop was held at each of seven clusters, and **RRA** tools were also introduced by the Study Team. After analyzing the results of **PRA** workshops and **RRA**, the clusters were integrated into five, and a three-to-five-day **PCM** workshop was held at each

representing community. The villagers participated were shown in the parentheses.

Cluster A: Kampi Turkana community of Marigat Location (Villagers of Kampi Turkana only)

Cluster B & D: Sandai, Loboi and Kapkuikui Locations (Villagers of the three Locations)

Cluster C & E: Kampi ya Samaki community of Salabani Location (Villagers of Kampi ya Samaki and surrounding areas including villagers form outside of the Study Area)

Cluster F: Rugus Sub-location of Mukutani Location (Villagers of Rugus)

Cluster G: Alabal Location (Villagers from all the villages in Alabal Location)

Projects within the community were expected in Cluster A and Cluster F, projects in the location were expected in Cluster G, irrigation related projects were mostly expected in Cluster B & D, and business related projects in Kampi ya Sakaki were expected in Cluster C & E. That is the reason why participants were different form cluster to cluster.

1.4 Project Design

1.4.1 Participatory Project Planning

1) Background

One of powerful tool sets for participatory project planning is the **Project Cycle Management (PCM) Method**, which was developed by the Foundation for Advanced Studies in International Development (FASID) in the early 1990's. **PCM Method** is a set of tools to manage projects throughout their running from planning, implementation, monitoring to evaluation and is based on a logical framework introduced by the United States Agency for International Development (USAID), and Objectives-Oriented Project Planning (ZOPP), a participatory planning method, introduced by the German Technical Corporation (GTZ).

Since **PCM Method** is a tool set for participatory **project** planning, it is always necessary to think if a **project** is a good approach to solve the problems. A **project** means pre-set objectives, pre-set time schedule and pre-determined input. Can we make a blueprint for the solutions we are dealing with? If not, it is better to choose a different approach such as **Participatory Learning and Action (PLA)**.

2) Process

There are three stages in participatory project planning workshops using **PCM Method**; analytical stage, prioritization or selection of projects and project design stage. Analytical stage can be separated into three steps; situation analysis, problem analysis and objectives analysis.

In situation analysis step, almost any participatory analytical tools such as stakeholder analysis, village history, poverty profile, trend analysis, SWOT analysis, wish/wants analysis, future image of the village and etc. Situation analysis outside of the workshops is also necessary for the people who cannot attend the workshops or who cannot express themselves in the workshops, if there are any. Non-structured interview is also a powerful tool.

Problem analysis and objectives analysis are rather structured tools using problem tree and objectives tree. In problem analysis, participation of the villagers is required far more than the outsiders because their own problems are being discussed. However in objectives analysis, participation of the outsiders such as government officers, NGO personnel and consultants is also important to identify possible and feasible solutions for the problems identified by the villagers.

It depends on the objective of planning either projects are prioritized or selected. In drawing a development plan, all the possible solutions need to be identified as short-term, mid-term and long-term projects. However it is not a necessary process if only an urgent project needs to be identified.

Project design in **PCM Method** is done using a **Project Design Matrix (PDM)**, which is identical to **logical framework** or **log-frame**. To give more flexibility to the project design, it is necessary to review the **PDM** repeatedly and also to avoid objectives and designs become too much in detail at the beginning.

A Case in Baringo

1) Stakeholder Analysis

In stakeholder analysis, the Study Team avoided using the word “project” at this stage. “Project” could be mistaken to mean a large

construction project, even though the Team repeatedly explained about community-based projects. The Team also noticed that the understanding of the meaning of “opportunities” and “potential” by the local people was different from that of the Team, so the Team used the phrase “what the villagers can do” instead. The Team did not identify the target group, because the term “the villagers” is good enough to describe the target group at this stage of planning.

2) Problem Analysis

Since the Study is still at the master plan stage, the Study Team asked the moderators/facilitators to keep as wide a scope as possible when participants were deciding upon the **core problem**. By doing this, the participants could analyze and plan not only for one sector such as water, but also for many sectors including health, income generation, and education. The Study Team also noticed that the scope of discussion sometimes tended to become too focused during the Problem Analysis. Thus the Team asked the moderators/facilitators to let the participants go back and see the results of the Participation Analysis. During a discussion about marketing, most of the participants only mentioned issues concerning “few buyers” or “poor market” and did not talk about their specific problems that they could tackle by themselves. In those cases, the Team asked the moderators/facilitators to explain the problems of the supply side such as quality, quantity and delivery of products and services.

3) Objectives Analysis

There were no special instruction for this Study was used to carryout an Objectives Analysis.

4) Prioritization of Projects

The aim was the prioritization of approaches rather than the selection of projects. The only criterion used for prioritizing was again “what the

villagers can do with little help from outside."

5) Project Design Matrix (PDM)

At the workshops with the villagers, only a narrative summary, which contains the overall goal, project purpose, outputs/results and activities, was determined. As for activities, whether or not the villagers can take action by themselves was also clarified. At the workshops with central- and district-level GOK officers, activities that could be done by the villagers and by the GOK were also clarified separately. Other elements such as input, important assumptions, objectively **verifiable indicators** and **means of verification** were not considered in the Phase I Study. The Study Team judged that there was not enough information to define them at this stage where it is not clear how much **activities** and **input** will be possible for the verification projects. Also the Team did not want to raise the expectations of the villagers too much, when no commitment could be made.

1.4.2 Community-Based Projects

1) Background

In community-based projects, the owners of the projects are villagers. Therefore, participation is the key not only for planning and project designing, but also for implementation, monitoring and evaluation. Participation here means participation by the community to the project at the same time participation by the governments and the donors to the community projects. If the project belongs to the governments or donors, villagers simply get involved or participate to the project. The governments and donors are the ones to participate, if the ownership of the project is in the community.

For community-based projects, it is impossible to draw a blueprint as detailed as large construction projects. Therefore, flexibility in project design and in planning process is a must. Pre-set design and time schedule need to be very modest, and the planning process itself is required to be as flexible as possible so that it can incorporate a trial and error approach. That means planning, implementation, monitoring and evaluation need to be done almost simultaneously in repetitive manner in community-based projects.

Another difference usually exists between large construction projects and community-based projects are their objectives. In large construction projects, the objectives of the projects are usually simply the project purposes of the projects. However, in community-based projects, project purposes are not the real objectives in many cases. Organization strengthening and capacity building of the villagers through implementation of the projects are also quite important. If these objectives are satisfied, there are no real failures of community-based projects.

2） Process

Even in community projects, there are implementers, who are usually community leaders, and ultimate beneficiaries. They will be identified through the participatory planning process. Also since there are implementers and beneficiaries in the community, some kind of project management tool is essential for efficient project implementation of a community project and also for transparency and accountability.

Type of contribution to the project must be decided in the project design stage. It could range from food-for-work, contribution-in-kind, cash contribution to subsidies. As shown in Figure 1.4.1, food-for-work and contribution-in-kind are forms of public involvement rather than participation and the villagers think it

is a government project they are involved rather than community-based projects they own. If the ownership of the project is in the community, all the material, labor and skills available in the community must not be counted as contribution.

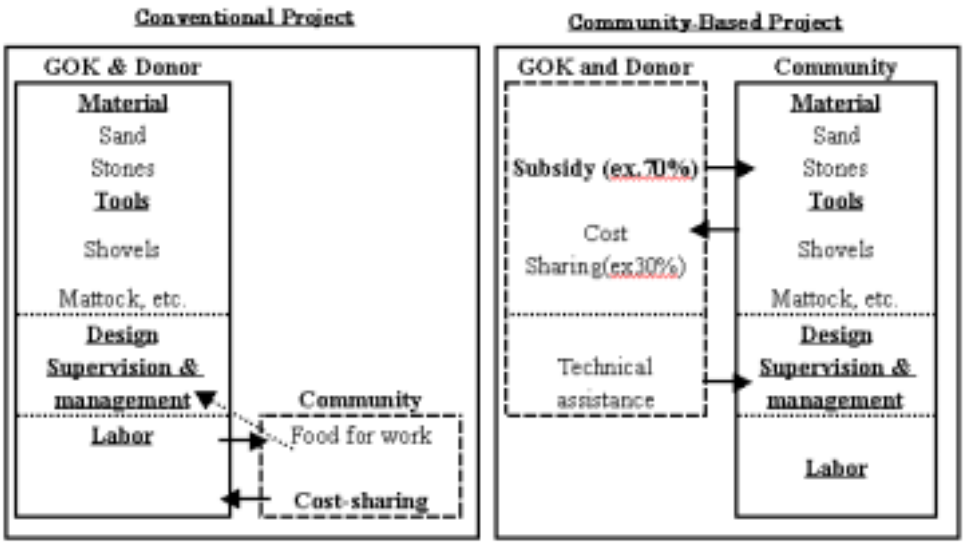


Figure 1.4.1 Community-Based Project

If all the stakeholders do not understand the type of contribution clearly at the beginning, collection of money or contribution of labor will be difficult. For cash contribution, at least certain amount of money should be collected before starting the component where money is necessary.

A Case in Baringo

At the beginning of the verification projects, the Study Team thought renting a pick-up to carry sacks of cement and stones and hiring a mason are not a big deal. The Team first used a pick-up of a town, and then a pick-up of the counselor of the project site community. The Team also hired a mason who is an instructor of a youth polytechnic. Later it became a big problem, because the transportation cost became

about 40% of the construction cost of canal lining and the wage for the mason was higher than they had thought. The villagers said they could choose a cheaper transportation means and did not use the pick-up full-time everyday if they knew the cost of transportation. They also said they could do parts of masonry work if the wage was that high.

Lessons the Study Team has learned are; 1) community members need to be involved in initial budgeting, 2) progress of construction including expenditure needs to be shown on a public billboard on time, 3) employment of transportation and technicians needs to be made with or by the community members, and 4) proceeding to the next stage of construction needs to be made in steps with the payment of cost-sharing in case so agreed.

1.4.3 Role of Outsiders

1) Background

If the community is ready to take the ownership of a project, the role of outsiders is minimum. Outsiders can just wait for the community to come for a little help with a concrete project idea. But if they are not ready, some kind of intervention at the planning stage is inevitable.

Even though intervention by outsiders is necessary to be big at the beginning, it is expected that the ownership of the community-based project will be 100% by the community at the end of the project period. Otherwise, it will not be sustainable. Therefore, the ownership by the community must increase and the role of outsiders must decrease through implementation, monitoring and evaluation.

2） Process

After identifying the workshop site and the participants to the workshop, training of moderators/facilitators follows. It is always better to let local people to moderate/facilitate the workshop. People tend to think outsiders do the projects and they can wait for the fruit of the project, but that is not the case for community-based projects.

Also let the community leaders help the moderator/facilitator as workshop continues. Even in community-owned projects, there are implementers and ultimate beneficiaries within the community.

For increasing the ownership by the community, a participatory approach is a must all through project design workshops, monitoring workshops and evaluation workshops. Community needs to monitor and evaluate the project even after the project period.

Evaluation should be as objective as possible, but evaluation by the third party is not the only way to get objectiveness. Self-rating is subjective when people cannot access to outside information and so that cannot see things relatively. The role of outsiders for evaluation is not to evaluate for the villagers, but to help them to evaluate objectively. Study and monitoring tour is a powerful tool for the people to get objectiveness.

Evaluation among the stakeholders is also a powerful tool to get relative point of view. Through the discussion in the evaluation workshops, the stakeholders can get a consensus on evaluation. The stakeholders with different interests usually have fairly different opinions on the project.

A Case in Baringo

In the workshops, the Study Team did not do any moderation/facilitation except for the ones held at Nairobi with government officers. Several division-level government officers, one local young man with high education and a central government officer mastered PCM Method and several RRA/PRA tools, and moderated/facilitated the workshops. By OJT, they did not need any help from the Study Team at the end of the verification period. The final evaluation workshop with community leaders, division-, district- and central-level officers, and the Study Team was managed 100% by Kenyan counterparts.

It is same in technical assistance. At early stage of the verification period, the Study Team worked with division and district officers for survey, construction and extension, however for the second-generation verification projects, almost no intervention from the Study Team was necessary.

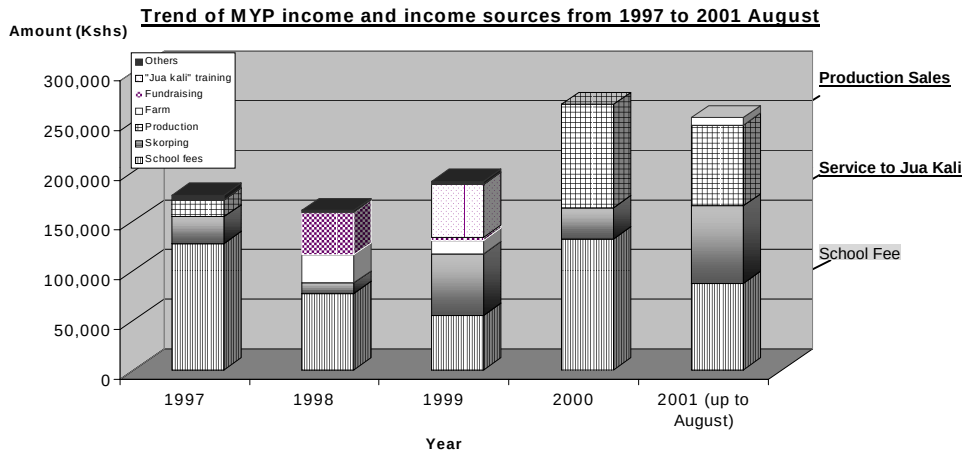
1.4.4 Incorporating Income Generating Activities as a Project Component

Having faced with a financial crisis, the GOK has had difficulties to provide financial support or sufficient public services to the rural communities in Baringo district and also over the Country by and large. It is now directed that the communities should basically go with their capacity and resources. For it is emphasized that, wherever possible, an income generating activity should be built in their projects to sustain their activities forward.

Irrigation improvement, livestock improvement, small-scale industry and rainwater harvesting have more or less a means of generating income as their nature. The benefit from the projects would help

them to go forward. Marigat Youth Polytechnic, which has not been supported by the Government but has been operating on Harambee basis, could be self-reliant by combining income-generating activities, say selling furniture, with the tuition, although its main objective is to give vocational-training to the students (see box). Health centers may need institutional reform to give more autonomy to the Board to handle the finance and day to day running of the institution.

An example of Youth Polytechnic in Marigat town: Financial coition has greatly improved with the introduction of such production sales as desk, chair, table, etc.



An improved Jiko is self-sustaining and does not require any outside costs and the women will have more time to get involved in income generating activities by it's reduction of firewood and time used in cooking. Even for a rehabilitation of pan, the women would be able to save time to fetch water and may get involved in other income generating activities such as bee-keeping, handicrafts etc. Even the silt from the pan might be utilized e.g. for kitchen gardening or brick making and so on in the long run. These possibilities, seeking an income generating activity, should always be considered in planning and designing project.

1.4.5 Considering Gap between Modern and Rural Livings

One may see a long distance lying between rural life and modern life. The rural life in ASAL area is still very traditional while town dwellers, like in Nairobi, enjoy with modern life although services are often disrupted. The distance between the two lives itself may not give much difficulty in planning, implementing and managing a project. The problem is lack of intermediary technique connecting traditional rural life and modern life. What is more observed over the Country is a sort of bipolarization without inter-mediator by and large.

Planners from a developed country and in charge of rural development have to be well aware of the lack of the intermediary technique. Same does apply to GOK officers who are living in modern life. For example, even simple farm tools including panga are mostly imported and not produced in this Country. Import can be justified from the viewpoint of comparative advantage; however there is a problem that is the lack of repair technique. Juakaris (blacksmith) are few, which is different from Asian developing countries. Without intermediary technique, it becomes difficult to maintain the sustainability of any projects and also not easy to move up to the next step.

Bank account is another example. Bank is placed in modern life, which is quite far away from rural reality. Whenever a committee is organized and officially registered with Social Department, the committee is automatically expected to open a bank account in spite of the size of the committee and the amount of the transactions. A joint account requires three signatories to withdraw money that in turn entails certain amount of expenses incurred by travel.

To open a bank account is a good idea and can be opened with assistance from GOK/JICA during project implementation period. However, operating the bank account may not be sustainable because of the expenses required for withdrawal, which is much higher than the bank's interest. Another difficulty takes place when they have to change any signatory according to the result of election. Even in case only one signatory has to be changed, all the three signatories have to come to the bank with their photo and endorsement letter from GOK. This signatory change may be very difficult unless otherwise they could get support from GOK.

An example of difficulties of operating bank account:

Three signatories from Sandai or Arabal locations in Baringo have to arrange about 1,500 Ksh to go to Kabarnet of the district capital, withdraw money and come back including a meager lunch allowance. Considering a fact that even the dip committees in Arabal and Sandai, dealing with relatively big amount of money in rural area, have just 30,000 Ksh and 22,000 Ksh respectively in their bank accounts as of end of July, 2000, it may not be practical that small committees like a Pan maintenance committee or a rain-harvesting group open a bank account. Instead, these small committee would better deal with in-kind, an example of which is goat-fine as practiced in an irrigation group in Mukutani location.

Huge gap underlying between rural society and modern society cannot be underestimated in planning any project in rural areas. The planner/GOK should be well aware of that kind of huge gap or lack of intermediary technique, or otherwise an idea which sounds good may not be well functioning on the ground. The more materials are brought to the community, rural society, from outside which is modern society, the less sustainability the project becomes.

Therefore, input from outside should always be tried to be minimal and done step by step.

1.5 Formulation of Master Plan

1.5.1 Sharing Knowledge and Natural Resource Management

1) Top-Down Approach and Bottom-UP Approach

A Master Plan is prepared sitting together with the local communities, Kenyan officers as well as relevant stakeholders. Although the Plan is prepared by active participation of the people which is so called bottom-up / participatory approach, one thing we do not have to forget is to apply some top-down approach in order to get a target area concerned for development fit into a broader regional development plan as well as to have sound outlook of the target area taking into consideration the environmental carrying capacity.

The bottom-up / participatory approach will be suitable to identify community-based projects, by which problem(s) the communities are now facing may be solved. However, the solution might be unnecessarily shortsighted or localized, an example of which may be an irrigation development implemented at an upstream without considering the effect to the downstream. Those community-based projects may have to be fit in a context of sound regional development.

It is therefore necessary to conduct a study to grasp somewhat broad view beyond the communities by over-viewing the target area, reviewing relevant development plans, as well as learning lessons from past experiences. Assessments of natural resources could also contribute to preparing a balanced development plan, which outlines a frame, defining the carrying capacity of the target area. This is a so-called top-down approach.

Master Plan should therefore be formulated putting the both approaches together. Figure 1.5.1 conceptually shows how both approaches apply to formulating the Master Plan. Bottom-up / participatory approach is graphically shown in a form of an objectives tree that itself will be produced in a workshop, while top-down approach may present sector-wise development plans as shown downside of the figure. Sector-wise development plans themselves have, of course, referred to the outcomes from the workshops but more were drawn from the viewpoint of expertise taking into consideration environmental carrying capacity, balanced development with others, and so on.

2) Sharing Knowledge and Natural Resource Management

"Sharing Knowledge with the Communities" and "Natural Resource Management" are key issues in preparing the Master Plan in ASAL area. In working together in RRA, PRA and PCM workshops, communities' knowledge has been referred to in preparing the sector-wise developments by GOK/donor. Natural resource management is critical issue in this ASAL area since the environmental carrying capacity is just balanced or some areas may show a sign of over-exploitation. Therefore, any development plan in ASAL area should not include further resource exploitation but be based on resource management. "Sharing Knowledge with the Communities" inter-connects bottom-up / participatory approach and top-down approach, and "Natural Resource Management" constitutes an outer-frame, within which the development plans/programs shall be formulated.

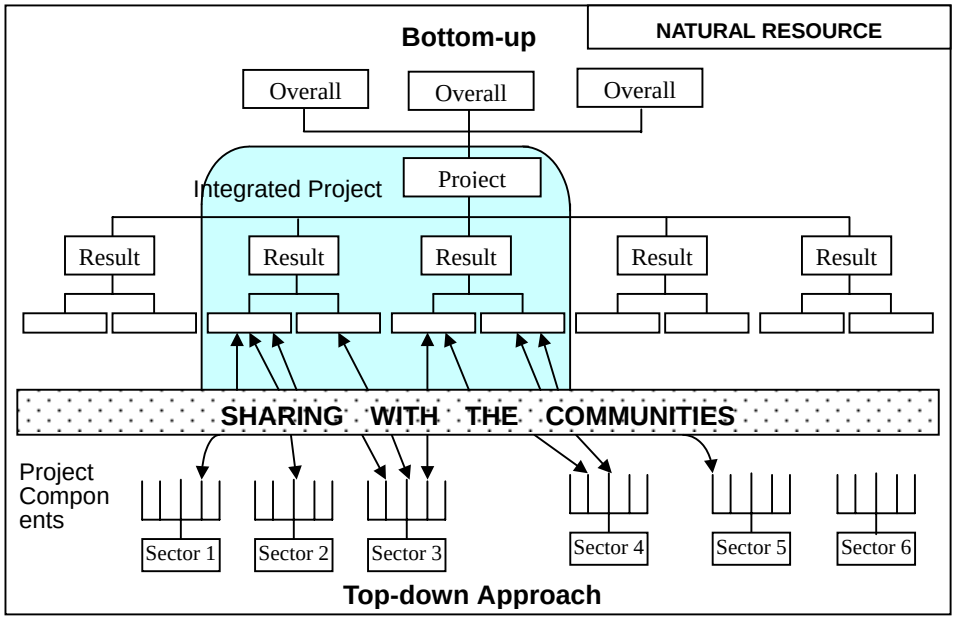


Figure 1.5.1 Conceptual Illustration of Formulating Master Plan

1.5.2 Integration of Sectors

Figure 1.5.2 shows the position of each sector in formulating a Master Plan. There are three major factors in the Plan. The first factor is “income generating activities” (agriculture, small-scale industry and livestock) to achieve people’s higher standards of living, security of food, and thereby the quality of life. The second one is “capacity development” of the local people (capacity building of rural community and human resource development) which enables sustainable development of the community. Lastly, “public services” (rural health and sanitation, agricultural and rural infrastructure, and education and training) provided by administration system, which are the foundations of rural development. People are definitely at the center of the development process and “environment and resource management” is the key requirement for the Master Plan as mentioned above.

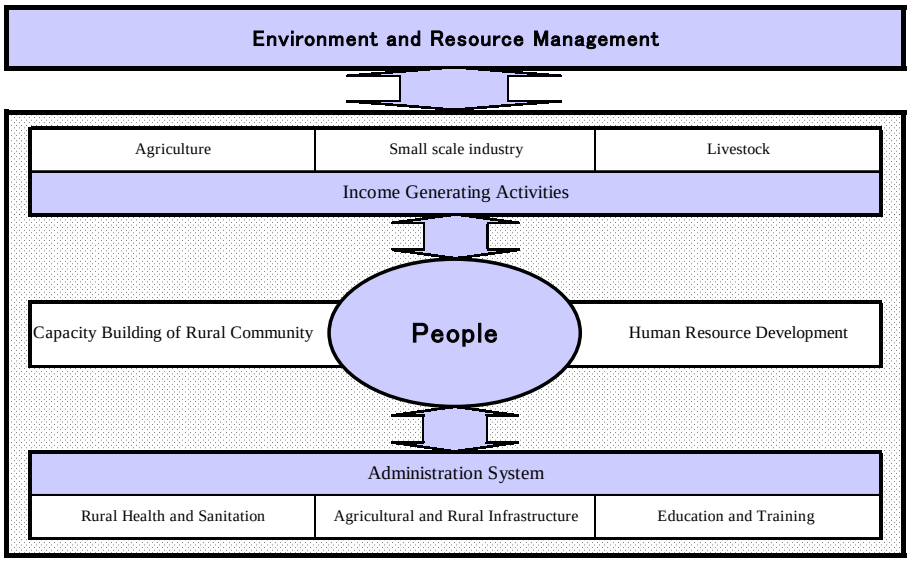


Figure 1.5.2 Positioning of Each Sector in the Master Plan

A Case in Baringo

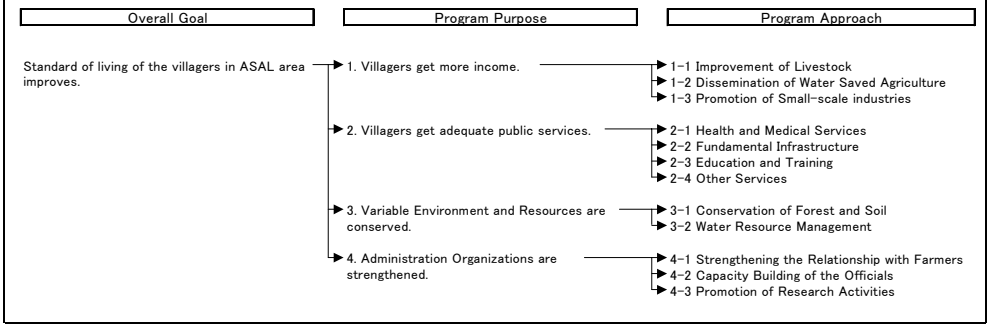
By conventional survey, discussion and workshops with GOK officials, as well as bottom-up / participatory approaches such as PRA workshops and RRA, a development framework, which is shown below was prepared by the Study Team. Four major program purposes below were identified for realizing the overall goal of "Standard living of the farmers in ASAL area improves."

a) Villagers get more income. (income generation activities)

b) Villagers get adequate public services. (basic human needs)

c) Variable environment and resources are conserved. (environment)
Administration organizations are strengthened. (administration system)

Development Framework in the Baringo Semi Arid Land Area (Marigat and Mukutani Divisions)



CHAPTER 2

Project Management and Administrative Support

Chapter 2 Project Management and Administrative Support

2.1 Implementation of Community-Based Project

2.1.1 Decision Making

In a participatory way, a project and its plan of activities are usually made in a workshop wherein concerned community members as well as GOK staff and donor members are present. Workshop often called participatory workshop, however, does not necessarily mean the venue of decision-making for the villagers. Even if the participants plan the project and formulate the plan of operation, they still may be feeling it is a sort of seminar wherein they are given new idea and studying it rather than preparing the commitment to commence a project.

Whether they think the workshop is a sort of seminar or venue of preparing their own project largely depend on not only each participant's concern but also the issue they are talking. For example, whenever money related issue arises, they

An example of decision-making:

A Project Design Matrix and plan of operation had been prepared by members of an irrigation association during a workshop held in in March, 2000. GOK/JICA, upon completion of the workshop, started the project preparation in arranging materials, transportation, etc. with a representative from the community.

The workshop participants did not cover all the irrigation beneficiaries and practically it was impossible to call all the concerned people to a workshop. Baraza, general assembly of the irrigation association, was not held before the commencement of the project. Implementation mechanism, including cash contribution and its handling, had not been well informed to all the concerned irrigation members.

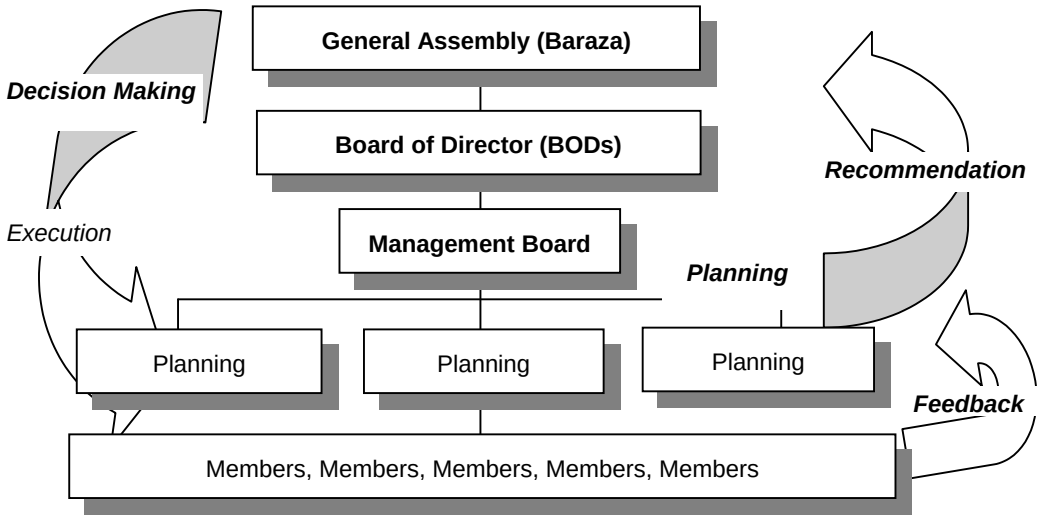
When almost all members of the irrigation scheme knew they had to pay cash contribution apart from their labor contribution, they expressed their frustration to not only the Study Team but also their leaders. They thought they should have been involved in the decision-making process. Communication even among local leaders as well as between the leaders and common villagers were not working as the outsider had expected.

automatically think it is their own issue but otherwise there is more or less someone else's businesses. Also, workshop in most cases practically cannot call all the concerned people; thereby some people are displaced in terms of communication and the following decision-making.

Planners and GOK staff should not count any workshop as the venue for their decision-making unless the project is very small like rain-harvesting which can be implemented by several farmers only. Since most of workshops cannot call all the concerned people, it cannot be the venue of decision-making whether all the concerned people accept or decline the project. Plan made in workshop has to be delivered down to all the concerned villagers and GOK/donors should wait until a decision based on their consensus has come up.

2.1.2 Institutional Setting-up

In most of institution building, there are three important decentralized parts; namely, 1) planning and recommendation, 2) decision-making for the plan recommended, and 3) day-to-day execution according to the decision made. In line with this, a typical institutional set-up is schematically shown below:



Any plan is formulated in a planning committee and recommended to the Board of Directors (BODs), which is sometimes called Management Committee in rural communities. BOD is the decision making body, and if a plan requires referendum, a General Assembly (Baraza) has to be convened wherein final decision is made. Management Board is composed of such chairman, secretary, treasurer, etc., who are in charge of executing the plan, thereby sometimes

An example of a Youth Polytechnic:

Members of the management committee, same as BOD in the above figure, have been involved in accusations and counter accusations that are of little help to the progress of the institution. The chairman has pursued various actions without following any procedures. For the months in year 2001, the chairman has been acting on behalf of the polytechnic without setting foot on the institution. By himself, he would call for meetings, request for a replacement of the Polytechnic manager. The authority vested in the chairman in terms of decision-making shall be only one over the management memberships.

called Executive Committee, according to the decision made by either BOD or General Assembly, and have to take responsibility of day-to-day management.

The management officers, chairman, secretary, treasurer, etc., are in most cases incumbent members of the BODs simultaneously. For example, there are 17 BOD members (they call the BOD committee members) in an irrigation association in Marigat division, out of whom 3 are the Management Board officers such as chairman, secretary, and treasurer. Problem is confusion of the responsibility between as the chairman of the Management Board and as a member of the BODs. Although the chairman is the chief Executive officer, he/she does have only one vote over the BOD members in terms of decision-making. When an issue is so important that needs referendum, even the chairman does have only one vote over the entire membership.

The decentralized institutional set up shown in the above figure may not be needed for a small group like pan management committee or rainfed agriculture group. Also, in an area where they has an ethnic conflict, obviously a strong leadership is needed, even called jangle fighter style leadership, taking into account the situation they are facing. However, if an organization is relatively big and deals with certain cash, that kind of decentralized institutional setting-up as well as demarcation of the responsibility have to be clearly established, so that the concentration of power could be avoided and decision making and the process could become more democratic and transparent.

2.1.3 Cost Sharing

Cost Sharing

Cost Sharing is an idea to invest some inputs from Donor/GOK into a project implemented in a community in case the community cannot handle all the inputs required for the project. In dealing with a community-based project, there should be clear understanding that **"the owner of the project is the community"**. Fund is a strong mean for donor/GOK to control the project, but or therefore the way of providing inputs by donor/GOK can confuse who is the owner of the project. Here an idea of cost sharing for community-based project is described.

1) Category of Inputs from Outside Community

There are several approaches of investing inputs from Donor/GOK. These are:

1) Emergency Relief
2) Grant
3) Food for Work
4) Community Contribution in Kind
5) Community Contribution in Cash

The approach of No. 5, "Community Contribution in Cash" is an outstanding one, which tries not to hinder the concept that "the owner of the project is community".

The policy of No.5, "Community Contribution in Cash" is not to count as a part of cost sharing whatever it is as far as the community can manage within their jurisdiction. It implies that

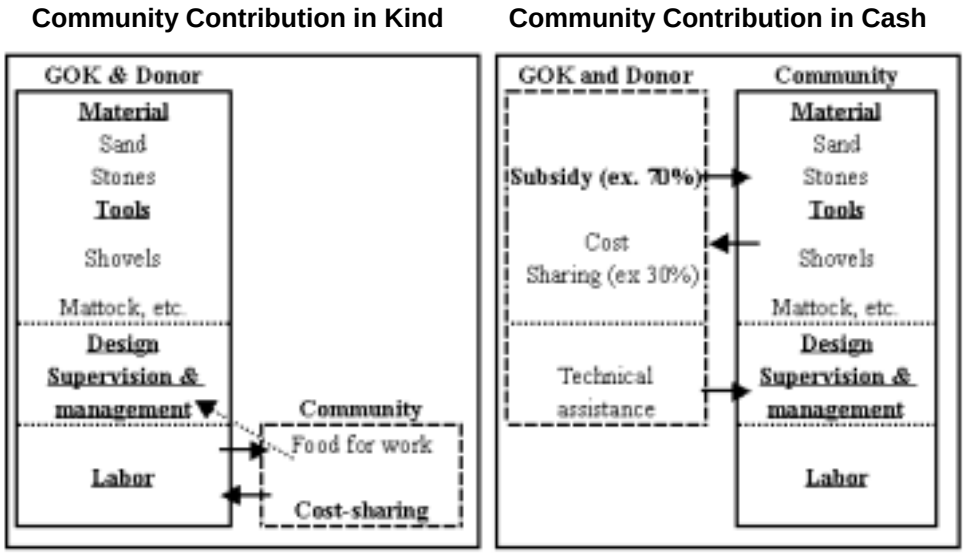
labor contribution does not constitute any part of their contribution, which is quite a different approach from past and current on-going projects in Kenya. Neither are local materials such as river sand, stones, acacia fence, etc

Cost sharing may stand on an equal basis or to a lesser extent on a sharing basis between the outsider and the beneficiaries in terms of the project ownership. Cost sharing practiced during project implementation is well known to continue even after the project completion, requiring another sharing during O&M stage as well. One example is given to the maintenance of a pan. The beneficiaries are supposed to maintain the pan by themselves after the completion, however no such practice has been done in the Country except a few cases. The pan beneficiaries try another cost sharing even in pan rehabilitation, which is actually an accumulated deferred maintenance in nature. Thus, project sustainability could hardly be realized.

To shift the paradigm, this approach proposes to give the entire project ownership to the beneficiaries, and the donor/GOK stands on as a subsidy provider. The subsidy is provided to equipment, fabricated materials such as PVC pipe, concrete culvert, etc. and transportation that the communities cannot manage by themselves. Cost sharing referred to in this Study, therefore, is rather defined as a subsidy in nature.

Based on the above discussion, a comparison between the approaches No. 4 and 5 is schematically shown below. Approach No.4, “Community Contribution in Kind” (see left figure) is that community’s participation is usually done as labor supply. On the other hand, the approach No.5, “Community Contribution in Cash” asks, in principal, the community to manage all the concerns such as material, design, supervision & management and labor. There are cases definitely beyond what the community can manage;

those are in most cases materials brought from outside and techniques required for design, supervision and project management.



GOK/donors provide a subsidy for the materials so that the community can buy those including the transportation. If 70 % of the material cost is provided to the community from GOK/donor, 30 % in cash is the cost sharing that the community has to bear. Technical assistance is given to the community so that the community could design, supervise and manage the project. The principal of Community-based Project should be the one shown on the right side of the figure. What the outsider, GOK and donors, should do for the community is, in principal, to provide subsidy for materials and technical assistance.

2) Subsidy Rate

The subsidy ratio may vary 70 to 90% depending on the communities' living standard and also the project nature (Basic Human Needs related projects or profit making ones). Following

are also some aspects to decide the ratio of subsidy

- As much as an average price of a goat (500 – 1500 Ksh) per household can be a criterion.
- Women's capacity to pay in cash: Women's money sources in their discletion are chicken sale (80 to 100 Ksh), water fetching (10 Ksh/time), small-scale industry etc.

Example. Subsidy Rate in case of the Verification Project in Baringo

Project	PIM in Sandai	Pan in Rugus	Kampi ya Samaki Women Group	
			Multipurpose Building	Equipment for Business
Total Cost*	1,120,220 Ksh	277,650 Ksh	1,350,000 Ksh	30,198 Ksh
Subsidy Ratio	70%	90%	90%	0%
Due of community	336,066 Ksh	27,765 Ksh	135,000 Ksh	30,198 Ksh
Due per household	(480 Ksh/acre)	487 Ksh	270 Ksh	75 Ksh
Performance	15% complete	Not paid	100% complete	100% complete

* Cost consists of material, skilled labor and transportation of materials (community labor does not include)

3) Collection System

a) Pay before the commencement

- Ask for community to pay their due before starting the project
- Community will pay their due to the contractor directly. In this case if the community is behind with their payment, the implementation may stop simply because of budget in short.

b) Charge forward and Installment

- Donor/GOK pay the total cost first and then the community will pay their due to the Donor/GOK. They can discuss and make an installment schedule. Issue receipt to the community.
- To establish organization for the project by the community beneficiaries or existing community group can be the one
- Collection should be transparent and open

c) Establishment of Fund

- Depending on the status of Donors/GOK, the payment by community may be returned to the treasury of the donor or government.
- If not, the payment of the community can be utilized for the seed money of establishing a fund (children Education Fund, O&M fund etc.) The debt left after the termination of the project team can be transferred to the fund committee.

A case in Sandai Communal Resource Management

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 past 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.

2.1.4 Study Tour (Learning from Best Practices)

Study Tour (Learning from Best Practices)

The objective of the Study Tour is to learn from best practices under circumstances similar to the area concerned and apply those to the planning of participatory rural development in the area. This is considered to be one of the most effective learning methods.

1) Program

a) Identification of site

The criteria to select the best practices can be: a) being located in ASAL area, b) having a good track record of achieving effective community mobilization, and c) having something new or relevant to show in terms of technologies being used, organizational set up, incentive systems, etc. Extensive consultations with government officials, NGOs, and donor communities will be also needed to identify the sites.

b) Preparatory Activity

- A preliminary visit to the project sites is crucially important to arrange the schedule and logistics.
- Complete selection of participants should be at least two

weeks before the departure date.

- Participants will be selected according to the strategic purpose of the Study Tour, e.g. participants will be only government officers, or officers and community people, or community people only etc.
- Selection of participants from the local communities will be made through a series of workshops convened for planning their community project.
- Size of a group will be better around 20 people or less for efficient and effective implementation.
- Announce in advance to participants about the condition of allowance (paid or not paid), responsibility for accidents etc.
- A Study Tour Kit for every participant should be made. The kit may consist of an explanatory paper for the study tour concept, agenda, schedule, participants etc., brochures of visiting projects, notebook etc.

c) Implementation

Study Tour would start with:

a. Registration and orientation (if necessary, gather at an evening before the day of travel. Reception can be combined). At the orientation meeting, various coordinators (bus leaders, health care, room assignments, water bottle procurement and distribution, translators, cameraman, lunch coordinator, etc.) will be appointed from the participants.

b. Visiting Project Sites

c. Wrap-up Session: On the last day of the Study Tour, a wrap up session with about two hours will be conducted. The team will be divided into small groups and discuss "**what were the major lessons learned"** during the entire trip and **"what actions they would recommend to their**

communities or offices". After the small group discussions, each group will report their results.

d. Post-tour Questionnaire: questionnaire to ask the participants for rating the Study Tour will be circulated. The question should be asked by agenda of the program to reflect into next Study Tour program.

e. Action planning for their own area: with the lessons from the study Tour, each participant is expected to carry out an action planning in their community or organization. This can be facilitated by the program or can be relied on their discretion.

f. Follow up Session: After several months, the program facilitates a workshop with the participants who joined the Study Tour and discuss what they have done in their community/organization after the Study Tour and future plan.

2) Arrangement for Study Tour

- Mini-bus
- 4WD (in case of emergency, 4WD can be a rescue corps)
- Accommodation arrangement
- Meal, snack and water arrangement
- Medicines
- Handout (above Study Tour kit)

3) Potential Visiting Site

There are three best practices applied for the Baringo Study, **the Semi-Arid Rural Development Program (SARDEP)** in the Keio and Marakwet Districts in the Kerio Valley, **the Samburu Development Program** in the Samburu District, and **the Social Forestry Extensions Model Project for Semi-Arid Areas (SOFEM)** in Kitui District. Outlines of these projects are described

below.

However, one thing common to all the three projects is the presence of a big donor behind each project, who provides a significant amount of cash grant every year. It would be interesting to know what would happen after such grant funding ceases (2002 for SARDEP, 2002 for SOFEM, and 2000 for SDDP). Notwithstanding the future uncertainties, those projects have contributed in training and motivating the local communities enormously, and their impact would be felt for a long time to come.

Study tours could also be organized to other areas such as Kajiado, Machakos, Meru (near Isiolo), Makeuni (Israeli-assisted scheme), West Pokot, Rangwe (Kisumu) and Narok.

SARDEP

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

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

ASAL I was planned and implemented essentially by the government and the donor without the involvement of the local communities, and its impact was small. At its conclusion, the program was terminated partly due to a mismanagement of funds. ASAL II was implemented by the government with the communities

and succeeded in enhancing agricultural production and improving the livelihoods of the local communities. However, ASAL II did not address major environmental issues. ASAL III adopted a new strategy called “the Transect Approach”, which focused development on an area demarcated by hydraulic boundaries taking account of administrative boundaries as much as possible. This was done with the understanding that unless the project area included the high lands and escarpments above the valley bottom, the environmentally sustainable integrated area development was not possible. Consequently, from ASAL III onward the project area has included not only the valley bottom (1,000 m above sea level) but also the escarpments and highlands (2,000 m).

The method the ASAL Team used to select the 14 Transects was as follows:

1) A desk study was conducted to demarcate the land primarily by drainage area, and categorized it from Transect A to Q
2) Members of the team drove around each Transect and carried out RRA
3) They selected 4 Transects, all of which would fit into the middle of the existing administrative boundaries (Divisions)
4) They carried out extensive campaigns which involved “theaters” by the local communities (for them to act out their problems) and lectures by the ASAL Team
5) They carried out PRA and Logframe exercises to prepare a Community Action Plan, a 7 day exercise, at the end of which a Community Action Plan (CAP) was formulated
6) The CAPs were harmonized into a Transect Action Plan
7) A Project Management Committee (PMC) was established for each initiative by the local community (now altogether 400 PMCs exist in the Keio and Marakwet Districts)
8) Four Transect Area Committees (TACs) were formulated

each consisting of Chairmen of PMCs in the Transect.

During this process, the ASAL III Team worked closely with the Local Administration (District Development Committee, Divisional Development Committee, and their members). ASAL III therefore was quite complementary to government efforts and not adversarial to them. ASAL III was completed and is now merged with two other similar projects under Dutch assistance, and is now called SARDEP and will continue for another three years.

Samburu Development Program

This program started in 1992 as a food security program with assistance from GTZ. Four years later, the program was expanded into a rural development program. Compared with Baringo, the project area is drier and higher, and is more affected by Mt. Kenya climatically. What is comparable is the same pressure that Baringo receives, such as the lack of water, conflicts with neighboring tribes, lack of health and education facilities, market access and income generating opportunities. The grazing capacity of the lands is reaching a critical point but the local communities do not seem to realize it yet. They experienced the catastrophic effects of drought in 1991/92, and 1995/96, when a large number of livestock died. The local communities must realize the risk of breeding livestock indiscriminately, and have to start changing their nutrition, social organization and take steps to limit their mobility. Slowly, the Samburus are realizing that their normadic life style and in particular the moran (warrier) system have to change.

There are about 50 local communities in the program area, and in all these communities, PRA has been conducted. Based on this bottom-up participatory approach, the program has been financing various rural development activities and receives about DM 1 million a year (about US$ 600,000) from GTZ and about the same

amount from CDTF (EU). The program is to be completed by the end of 2000.

SOFEM in Kitui District

The Social Forestry Program in the Kitui District started in 1985 with JICA assistance. The overall goal of the current phase, the Social Forestry Extensions Model Project for Semi-Arid Areas (SOFEM), is to equip the inhabitants of semi-arid areas in the Kitui District with the appropriate technology to plant and tend the trees through the development of social forestry. The expected outputs are:

- Provision of technology for planting and tending the trees for the establishment of farm forests
- Adoption of community mobilization methods for establishing farm forests
- Sharing of information about social forestry extension.

The activities include the screening of tree species and forestry technology in semi-arid lands, pilot forestation with volunteer farmers using the technology developed at the project experimental station, and the preparation of manuals for use in extension work.

SOFEM is particularly relevant to learn due to the following two aspects:

- “Participatory Technology Transfer”: the local knowledge of the farmers (beneficiaries) is just as important as any scientific knowledge to be brought in by outsiders, though the two may be totally different in context
- “Farmer-to-farmer extension”: beneficiaries are able to exchange information and share experiences between themselves

Box1:

The participants indicated many lessons learned, among others, a) community mobilization based on people-centered, bottom-up, participatory approach, b) transect approach (SARDEP), c) effective use of demonstration farms and training centers, d) selection of individual farmers for demonstration, e) utilization of appropriate technologies such as Enzaro jiko, water-harvesting, disease and pest control, and f) organizational structure to mobilize communities such as Project Management Committee in SARDEP, and District Inter-sectoral Committee in Samburu. They also indicated their plan to share the lessons learned with their own community. The group from Arabal, for example, came up with the following action plan:

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

2.2 Organization Management

2.2.1 Traditional Organizations

- Find out about existing traditional organizations and assess if they can offer a basis for ASAL development projects
- Bring the topic of such traditional organizations for discussion in a meeting attended by community members and obtain recommendations on how such traditional organizations can offer a platform for development Projects
- In most cases such traditional organizations may not be suitable for supporting a project and a new organization may have to be started from the beginning

2.2.2 Women Groups

1) Formation of A women Group for ASAL Development

- Identify types and activities of women groups in the study/project area
- Assess the groups' general performance in terms of realization of initial objectives; document both achievements and problems facing the groups
- Assess if existing women groups can be the basis of women-targeted development project eg (the case of Muungano Women Group at Kampi ya Samaki verification Project)
- Promote development activities in which women already have skills

- If possible avoid too big a group, not exceeding 100 members since co-ordination becomes extremely difficult
- Stimulate the women group to elect a management committee that will oversee planning and implementation of the group's activities; in this regard, election should be preceded by discussion among the members considerations when electing persons for the various positions in the management committee (literacy, trustworthiness, initiative, fair to all, unselfishness, geographical and social representativeness etc)
- Support the management committee in formulating group by-laws for later discussion by the members in a general meeting
- Assist Group to obtain a registration certificate from the Department of Social Services subsequently in opening of bank account

2) Project Implementation, Operation and Maintenance

- From the beginning encourage the habit of keeping records (membership list, attendance of meetings, minutes of general and committee meetings, cash receipts and expenditures, stocks, accounts etc)
- Broaden group members' perspective through tours to areas and activities relevant to their project
- Challenge the women to have a hands-on involvement in project activities if even if this implies slowing project implementation progress
- If project involves producing products for sale, training in marketing and quality management is critical

3) Watch out for the following:

- Be prepared for interference from the men-folk in the project activities particularly if project involves

considerable financial expenditure

- Avoid scheduling meetings in the first half of the morning since women have to complete many tasks during the morning session
- Watch out in case existing women groups have been established on the basis of local political alignments
- Promote participation across the entire membership in order to pre-empt take-over of the project by a minority elite

2.2.3 Participatory Irrigation Management

1) Formation of Irrigation Farmers Group

- Get an general appreciation of the Study/project area from government officers on the ground as well from other informal leaders (elders, teachers, business men and women)
- Explain justification and plan aimed at forming farmers organization as part of a broader irrigation development or rehabilitation
- Build up a data base of prospective or existing farmers as well as a map showing location, extent and lay-out of irrigation channels and if possible confirm with farmers their plots on the map
- Find out what other farmers groups exist and assess their achievements and problems
- Using a workshop medium, facilitate farmers to discuss irrigation organization options including organization approaches that might have been used in the area before
- Once consensus an organization is reached, encourage discussion on qualities of good leadership for a group

irrigation project and follow this with election of management committee that is representative of the irrigation project(representation by secondary canals, upper, middle and tail end, gender, age)

- Stimulate discussion on the role of the committee as a whole as well as the precise duties of each of the committee members
- Assist the committee in formulating by-laws of the irrigation farmers' organization for later adoption by the general meeting of the members
- At an early stage, support members of the Committee with leadership and management training so as to build their capacity to steer the organization

2) Project Planning

- Discuss a suitable time-table with the Group Management Committee when the beneficiary community can discuss and formulate a project plan
- Resist the temptation to dominate the planning process confine your role to providing guidelines regarding what is technically feasible and what is not
- During the planning workshop, encourage contribution of women and young people and discourage a few members (the wealthy, educated or men of high status) from monopolizing contributions
- Define the role of GoK/Donor personnel as that of providing specialist advice on various aspects of the project plan while the community is responsible for shouldering the bulk of implementation tasks
- During the time of elaborating the plan, encourage emphasis on organization aspects since these often get forgotten as members concentrate on technical and financial issues

- What, who, when and how should always permeate the planning process irrespective of what planning tools are being used (PRA., PCM, etc)
- Facilitate the planning workshop to define clearly how tasks will be shared between community and GoK/Donor/NGO during implementation and post-implementation phases; this should include quantification of cost sharing and procedures

3) Implementation, Operation and Maintenance

- Encourage the management committee to re-affirm their precise role in community mobilization for implementation, operation and maintenance
- Provide committee members with training on record keeping, business and organization skills
- Promote regular committee meetings as per by-laws with a view to assessing project performance and deciding on necessary interventions

Things to Watch Out

- Be alive to under-currents of power competition among the beneficiary community that can affect the composition and performance of the management committee
- Be careful when assigning contract assignments eg allocating a project contract to one camp thus triggering resentment from the other .
- Look out for a tendency of an elite group assuming ownership of the project and thus marginalizing the rest of the irrigation members
- Use the good services of the local chief and councillor during the early stages of project initiation but later rely more on the Committee for community mobilization in

order to build up their confidence and organization skills

- As the representative of the project promoter (GoK, Donor, NGO), resist the temptation to become indispensable by limiting your visits to the project site to periods when critical events are taking place and when your support is really needed

2.3 Participatory Monitoring & Evaluation and Project Extension

2.3.1 Inter-location Monitoring

Inter-location monitoring

Inter-location Monitoring is an activity to facilitate villagers to visit a project site and communicate with project beneficiaries. The activity aims at involving people who live outside the locations, where the project is not implemented, into monitoring of the project. This is why it is called inter-location. The project management unit will prepare the mean of transportation and go to the project sites with the representatives of the people in each location.

1) Function

There are two expected functions in the inter-location monitoring, namely a mean of better monitoring & evaluation and a mean of project extension.

a) Who will monitor?: Mean of Participatory Monitoring & Evaluation

Monitoring and evaluation are defined as follows:

- Monitoring is a process of systematic and critical review of an operation with the aim of controlling the operation and adapting it to circumstances.
- Evaluation involves the comprehensive analysis of the operation with the aim of adapting the strategy and planning to circumstances" (quoted from "Participatory monitoring and impact assessment of sustainable

agriculture initiative" Guijt 1998)

Agreed with the definition above, inter-location monitoring focuses on "who" will monitor and "who" will evaluate. It is most useful for beneficiaries to receive the result of monitoring and evaluation by themselves for their further development and they are the ones who know throughly the process of the implementation, as well.

Inter-location monitoring can contribute to make beneficiaries evaluate themselves more objectively by offering the opportunity of access to information. To enhance this function, implementing the same components of the project in more than two different sites is an effective way. Inter-location monitoring facilitates beneficiaries in each site to compare their achievements and exchange views and encourage each other. Inter-location monitoring can be a good mean for participatory monitoring and even for evaluation with the combination of the inter-location monitoring and evaluation workshop for the project beneficiaries

b) From spot to area: Mean of Project Extension

Inter-Location monitoring could be a very workable catalysis to disseminate the projects to other locations. There are double effects from this inter-location monitoring. The people in charge of a verification project could be proud of showing their achievement, so that they become more active in their activities, while the visitors could also be motivated by seeing the achievement. Thus the visitors are often so motivated that they think they also can start similar project.

The inter-location monitoring should be devised in order to disseminate a pilot project to other areas even if the pilot is so designed that can be copied easily. In line with this, inter-location monitoring tour should be considered whenever sort of pilot

projects are tried, and even if there is only one sort of pilot, the pilot should be tried in different places if budget allows.

2) Inputs

Necessary inputs of the inter-location monitoring are as follows:

a) Mini-bus (Matatsu)

About 16 people can ride in a car. The number as many as the capacity of one mini-bus will be adequate to handle the tour. The tour can be conducted several times for more opportunity although the tour should not be too frequent to disturb the implementation of the project.

b) Soda and bread

It depends of the situation, but if necessary, it is better to take some food and drink for lunch. Especially in rural area, it is very often difficult to find a restaurant to serve customers quickly. It should be negotiable between the sponsor (project management unit) and participants on who will prepare the lunch.

c) Papers and pens

Before the departure for the tour, some piece of papers or a note and pens should be provided to the participants to make note during the project site visit.

3) Program

Program of Inter-location is described as follows:

a) Site preparation

Information about visitors should be sent to the beneficiaries of the project to make them ready for welcoming visitors.

b) Invitation of Participants

It is better to ask the leader of the location, preferably Chief, for selecting the participants of the inter-location monitoring. When asking the leader, it is better to advise him to select the participants in wide range from youth to old and from women to men.

c) Activity 1 –day of Inter-location Monitoring

1. Assembling of the participants
2. Introduction and explanation of the monitoring activity by the conductor from the project management unit
3. Distribution of papers and pens to the participants
4. Departure for the project site
5. Presentation of the project by the beneficiaries
6. Observation of the project and discussion with the beneficiaries
7. Wrap-up session (discussion among the participants about what they saw, what they thought, and what they learned) immediately after the monitoring among the participants
8. Collection of papers (memo of the participants) and pens.

Visiting a Project Site

d) Analysis 2 – Post Inter-location Monitoring

- Meeting in the community with the participants of the Inter-location monitoring to disseminate what they saw (this meeting will be held by community initiative)
- Analysis of the papers (memo) collected from the participants by the project management unit to feedback the opinions into the project implementation (After the analysis, the papers should be returned to the participants probably through the leader)
- Follow-up of the monitoring by the project management unit (Check if any impact occurred after the inter-location monitoring)

Involvement of more people

The verification projects implemented in the Baringo Master Plan Study was defined as a mean to learn lessons for the formulation of more feasible Master Plan. However for the people in the Study Area, the meaning of verification projects was just project itself. Because there are somehow inputs from the donor for the verification projects, it would be necessary to distinguish people in the Study Area according to the degree of benefit they get from the verification projects, namely those who would be directly benefited, indirectly benefited or not benefited.

Those who would not be benefited were put in that position just as a result of the site selection. When the Study Team explained the location Chiefs, whose location were out of the verification project sites, on how we selected the sites, it was recognized that the fact that their places were chosen as the project sites or not was so crucial for them. Even in the areas selected as the project sites, it became clear through the workshops that the degree of the benefit would be different among the community residents.

As the people in the Study Area have been already involved in selecting the verification project sites during the Study, effort for more participation and more beneficiaries will be necessary. The Study Team, therefore, took a policy that is to involve more people in the monitoring activity as the effort for more participation and more beneficiaries. The monitoring activity was put in a position being in line with participatory approaches and the way of benefiting more people.

Explanation about Enzaro Jiko by a Woman Beneficiary

Extension of Improved Jiko

Jikos constructed in the first target area served as a showcase because many visitors have visited through inter-location monitoring tours.

First extension of jiko started with the villagers in Kimalel location. Villagers in Kimarel 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 and second jiko in Kimarel location were constructed with the assistance of GOK officer and a local expert trained in Kampi ya Samaki.

Another dissemination took place in Eldume location. The Eldume's jiko were self-initiatively constructed. Villagers in Eldume were

invited to an inter-location monitoring tour at the beginning of July 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. Eight Jikos were constructed in one month and the number of jiko is slowly increasing.

Livestock Project Beneficiaries

There is a unique outcome during an inter-location monitoring by Sandai people to Arabal. Both communities have a same type of verification project; that is livestock improvement by buck introduction. Back custodians from Sandai were very surprised with the fact that Arabal custodians had already completed the their due (30% of cost sharing in cash), while the custodians in Arabal were also very much surprised with the fact that Sandai custodians had not yet paid their due. Though Sandai people are apparently richer than Arabal people, the Sandai custodians were not well aware that they were delinquent. Compared to the achievement of Arabal people Sandai people got a view to rate themselves more objectively.

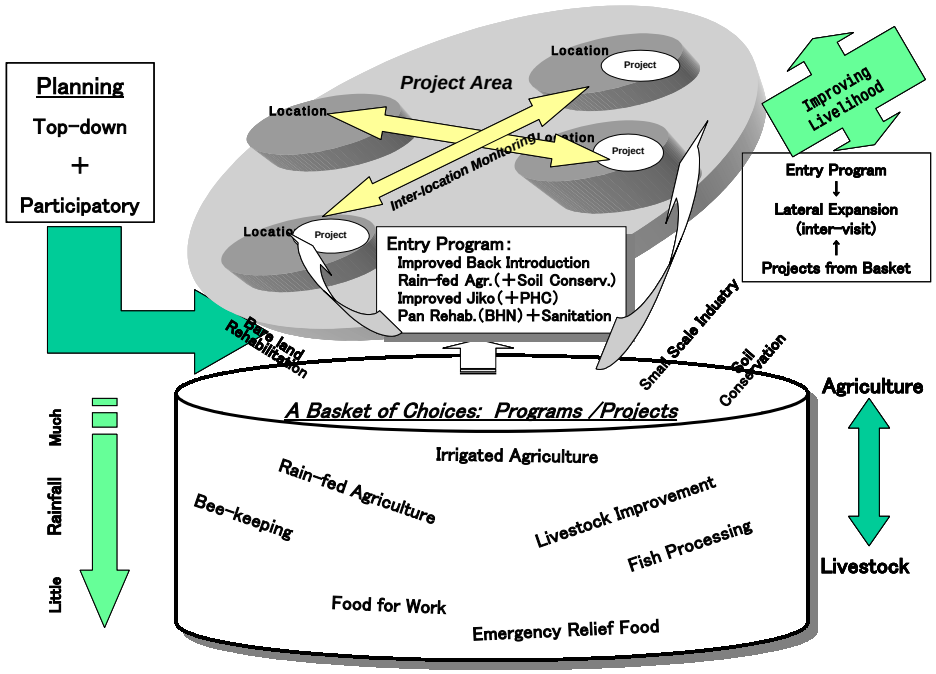
2.3.2 From Entry to Sustainable Development

1) From Entry to Implementation

A conceptual model shown below shows a procedure from entering the concerned project area and then disseminating programs/projects over the area as well as even to outside neighboring areas. The model has three key components;

namely,

- Entry Programs,
- A basket of Choices, and
- Inter-location Monitoring.



Conceptual Model of Entering the Project Area to Extension

Tough rural development is principally pursued in such a way of fulfilling the people's needs with their own initiatives first and plus supports from outside like the Government, donors, and NGOs, there may be some programs/projects that could be well entering the Project area as the first development step. These are defined as Entry Programs.

Following the entry programs/projects, there should be a sort of a la carte menu consisting of various sorts of programs/projects. It is conceptually shown as a Basket of Choices containing various programs/projects that could be selected by the people and agreed by both sides (the people and donors/GOK) for the implementation. Since the people in ASAL area have to diversify their way of living to cope with unstable and harsh environmental condition, the concept of the Basket of Choices would meet the way of people's living.

An example of entry programs:

The entry programs should be small in scale and should have nature to be well adapted to ASAL condition. Some projects have already been suggested through the verification projects, which are as follows:

- Improved Back Introduction
- Rain-fed Agriculture (plus Soil Conservation)
- Improved Jiko (plus PHC Promotion)
- Pan Rehabilitation (plus Sanitation Promotion)

The third key component, but not to the least, is Inter-location Monitoring. People, especially women, are more or less confined in and around their own community areas. Information concerning the programs/projects undertaken by the Project can be exchanged through this Inter-location Monitoring among people beyond their own location. By visiting each other's program/project, they will definitely lean each other and thereby empowerment would take place automatically among themselves. This would also motivate the people who have not yet started any project to embark on similar development activities.

The process from the entry to dissemination is as follows, and the process would improve the people's living condition gradually but in a wider area rather than sharply but in a quite confined spot:

a) identifying communities for the Entry Programs and those implementation,

b) these programs' dissemination through the Inter-location Monitoring,

c) taking up programs/projects from the Basket with reference to the people's need, and

d) Inter-Location Monitoring for these from the basket once again.

2.4 Human Resources Development

2.4.1 Human Resources

The importance of assessing Human resources lies in the fact that it is human beings who bring change to their environment. Through better awareness, knowledge and skills, they can take an active role in development. For development to be realised, a sizeable ***population*** is important. But what is perhaps more significant is that this population should have access to ***education*** as well as to other ***capacity building schemes*** that would improve their knowledge, skills and awareness. In turn, the communities will be better equipped to find solutions to their problems.

Available resources include in the study area that address human resource development includes formal schools, non-formal schools, adult education classes, a youth polytechnic and other capacity building schemes of both the government and NGOs.

1) Formal Education

a) Pre-primary Education

Most of the pre primary schools are not well distributed and low and late enrolment in primary schools may be attributed to this factor. Because there are few primary schools, children have to wait until they are old enough to walk the distance to school.

b) Primary Education

The 8-4-4 curriculum applied at the primary and secondary levels has been designed to provide the pupils with sufficient intellectual and vocational training to enable them to lead a full and rewarding

life by emphasizing on technical and vocational education. This is expected to help pupils get oriented to the value systems in their community and also ensure that the school leavers are equipped with technical knowledge enabling them to be self-reliant after leaving school.

However, the enrollment difference between sexes is normally slight and girls' enrolment decreases from the lower classes to the upper ones. Drop out is high in the upper classes, and at the lower levels, it is common to find over age pupils owing to late enrolment. Reasons for this include:

- Pupils are enrolled late because where schools are far, their parents would like them to attend when they are old enough to cover the long distance to school. Similarly, parents may keep their children home to assist in household roles, until they can find an alternative.
- While the ratio of boys to girls is often 1:1 at lower classes, it reduces gradually as one goes up to the upper classes, sometimes reaching 1: 0 in favour of boys in schools. This occurs because the girls are enrolled late, and by the time they reach standards 5, 6 or 7, they are ready for marriage, and actually get married.
- There is a direct correlation between enrolment and attendance to school with the availability of food at the school. Whenever food is not provided, enrolment tends to decline. Food is provided to all ASAL Schools, under the World Food Programmes School Feeding Programme.

c) Secondary Education

Secondary education in Kenya aims at promoting growth of the individual towards maturity and self-fulfillment as a useful and well-adjusted member of society. To achieve the above, the

curriculum is designed to give the students experiences, concepts and understanding which will facilitate the student to develop positive self and other attitudes, awareness of his/her immediate as well as external environment, appreciation of own and national potentials and lastly develop the necessary skills. The syllabi as well as national examinations done by these schools are nationally developed and co-ordinated.

Over all, the secondary schools are inadequate and are over utilized. Most of the schools in ASAL areas are mainly facing the problem of a lack of facilities like laboratories and libraries. The high school fees demanded for secondary education has also led to a few dropouts when their parents cannot just raise the fees. And quite often, because many parents cannot pay on time, students attendance is disrupted as they spend a substantial amount of time at home looking for fees.

d) Scholastic Progression Rate[1]

While it is expected that majority of primary school leavers enter into secondary schools, this is not so in ASAL schools. Statistics indicate that out of the 402 pupils who sat for the KCPE exams in 1998[2], 193 of them were admitted to National, Provincial or District schools. Hence the *scholastic progression rate* was 193/402 x 100 = 48 per cent. This shows that the proportion of std. 8 to form 1 enrolment in the study area is 48 per cent, while the *wastage rate* (proportion of pupils who fail to move up to form 1) is 52 per cent.

Factors militating against continued education include;

- poor performance at KCPE level

[1] Scholastic Progression Rate equals to Form 1 enrolment divided by Std. 8 enrolment times 100.
[2] Source; Divisional Education Office.

- poor facilities for teachers accommodation, resulting in low morale,
- early marriages particularly among girls
- unaffordable costs of secondary education
- pastoralism, where other types of skills and knowledge as well as gainful employment is considered inferior
- general negative attitudes towards education.

e) Dropout

Since the rates of dropouts who failed to progress to secondary schools as well as the ones who failed to join higher are high, the pool of potential trainees of the polytechnic is simply vast!

f) Youth Polytechnic (MYP)

Youth Polytechnics were previously commonly referred to as "village polytechnics". These institutions target mainly dropouts of primary and secondary schools. Village polytechnics became popular during the 1970s when the modernisation paradigm was strong. In Kenya, most of these polytechnics were begun on a "Harambee" basis, with meagre communal resources. Only a few of these received GOK grants. According to the Artisan Training Programme[3] of Kenya Institute of Education, the general aims of post-primary training programme (provided by youth polytechnics) are to;

1. Develop skills and attitudes to enable the trainee enter gainful employment,
2. Provide basic foundation to enable the trainee pursue

[3] Technical Education Programmes, Artisan Training Programme, KIE Carpentry and Joinery Course; Syllabi and Regulations, KIE, 1989.

advanced courses on either full time or part time basis.

For this reason, these institutions have not been popular with secondary graduates, who prefer to join colleges and technical institutes like the Kenya Industrial Training Institute (KITI) in Nakuru town. Institutes and colleges provide certificate, diplomas and higher diploma courses. Graduates from the institutes stand a higher chance of employment and/or self-employment than their youth polytechnic counterparts. Over time, youth polytechnics have become less responsive to the present needs and quite a number of them have been shut down for being dinosaurs. Nginyang Youth polytechnic, which is 30Kms North of Marigat town, is one example of a polytechnic that has been closed.

Exerting even more pressure to the polytechnic is the local community whose resources are minimal, and their preference for traditional lifestyles undermines the interest towards education and training. Consequently, the polytechnic has been run in a relatively informal way.

2) Non- Formal Education

a) Illiteracy Rates

Illiteracy rates are higher among females (43%) than males (29.7%)[4] in the Baringo district. In the rural parts of the district, the rates are even higher (31% of males, 44% of females) than in the urban (10% of males and 23% of females).

b) Adult Education

Adult Education has not been quite effective. But more significant,

[4] Population Census, 1989

the literacy programme does not pursue the functional aspect of Functional Adult Literacy (FAL) curriculum. FAL as a method of implementing adult education, is designed to impart learners with knowledge and skills that enable learners to understand and control their environment better, and if possible, secure employment i.e. employment and/or life skills. Other problems facing the adult education programme in the study area include;

- Poor supervision by the adult education department which lacks means to conduct regular supervision,
- inadequate learning and teaching materials, due to financial constraints,
- general lack of interest by the community,
- inadequate training facilities for literacy campaigns,
- poor networking and integration with other extension programmes,
- existing cultures and traditions which dictate that men should not attend class together with their women.

c) The "Jua Kali" Sector

To the polytechnic, the "Jua Kali" artisans provide a good benchmark of the life after trade courses. A vibrant "Jua Kali" sector is good news to the polytechnic, which actually supplies the sector with more graduates. For this reason, therefore, the link between these two should be seen as symbiotic.

Jua Kali and Marigat Youth Polytechnic

The artisans in Marigat rely on the Marigat Youth Polytechnic for the access to expensive machines such as the lathe machine, which they would not be able to afford, keep or even run profitably. On its part, the polytechnic should be concerned about the fate of its graduates.

Already, carpenters from the "Jua Kali" sector in Marigat use the polytechnics equipment because they cannot afford to keep such equipment. There is a need to establish such links with the "Kokoto" group in Marigat. Through the group members have wide experience in breaking stones into ballast, they need some skills and advice on how to maintain good standards. The polytechnic, through the masonry couse, has the capacity to assist them to improve.

2.4.2 Institution Building and Human Resource Development

1) Human Resource Development

The problems that the human resource development plan needs to address relate to education and awareness at the community and institutional (school) levels. These two levels are closely related as the improvement of schooling which would instill self confidence and self reliance, depends on public support and general public awareness. In the long run, the improvement of awareness, knowledge and skill in the communities depends on the current quality of schooling.

At the community level, it is vital to address illiteracy, awareness, knowledge and skills of both adults and out-of-school children. These are the members of the community who are already seeking ways to earn a living. They do this by seeking either employment or self-employment opportunities. Owing to the scarcity of employment opportunities, they certainly need appropriate skill to try out alternative solutions.

a) Support to Pre-primary schools

This should address the problem of low and *late enrolment* in

primary schools. Early childhood education, which is the focus of this plan, has been accorded a high priority by MOEST. *Low and late enrolment* in primary schools is principally a problem of few pre schools in many areas as well as the lack of awareness of the importance of early childhood education by parents. Pre primary schools can go long way to reduce address this problem especially where primary schools are so far that parents opt to send their children to school when they re old enough to walk the distance.

b) Improvement of Primary and Secondary School facilities and equipment's

As a way of improving the standard of education and performance in primary schools, this plan will equip existing schools and also uplift the standard of buildings as necessary. Improved standards of education should address both late enrolment and completion rates. Late enrolment also impacts negatively on the performance of primary schools. It also tends to be correlated to completion rates, where the older the children in schools, the more likely they are to drop out or not to proceed to secondary schools or for post-secondary education. Girls drop out to get married or because they got pregnant, while boys may drop out to seek employment.

c) Support to Youth Polytechnic

Considering that polytechnics offer opportunities for both primary and secondary graduates and drop outs, this plan should open up alternative avenues for imparting skills necessary for self-employment and or formal employment. Youth polytechnic has become unpopular with school leavers hence the decline in enrolment. One of the reasons for its unpopularity is the fact that the long duration courses it offers are no longer favourable for school leavers who want to gain skills quickly and get employment

or begin some income generating activities.

Over the years, the polytechnic has also provided training in very limited areas, namely masonry, carpentry and dress making. Today the number of graduates with such skills has probably reached a saturation point. New graduates can not find jobs or enough customers to do good business. In addition, graduates who can not find jobs can not open up businesses owing to lack of initial capital.

However, the polytechnic has still a lot of opportunities to re-establish itself if only it can embrace change. They also have a potential to generate extra income through other means that may focus around the special equipment's they have or the skills they impart to students. Recently, polytechnics have begun to focus on improving the quality of their training so that they would attract secondary school leavers. When they do that, they also upgrade their name into "Technical Training Institutes".

d) Non Formal Education

Mainly for *out-of-school children*, a plan for Non-Formal Education (NFE) will address the problem of lack of knowledge and skills for the children who are too old to fit in a formal school. Primary school dropout may also be accommodated under NFE. Besides education they should develop practical skill which will allow them to become self-reliant.

e) Functional Adult Literacy

Adults will be provided an opportunity to gain not only literacy and numeracy skills through a plan on Functional Adult Literacy, but also to collectively decide on activities that will improve their lives. This plan should incorporate the on-going activities of the Adult Education department.

2.5 Health

2.5.1 Background

The ASAL could be defined by small amount of rainfall with wide variety in both geographically and chronologically. For particular area, it means great uncertainty of getting rain and it makes people's way of living quite different from agriculture dominant area or urban where most of us belong. Those unique ways of living influenced every aspects of their life such as nutrition, risk of infections as well as their perception of health. Before starting any planning of intervention, an outside donors or suppliers should have equipped with enough insight for their cultural background. Culture itself is a product of their way of living and it is crucial part to design comprehensive PHC activities.

2.5.2 Some Hints

In nomadic or pastoral settings, diet pattern heavily depend on milk and dairy products supplemented by varieties of natural animals and vegetations. Total calorie intake varies widely by seasonal change and natural climate, and sometime quite low as famine hit them. However, the protein intake can be maintained contrast with scarce calorie intake.

Their ecological lifestyle also allowed many varieties of infectious agents surrounding them. Thus the infection control is surely a center focus of health interventions. Some of them are defined as 'Cattle association diseases' or 'Zoonosis'. In order to control these diseases, both human and animal health programmes should be considered in closely related interventions. Particular disease specific intervention may not be appropriate in these settings.

Their own culture includes significant local wisdom for health naturally. Even though some of them seems not make sense for modern western medical technologies, local people are confident and proud of them. Thus this would come up for the theme to communicate with the people in both ways, interactive manners. Maybe this kind of communication could be started with asking local name of a disease.

2.6 Institutional Reform Based On Decentralization

This manual explains what decentralization is, why it makes sense to be carried out in Kenya and how to go about it. Part I presents the definition, types and rationale of decentralization. To illustrate the points raised in Part I, Part II presents two actual cases, one from Pakistan and the other from Kenya. The Pakistan case would provide a good example of how to go about introducing effective decentralization in economically depressed rural area such as Baringo.

2.6.1 Institutional Reform based on Decentralization

What is decentralization, and why decentralization makes sense? Rather than reinventing the wheel, this part is heavily quoted from the World Bank's Internet web-site, "Decentralization On-Line Sourcebook".[5]

1) Definition of Decentralization

Decentralization is the transfer of authority and responsibility for public functions from the central government to subordinate or quasi-independent government organizations and/or the private sector. It is a complex multifaceted concept.

2) Typology of decentralization

Types of decentralization include political, administrative, fiscal, and market decentralization.

[5] http://kms.WorldBank.org/prem/psf/dcen/dcen.htm

Political decentralization aims to give citizens or their elected representatives more power in public decision-making. It often requires constitutional or statutory reforms, the development of pluralistic political parties, the strengthening of legislatures, creation of local political units, and the encouragement of effective public interest groups. In Kenya, for example, while the separation of power among executive, judiciary and legislature branches exists on paper, in practice, there is no clear separation, particularly at the district level. The executive branch outweighs by far the other two branches.

Administrative decentralization seeks to redistribute authority, responsibility and financial resources for providing public services among different levels of government. It has three different forms:

- **Deconcentration,** which is the weakest form of decentralization, is used most frequently in unitary states and redistributes decision making authority and financial and management responsibilities among different levels of the central government. In Kenya, what happened under the District Focus for Rural Development (DFRD) introduced in 1983, was essentially this deconcentration.
- **Delegation,** which is a more extensive form of decentralization, transfers responsibility for decision-making and administration of public functions to semi-autonomous organizations not wholly controlled by the central government, but ultimately accountable to it.
- **Devolution,** which is the most thorough form of decentralization, transfers authority for decision-making, finance, and management to quasi-autonomous units of local government with corporate status. It usually transfers responsibilities for services to municipalities that elect their own mayors and councils, raise their own revenues, and have independent authority to make investment decisions.

Fiscal decentralization can take many forms including:

a) self-financing or cost recovery through user charges;

b) co-financing or co-production arrangements in which the users participate in providing services and infrastructure through monetary or labor contributions;

c) expansion of local revenues through property or sales taxes, or indirect charges;

d) intergovernmental transfers that shift general revenues from taxes collected by the central government to local governments for general or specific uses; and

e) authorization of municipal borrowing and the mobilization of either national or local government resources through loan guarantees.

In Kenya, while a) and b) can be seen in many areas, there are few if not no cases of c), d) and e). Thus, Kenya is a highly centralized country as far as fiscal decentralization is concerned.

Market Decentralization shifts responsibility for functions from the public to the private sector. The most complete form of market decentralization is privatization and deregulation.

- **Privatization** can range in scope from leaving the provision of goods and services to the free operation of the market to "public-private partnerships" in which government and the private sector cooperate to provide services or infrastructure.
- **Deregulation** reduces the legal constraints on private participation in service provision or allows competition among private suppliers for services that in the past had been provided by the government or by regulated monopolies.

3) Benefits and Costs of decentralization

Decentralization can help cut complex bureaucratic procedures and it can increase government officials' sensitivity to local conditions for diverse political, ethnic, and cultural groups in decision-making; and relieve top managers in central ministries of 'routine' tasks to concentrate on policy. It may create a geographical focus at the local level for coordinating national, state, provincial, district, and local programs more effectively and can provide better opportunities for participation by local residents in decision-making. It would give local communities control of resources to invest in projects they care about – often education, health, infrastructure and other growth enhancing services. It would empower under-represented groups, such as local pastorals, farmers and entrepreneurs as well as women, to be politically active. Thus, by and large, decentralization helps poverty reduction.

But decentralization is not a panacea, and it does have potential disadvantages. It can result in loss of economies of scale and control over scarce financial resources by the central government. Administrative responsibilities may be transferred to local levels without adequate financial resources and make equitable distribution or provision of services more difficult. Privatization could at times affect the poor adversely, at least in a short run, unless there is a proper regulation coupled with some safety net.

Centralization and decentralization are not 'either-or' conditions. In most countries, and particularly in Kenya, an appropriate balance of centralization and decentralization is essential to the effective and efficient functioning of government. Even when national governments decentralize responsibilities, they often retain important supervisory roles, and must create the 'enabling environment' that allow local units of administration or Civil Society

Organizations (CSOs) to take on more responsibilities. Technical assistance is often required for local authorities, private enterprises and local CSOs in the planning, financing, and management of decentralized functions.

2.6.2 Illustrative Cases

To illustrate the theoretical points made in the previous parts, let us examine two cases, 1) the Aga Khan Rural Support Program (AKRSP) in Pakistan, and 2) the Mwea Irrigation Scheme in Kenya. The Pakistan case is chosen as one of the best practices in the world, which made a breakthrough using a strong support of an NGO in otherwise a very difficult environment. The Kenya case presents a typical example of how the state has been dealing with goods, for which they have little comparative advantage.

1) Pakistan: Aga Khan Rural Support Program (AKRSP)

The AKRSP was established in 1982 by the Aga Khan Foundation (AKF), a Pakistani NGO. It has focused on alleviating rural poverty in the Northern Areas and Chitral (NAC), which is an isolated and mountainous region of Northern Pakistan. In the program area, about 90 percent of the population were engaged in subsistence farming; literacy rate was 57 percent; population growth was 2.9 percent per annum; per capita income was half of the national average; and the physical infrastructure and communications were poor, with virtually no manufacturing base. The Government of Pakistan (GOK) and many donors were walking away after large-scale rural development efforts failed. AKF nevertheless stayed, and tried an alternative approach.

The broad objectives of the program are to:

a) Improve the welfare and income of the majority of households through self-help schemes

b) Undertake specific programs targeted to improve the conditions of those who appear unable to benefit from available opportunities without special assistance

c) Develop a replicable model for rural development through various experiments

There are no prefixed components in the program. The activities are decided depending on the local community's demand. In the program, village organizations are organized to develop and manage activities in the areas of sustainable natural resource management, human resource development, and micro-credit and savings, depending on priority of local needs. Organizing Village Organizations (VOs) and Women's Organizations (WOs) is the core of the program strategy. VOs are trained and strengthened to undertake the task of building and maintaining a piece of collective infrastructure, such as an irrigation channel or bridge. Once the organization is institutionalized, VOs start to expand their activities. VOs take a leading role in managing other public goods and services, such as schools, health clinics and natural resources. Beyond the physical infrastructure, VOs make collective actions to deal with governments and other institutions. The main program activities and their impacts are shown below:

1) *Formation of village institutions* :
   As of 2000, the program had created 2,317 VOs and 1,329 WOs in 1,123 villages in the project area, achieving 80 percent coverage in the target region. GOK has recognized the effectiveness of VOs and has agreed to use those as the instrument to channel Social Action Program in the Northern Areas.

2) *Planning and management of productive physical infrastructure*:
   As of 2000, more than 2,100 productive infrastructure

projects had been initiated, of which 1,763 (about 80 percent) had been completed. Most popular projects include gravity irrigation channels and the linkage of rural roads, vehicle and foot bridges, and pony tracks. As a result, 84,000 ha of new agricultural land had been developed, and communication had been improved significantly.

3) *Natural resource management*:
The Program introduced new technologies through specific sectoral programs that included demonstrations, input supply, and technical assistance. It also trained quasi-professional agricultural specialists in each village in areas such as livestock management, forestry and agricultural extension. Female specialists are specially trained in vegetable production and protection and nursery management.

4) *Human resource development*:
The Program focused on training village representatives to manage the affairs of VOs and WOs, and to act as a disciplinary specialist in natural resource management. Further, it trained AKRSP staff, hired interns and trained staff from other agencies seeking to replicate aspects of AKRSP's rural development strategy.

5) *Marketing and enterprise development*:
AKRSP encourages promotion of particularly marketable products. Farmers receive training in production, grading, processing, and marketing of these products. As of 2000, more than 400 marketing specialists had been trained. These marketing efforts have been expanded to cover non-agricultural activities.

6) *Savings and credit*:
This program aims to create a large capital base, provide access to microfinance services on a sustainable basis, devise simple and appropriate financial management systems for VOs and WOs, and establish a sustainable financial institution. Women's credit programs have been particularly effective. Women were able to achieve a degree of independence by having their own savings accounts, which were set up through VOs.

Evidence of AKRSP's institutional impact in Pakistan is to be found in the burgeoning growth of rural support schemes imitating the program in whole or in part, and include the Sarhad Rural Support Corporation, the National Rural Support Program, the Ghazi Barotha Taraquati Idara, the South Asia Poverty Alleviation Program and the Punjab Rural Support Program. Internationally, AKRSP clones exist in India, Uganda, Mozambique, and Kenya.

The India program in Gujarat has been operating since 1987. It follows similar processes, which drew from the AKRSP Pakistan experience and has had particular success with women's income earning activities and in the policy area (the World Bank, Operations Evaluation Department).

Lessons Learned

Why AKRSP has worked so well? First and foremost, under this program, **an NGO played a major role**. When major donors and even the government were leaving the area after their failed effort in launching ambitious and large-scale integrated area development projects, AKF remained. AKF had a better rapport and consequently better access to the local community, more determined to stay and live with the community, and in particular, had some dedicated staff who were willing to live in a harsh environment. They obviously gained intimate knowledge of the project area and the trust of the community.

Second, AKRSP created **an effective organizational structure**, i.e., VOs and WOs, and made them feel owning the program by empowering them. It is not just the organization, but the way AKRSP proceeded with creating it. There were no prefixed components (blue print) in the program. The activities were decided depending on the local community's demand. This **demand-driven flexible approach** greatly attributed to the

success of the program.

Third, the government itself should be credited, not that they initiated the innovative program, but the way they recognized its relevance and decided to use it. For example, the Chief Secretary of the Northern Area instructed line departments to maximize use of VOs in implementing government programs; and the government used the VOs to distribute rehabilitation funds following the disastrous rains of 1992. The **flexible and open-minded attitude of the government** to accept AKF as a partner should be commended.

Fourth, the program was successful in attracting **a large amount of donor support** (DFID, EC, NORAD, SIDA, USAID, and the World Bank). AKRSP's annual expenditure has grown from Rs14.6 M in 1983 to Rs346.8M in 2001 (Operations Evaluation Department, the World Bank). Such support has come not only because of the innovativeness of the program but also its well developed and managed budget process. The increasing contribution of donors has at once allowed AKRSP to expand and deepen its program quickly. At the same time, however, it has created **a greater than desirable degree of dependence on external funding**. Most donor programs are due to terminate by the end 2002 unless new agreements are reached well before that. This casts doubt about the **sustainability** of the program in the present form.

In sum, the innovative approach of AKRSP owes a lot to AKF, an NGO, who mobilized local communities; created appropriate organizational structure consisting of VOs and WOs; trained those organizations; trained also the community members at large but especially women on microcredit and savings; and attracted many donors to financially support the program on a reasonably sustained basis. As a result, it gained not only the trust of the

community but also of the government, who has decided to use VOs for their own programs. Thus, all the stakeholders played their role well. This is an excellent example of **true devolution**.

2) Kenya: Mwea Irrigation Scheme

After its independence in 1963, Kenya's agriculture initially performed better than the average sub-Sahara Africa, realizing the annual growth rate of 6.2 percent through 1973. Since then, however, agricultural performance has worsened steadily, and now the growth rate is about zero percent, which is far below the annual population growth of 2.5 percent.

The decline of the Kenyan agriculture and the economy as a whole can be attributed to many factors. The periodic droughts, adverse export prices of coffee and horticulture produce, combined with population increase and the devastating impact of HYV/AIDS, among others, have all contributed to the declining economy, degradation of the ecosystem, high unemployment (estimated to be almost 50 percent in Nairobi), and landlessness. The World Bank, however, singles out the lack of governance as the main culprit for the slumped economy. In fact, since 1997, most members of the donor community have kept a low profile in their development assistance pending Kenya's reform in establishing good governance.

Kenya's rural sector bears a disproportional burden of poverty. Kenya is heavily reliant on rain-fed agriculture. Unreliable rainfall distribution and frequent droughts, however, often resulted in crop failures and necessitated the country to import critical agricultural commodities such as maize, wheat, rice, oil crops and sugar. Kenya's irrigation and drainage potentials are estimated to be about 540,000 ha and 600,000 ha respectively. At the moment, only about 110,000 ha or about 20 percent of the potential have

been developed. Currently, 46 percent of the irrigated area are under private schemes, 40 percent under small holder schemes and the remaining 14 percent public schemes. The private schemes are located mostly in fertile uplands and providing supplementary irrigation for cash crops such as coffee, pineapple and horticulture. The small holder schemes have been developed by the Irrigation and Drainage Branch (IDB) of the Ministry of Agriculture and Rural Development, and the public schemes are run by the National Irrigation Board (NIB). Although the public schemes account for only 14 percent of the total irrigated area, they serve most of the country's grain production especially rice.

The National Irrigation Board (NIB) was established in 1966 as a parastatal organization, through CAP 347 Laws of Kenya, with the mandate to promote irrigation development and to settle the landless in public irrigation schemes. It was assigned to the existing schemes of Mwea, Hola and Perkerra, the development of which was initiated under the colonial period using detainees' labor. Mwea is the largest scheme of all, accounting 80 percent of all the irrigated lands under NIB. According to the mandate stipulated in the Irrigation Act of 1966, NIB is obligated to provide not only the irrigation services but also agricultural input, extension and marketing services to the farmers. In turn, as a general rule, the farmers (tenants) in NIB schemes must cultivate crops NIB decides and sell their produce only to NIB at prices set by NIB. This has often resulted in farmers selling their produce at far below the market price.

In 1998, the farmers in the Mwea scheme took over the irrigation facilities by force and have since been running the scheme on their own. The take over of the Mwea scheme sent a shock wave to the Government, and the Ministry of Agriculture and Rural Development dismissed the entire Board of NIB and sent a new General Manager. Currently NIB still does not have a Board, and

because of the Mwea scheme not repaying their Ksh 300 million debt to NIB, NIB itself is now in critical financial crisis. It is also feared that the Mwea facilities are being run down due to lack of proper operation and maintenance. The 1,500 tons of paddy that NIB managed to buy were looted by the farmers. Further, the depletion of NIB's revolving fund prevented it from serving the other schemes. The general weakening of NIB could lead to a collapse of all the public irrigation schemes.

The Mwea scheme, under the Mwea Multipurpose Cooperative Society's management, is still operational, but barely. Members have not been paid for the paddy they delivered during the past two years because the cooperative could not compete with imported rice. In 2000, a group of farmers claiming to number more than a thousand (about one third of total holding) separated from the Mwea Multipurpose Cooperative Society to whom they refused to make any payment. This dissident group has requested a few services from NIB on cash payment basis. The splitting of the farmers would further complicate the management and operation for water delivery and may raise security problems in the scheme.

The Ministry and NIB management have now shown commitment to solve the Mwea issue and restructure NIB basically by focusing its functions to only those tasks directly related to provision of irrigation services and functions concerning policy, regulation, research and technical assistance. This requires, however, careful consensus building among all the stakeholders, which is not easy without technical assistance and some outside neutral intervention.

Lessons Learned

What went wrong in Mwea? First and foremost, NIB, a parastatal, has been meddling with goods and services for which they have

little comparative advantage. For provision of input and marketing of the produce, for example, the NIB staff , many of whom are engineers and agriculturists, have little strength in dealing with such matters. We call it in Japan, 'samurai's commerce'. As a result, the Mwea scheme has become unable to compete in the market. If NIB were a private corporation, it would have bankrupted a long ago. What has happened, or more precisely what has **not happened** in Mwea, is the desired **'market decentralization'**.

Second, **tenancy's paternalistic relationships stifle settlers' initiative and managerial skills**. The tenants, unable to exercise their initiative, would never realize their true potential. NIB on the other hand has been bogged down with the day-to-day management of the scheme at the expense of achieving its major mandate: promotion of irrigation development. With the liberalization policy adopted nationwide from the early 1990s, the tenancy system became untenable but 'CAP 347' although obviously obsolete, was there, unchanged since its sole revision in 1986, and NIB has been unable to change its mandate.

Third, and this is not just the case of Mwea but applies to the entire Kenyan system, is the over concentration of power in the executive branch, which is not conducive to encourage participation and empowerment of the local community. From village chief, location chief, divisional officers, district officers, to provincial officers, every officers are appointed by President or President-appointed District Commissioner. Consequently, all these officers are responsible only to the President and not to the local community that they are supposed to serve. There is no local civil service system under elected leaders. The local administration has practically no taxing authority and it is almost impossible to raise resources locally. In other words, there is **no fiscal and political decentralization**.

CHAPTER 3

Technical Aspect

Mambo ya (Uagalizi wa) Kiufundi

Chapter 3 Technical Aspect

3.1 Livestock Improvement

This chapter has benefited from a number of background documents prepared by the JICA verification livestock project. Contributors to this background documents include livestock counterparts from Veterinary Office in Marigat and local individual farmers who are worked with this verification project.

3.1.1 Selection of Livestock Components

1) Carry out castration

The biggest problem of the ASAL areas is a huge percentage of unproductive or low productive livestock population. Non-descript male animals unfit for breeding are to be castrated. Among females, the unproductively is mainly due to infertility and sterility. Hence special campaigns could be organized for treating such infertile females to make them breedable. Wherever socially acceptable, such unproductive mail animals should be castrated and used for meat.

There are various castration methods, some of which are crude or traditional way and painful to the animal. Crushing the seminal cord with stones etc should not be used. Castration by a knife is acceptable, but there is a strong risk of infection from dirty knives and flies. The most recommendable methods are by the Burdizzo bloodless castrator. One of the effects of castration is that the animal will fatten faster than an entire animals, as it will not waste energy chasing females.

2) Up-grading through crossbreeding

In order to improve the average level of livestock population for any trait by genetic means the population must be subjected to selection for the specific trait or combination of trait required. Some traits are strongly inherited, while others are weakly inherited as their development in the animal is more dependent upon environment conditions.

When unrelated livestock are mated the system is known as *crossbreeding*. The progeny of crossbred livestock are heterozygous for those traits that differ in their parents, and the greater the differences between parental traits the greater the degree of heterozygosity in the offspring. As all crossbred progeny inherit the totality of parental characteristics in more or less the same manner they tend to resemble each other to a greater or lesser degree.

The first-cross progeny are usually superior to the inferior parent in productive traits and often to both parents. This phenomenon is known as *heterosis or hybrid vigor.* It is probably due to the effect of over-dominance where the heterozygotes are superior in one way or another to both the homozygotes.

Hybrid vigor disappears very rapidly when hybrids are mated *inter se* so that new parental stock are continuously required if the livestock owner wishes to exploit hybrid vigor to the utmost.

Cross breeding can be useful in three ways to livestock owners in the tropics.

First, local low-producing livestock can be upgraded by continuously backcrossing them to more highly productive introduced improved breed.

Secondly, an attempt may be made to create new and more productive breeds by crossbreeding local and introduced improved livestock, mating *inter se* at either the first generation or after one or more backcross generations and then selecting the type of animal required.

Thirdly, advantage may be taken of hybrid vigor by some form of systematic crossbreeding between two or more breeds of local livestock or between a local and an introduced improved breed.

3) Goats farming should be given a priority

Today there is marked shortage of meat largely because the existing stocks of meat cattle are unable to keep pace with the rapid rate of increase in Kenyan population.

Any solution to the beef problem must necessarily be a long term one because the improvement of local meat cattle is limited by lack of good breeding stock and pastures, and the relatively long time must be taken to effect any improvement when compared to other livestock animals.

The goat is a particularly important animal in subsistence agriculture on account of its unique ability to adapt and maintain itself in harsh environment. Local goats provide a useful and popular source of meat, being hardy and not very susceptible to disease. The majority of goats owe their existence to the fact that they thrive as meat producers under conditions in which it is difficult for other species of domestic livestock to survive. They are able to find their own food, browsing on the leaves of shrubs and trees and eating the coarse grasses those cattle and sheep reject.

Goats will also clear up foods that would otherwise be wasted, such as maize bran (usually available fairly cheaply from Posho

mills) and sweet potato peelings, which help them to fatten quickly.

Goats have another advantages over other ruminants such as, they mature early, have high fertility, capable of multiple birth and undergo short gestation period. Goats can be bred as early as 8 month old. Goats in the foundation herd could yield milk five months after conception. The first carcass of kid crop can be sold in less than a year.

Increased production of milk and meat can help resolve the problem of protein malnutrition. The short life generation interval of goat makes it possible to increase production of both milk and meat in relatively shorter time.

Lastly, goat meat is relished in all Kenyans where the meat traditionally forms part of the diet and preferred to both mutton and beef. This is probably due to the higher lean content of the meat relative to mutton and beef, but it might also be related to certain special features that make goat meat quite different from mutton. Whereas in sheep the fat is distributed all over the body, in goats visceral concentration is characteristic and the grain of the meat is more compact and the color slightly darker than mutton.

In the past there has been some disagreement as to the value of goats because of the widely held belief that damage they do to trees and vegetation – especially in arid regions – outweighs their usefulness as producers of meat, milk and skin. There is, however, a growing school of thought that recognizes that the bad reputation of goats stems more from their mismanagement than from any inherent fault, and that with controlled management they can be a great help in agricultural development and food production.

4) Animal health control

Animal health support to livestock production system is the most vital segment of planning. Whereas farmers easily learn by experience the technique of breeding, feeding and management in which they become self-sufficient, they need expert's help in specialized health services. Production losses due to diseases and pests are immeasurable. They are perhaps one of the single largest factors coming in the way of production. Hence animal health planning is of paramount importance.

Gradually, a system of cost sharing is to be introduced for bearing the cost of drugs, some vaccines and small equipment such as castorator, knap-sack sprayer, etc. by the beneficiary farmers.

Disease investigation services by the government are to be improved and expanded. Basic diagnostic kits should to be devised for on the spot diagnosis. Supply of quality vaccines needs to be assured. A system of animal disease surveillance incorporating disease-wise epidemiological analysis culminating into a disease forecasting system may be devised.

3.1.2 Record Keeping (Format of keeping, transparency)

1) Principle

This management practice is very important, since most decisions in the farm are based on records. Record keeping usually accounts for the success or failure of the farm enterprises. Records should be simple, complete and accurate. Important criteria that should be recorded are: the livestock identification, production, reproduction and breeding, health, feeds and inventory.

Recorded information such as when to bred, when to dry off females, when to cull, when the animals are expected to birth, when to treat animals for certain diseases and abnormalities, etc. are valuable in daily management decisions. The regular monitoring of these parameters whether it be monthly, quarterly or annually allows the livestock raisers to determine the strength, weakness and profitability of the farm production.

The keeping of accurate records is essential for good management. This chapter explains the principles and offers suggestions, as there are many different record-keeping systems used.

To make the right decisions the farmer must have information. Records kept of all the livestock farmer's activities should provide this information.

Records, to be useful, must be neat, concise, accurate and complete. They should not include any guesswork or estimate, but should show actual weights, measurements, dates etc as the case may be. There is no point in keeping records which do not supply useful information to the farmer.

For an effective farm management, the types of records to keep are;

1. A clear picture of what has happened on the farm during the recording period; by comparing records made of one year with another, profits and progress may be assessed.
2. Information is necessary for planning farm operations, for budgeting for the best use of available resources, and for working out breeding programs.
3. A check on whether the farming operation is going according to plan.

4. Information which could be of great assistance when applying for loans from Government sources, commercial banks and co-operative societies.

2) Examples of livestock record book

These are neatly kept permanent records, and are used for evaluating breeding programs, and so on. The object is to have the whole of a female or male livestock record on one page or card, so that her history and progress are easily seen.

The system requires a large book which numbered pages or a card index system in numerical order. Each page should contain the following data at the top.

Livestock name, number, breed, and identification.

Livestock birth date

Sire's name, number

Dam's name, number

and then the livestock history in columns.

3) Production records

Production records should show for each animal or group of animals the total production achieved and the feeding stuffs and other materials used over the relevant period. A farmer who has even a small number of livestock should keep some record of the numbers on his farm from week to week, in order to check on thefts and losses. Records for different classes of livestock may be kept in one book, but should be shown separately.

BUCK RECORD

Owner:._____

Village:._____

Buck No, (Identification)._____ Origin:._____

	Birth date	Dam No.	Dam age	No. of kids	Weight (kg)	Remarks
1						
2						
3						

4) Inoculations, sickness and treatment records (including dipping)

It is good practice to record these on individual female pages in the case of livestock. However, a separate book should also be kept for routine inoculations such as FMD, CCPP etc, as these normally include all the livestock on the farm.

A record should be kept of the number of animals dipped on each dipping day.

RECORD OF TREATMENT

(Dipping, De-worming and Vaccination, Spraying, Injections, etc)

Date	Treatment	No. of Goats	Cash Payment	Remarks

5) Sales records and Produce used in the home

Many farmers use part of their production to feed themselves and

their families. This should be recorded separately from the sales account, but at the same values as if the food had been sold. This is in order to provide a true picture of the farm's production.

SALES RECORD

Date	No.of sold	Sex	Buyer (Auction)	Age	Price (Ksh)	Remarks

6) Efficiency standards and transparency

The purpose of keeping accounts and records is to improve the standard of management. There is little value in keeping records unless they are used for this purpose, and the standards achieved should be compared with results achieved on other farms or suggested by Government advisers. Comparing results and discussing problems with other farmers in similar circumstances are useful aids to better management.

A record book should be combined each record items together with visitors record to one book. Visitors are signed this visitor book and also he can see and check available to their several record items, so that this record transparency will be increased.

A farmer who uses records properly will be able to search out inefficiencies and weakness in his farming methods. It may be that he has an inefficient system that should be changed or that he would obtain better results by changing from one class of livestock to another.

3.1.3 Operation and Maintenance (O&M organization and costs)

1) Castrating

Male animals that are not intended to be kept for breeding should be castrated, preferably within a month. In fact, the earlier the better. In many ASAL areas, castration is carried out very late; often cattle are 3 – 4 years of age. Castration can be carried out with Burdizzo castrator. The Burdizzo method is the most suitable for animals. When the operation is performed by this method on young male animals that are about less than 3 month old it causes a minimum of pain or discomfort. The Burdizzo bloodless castrator makes the operation a comparatively safe one at all ages.

2) Choosing the foundation stock

The success of a livestock project will primarily depend on the kind and type of animals used as foundation stocks. Some breeds and strains of livestock raised under local condition are presented in Table 1.

Table 1 Some Breeds and Strains of Livestock in the ASAL areas

Ecological Zone	Cattle	Goats	Sheep
ASAL areas	Boran	Galla	Masai type
	Sahiwal	Galla & Boer cross	Somal sheep
	Local Zebu	Local goats	

Source. JICA Study Team 2001.

There are areas in many arid areas where camels could be cropped on a small scale. Even small schemes can be a valuable economic asset. There are some major regions in the ASAL areas

where camel cropping could, if properly organized, become an industry that would produce considerable supplies of meat and milk. Unfortunately, our study areas very few camels are founded, so that there is very little knowledge about camel husbandry. Please refer to Kenyan literature.

There is no shortage of stock. It is a fact that local animals are of poor stature, dressing out at a carcass weight of 10 – 16 kg, but they could be improved by crossing with a large sturdy improved breed such as Sahiwal or Boran (cattle) and Galla or Galla x Boer breed (goats) which is available from the Department of Agriculture, KARI and Goat Multiplication Center.

It is important to note that the more highly bred an animal is (through selection for production), the more sensitive it is to changes of environment and hard conditions. So that using a crossbred male such as Galla x Boer bucks is recommended.

3) Starting the livestock farming

Grades and native livestock breeds are more practical to start with.

Thorough inspection of herd males before buying is necessary. This often gives knowledge of the condition under which the animal was raised.

The important factors in choosing a herd are blood composition, constitution and vigor, breeding quality and aggressiveness. These males should be the heaviest in the herd, should be capable to transmit its good qualities to its progeny and should be active and always ready to breed a female that comes in heat.

On the other hand, females should be chosen based on milk production ability, reproductive capacity, dairy temperament and

motherly instinct. The udder should have plenty of capacity and well held up to the body by the suspension ligament. It should also be pliable, soft and balanced in shape with teats hanging at uniform length. The teat should be large enough for easy milking. If possible they should be slightly tilted forward.

The middle of the females should be long and the rib well-sprung, allowing for room for roughage. The floor of the chest should be wide enough for the front legs to be set apart.

For both males and females, large size, high feeding capacity, long life and fertility are desirable characteristics.

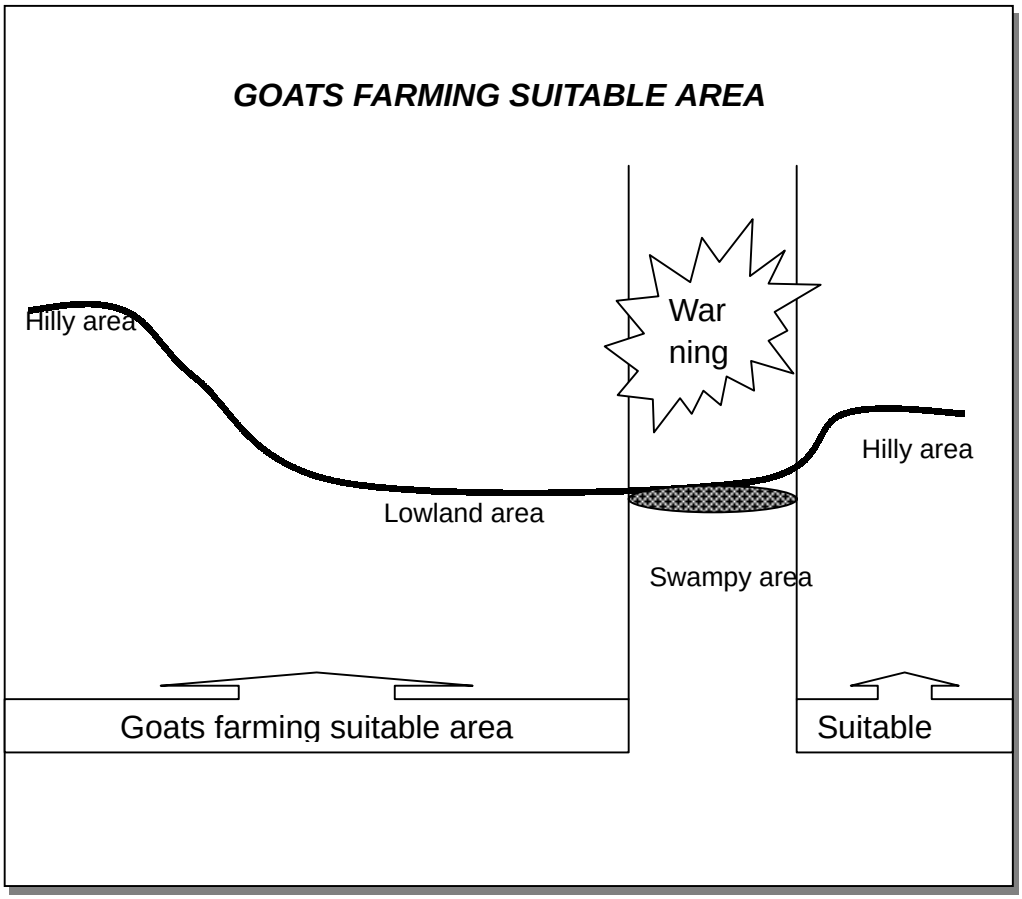
The score cards for does and bucks in appendices C & D will materially help in the selection process.

Records to guide selection and determination of age before purchase of stocks are still unavailable in the private farms in the country. However, age could be determined through dentition.

4) Suitable areas for goat farming

Most part of the dry zone are suitable for goat farming, particularly the ASAL area which are generally of no use for any other form of agriculture. The scrub jungle found in these areas provides the best fodder for goats.

Don’t grazed swampy or wet areas which is the dangerous zone for goats because of the worms and bacteria are exists and causes gastroenteritis or foot-rot.



5) Rear goats separate from cattle

Although goat farming does not call for much skill, there are certain problems that must be taken into account. The first of these is the common farmers mistake of running goats and cattle together largely because there is a scarcity of grazing ground. This practice exposes the goats to a serious disease known as “goat paralysis” etc.

Certain young worms that lodge in the brain and spinal code cause “Goat paralysis”. Consequently, there is a loss of motor power in the hind legs or in all four legs. The onset of the disease is

sometime dramatically sudden – a goat may be found on its side struggling to rise until it dies in a day or two, or more often the first sign is the unsteadiness of the limbs.

The adult stage of this worm is found in the abdominal cavity of cattle and is easily passed on to the goats with disastrous results although no harm is caused to the cattle. There is no treatment for paralysis. For these reason goats farming is best undertaken in areas that are unsuitable for cattle.

6) Wet-season care for goats

Goats thrives best under arid or semi-arid conditions, so that the wet season or wet area are always a dangerous time and zone for them from the point of view of two troublesome diseases viz., “gastroenteritis” caused by worms and “foot-rot” which is caused by bacteria.

All goats have worms. They live in the intestines and when mature lay eggs that are passed with the feces. If the ground is dry the weather is sunny the eggs are dries out and killed – very few survive to re-infest the goats. But in the rainy season or wet areas (such as swampy area) when the ground is wet and there is plenty of grass to shade the eggs, they survive in large numbers and re-infest the goats four days from the time that are deposited. This is why goats that have been quite healthy during the dry season or dry areas, specially the kids, suddenly become emaciated in the wet season or grazing wet zone despite the fact that plenty of pasture is available for feeding.

Control measure, therefore, should be affected as a routine drill during the wet season or not grazed swampy area, instead of waiting for the animals to fall sick before doing anything about it.

In as much as healthy animals suddenly become sick and emaciated in the wet season or grazed swampy area, because of worms, they may also go lame owing to bacterial infection of the hooves. During the dry season or grazed at dry area, the hooves are hard and dry and bacteria cannot get in easily. In the wet season or wet area, however, the hoof is soft and easily damaged and this facilities the entry of bacteria.

7) Housing for goats

Unlike in dairy farming elaborate houses are not necessary. The simplest shed (bomas) with simple roof is sufficient, provided it is dry and protected from draughts. A properly constructed thatched roof is perfectly watertight, provides very good insulation from both heat and cold and will last many years. Goats are particularly susceptible to pneumonia as a result of damp floors, bad ventilation and overcrowding. If the boma is swept out daily, it can remain clean and healthy for long time. The manure collected should be put on the shamba. Goat manure is a good fertilizer, but it takes a long time to break down in the soil, up to one year.

8) Dosing

Shoats need to be dosed at regular intervals with various remedies against worm and fluke infestations. All dosing and inoculation programs should be carried out in consultation with the local veterinary authorities.

9) Tick control (The dipping)

Ticks occur in all parts of the world, and on a global scale they are of even greater importance than the tsetse fly in the transmission of disease. They transmit many of the more serious viral and protozoan diseases found in the tropics, and their significance in

this respect is such that tick control is one of the first requirements for an efficient animal industry in most ASAL areas. It is thus essential for the livestock owner to be acquainted with the principles underlying tick control. Various measures such as grass-burning, cultivation of land and starvation have been recommended for the control of tick populations, but their destruction on the host by the application of chemical substances is still the most practical and effective method. Application is by dipping or spraying.

The law provides that no livestock shall be moved without a veterinary permit and all livestock shall be dipped prior to movement. A farmer is also obliged by law to dip or spray his animals as a routine. This should be done in most cases once every 7 days unless there is an outbreak of disease on the farm.

For satisfactory results it is necessary to maintain the dip wash at a constant strength. Precautions must therefore be taken to prevent storm-water from entering the tank from the drainage and entrance races. The stock owner should be conscious of this possibility, and he should see that formulation are not used below the recommended strength and should seek expert advice at once if he has any reason whatsoever to believe that his dipping is ineffective.

Thus, the risk of using under-strength solutions is avoided and the farmer can switch to hand spraying or hand dressing. Spraying is quicker than dipping and causes fewer disturbances to livestock.

Finally, it should be a appreciated by the livestock owner that the control of ticks is a complex undertaking, and in planning a program much thought must be given to such matters as the frequency of dipping or spraying, whether such treatment should be seasonal or continue throughout the year, the best formulation

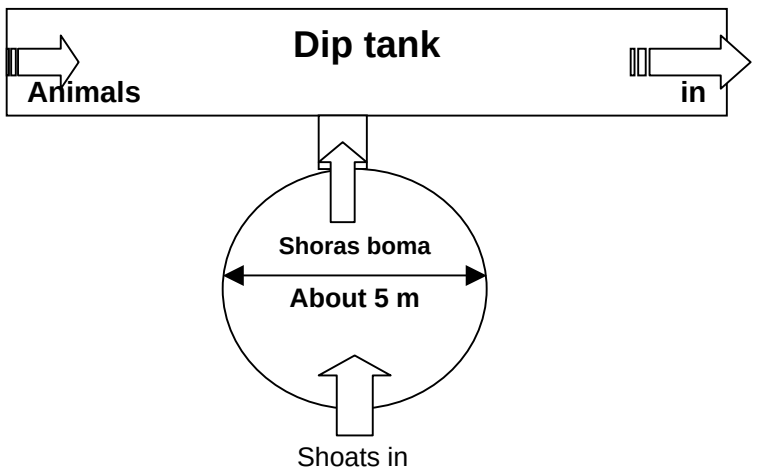
to use and the most suitable rate of application. Decisions depend on such considerations as the species and ecology of the ticks in the area and whether the purpose of the program is merely to reduce tick infestations on the host or to control tick-borne disease. Expert advice, which is generally available locally from Government, should be sought.

10) Dip collection (handling) yard for shoats (Shoats boma)

Before dipping, collecting yard for cattle is prepared for almost all dipping areas. However, dip collection yard for shoats (boma) are not established yet in most of the study area. That is why shoats dipping is some trouble to collect and dipping.

We (including counterparts) were designed special shoats collection yard (boma) at Arabal dip. This special designed shoats boma, the work to be done in the boma may take only a few seconds for each animal, such as sorting and dipping. The plan of yard designed to handle 120 head of shoats. This useful plan of special shoats collection yard (boma) are described and illustrated in detail as follows.

Plans of a shoats handling yard (boma)



Materials that are strong and that are seen to be strong are needed. Substantial swan timber, preferably hardwood or wire fencing, is satisfactory.

11) Hand spraying

For this operation, mainly used by small farmers, the following is the only equipment needed:

1. A simple V crush with two rails for cattle or boma for shoats to allow easy access to the animal.
2. A proper hand operated knap-sack sprayer, and
3. Acaricides.

First spray the animal's back, working through the whole length in zigzag fashion towards the head, then the sides and flanks. Next spray the brisket and all four legs in turn, then the belly, udder (or scrotum) and up to the tail which should be laid along the back whilst being sprayed. Finally, spray the head, neck and ears.

For tick control, now and environmentally more effective method are now available. Long duration tick injection, which can be applied on individual animals (Ivermectin injection) now exist, and these have a negligible environmental effect. More research is needed on the tick control systems.

12) Dairy goats in the ASAL area

There is some demand for dairy goats, but from available data on the milk production from dairy goats within the ASAL areas, this has not been a very successful exercise.

The main constraints are the lack of sufficient and suitable forage

to feed the dairy goat, scarcity of suitable stock, and lack of management knowledge. Also, heat stress, low nutritional levels, lack of water, no natural resistance to tick borne diseases, have all contributed to this problems. This solution will take time, but it is advisable, in that it will give the farmer experience in the breeding and management over a period time.

The dairy goat industry is still in its infancy. There is still attitude around where people think that a goat is a goat. Until this attitude changes, progress will slow.

13) Organizations

As most incremental improvements in small holder livestock production will come from the adoption of new production methods and the increased use of support services such as veterinary services, the establishment of the process by which these new approaches are identified and made appropriate for adoption by local farmers needs to be established.

The establishment of single purpose village based farmer groups who can work together and develop locally appropriate approaches for subsequent general farmer adoption, as part of a farming systems program, should be the first step.

Individual group member wants would be identified after a number of member visits to other farms and facilities (such as breeding stock multiplication center) which exemplify the various available development opportunities to the group, and the members had participated in carrying out a general analysis of their findings and conclusions after discussions with extension agents, traders, veterinarians and other relevant individuals.

It would be form these findings that a group livestock development

program would be formulated, and an implementation plan agreed upon and adopted including the role of the extension agent and other services providers.

The implementation and expansion of the smallholder livestock program requires the purchase of improved crossbred animals. Such animals cost about Ksh. 2,500 each (case of bucks). Most farmers in this program do not posses the necessary capital to purchase the animals. They, therefore, should be depend on cost-sharing within the groups and bear the expenses and share the use of breeding stock. Some of the useful equipment, such as castrator, knapsack sprayer, etc. are also applied cost-sharing systems within the groups.

Currently, most farmers purchase one or two breeding stocks to participate in livestock improvement program. If he lent money, the present efforts to develop the industry and particularly to utilize the improvement program as a means to uplift the rural poor could fail it the improved crossbred animal purchased by the farmer dies of disease or accident.

In such an event the farmer not only loses his animal but also a source of income. He therefore, is unable to repay the loan

In view of the above, it is considered that it would be desirable to evolve a form of cost-sharing and share the use of breeding stock.

Experience from on-going goat improvement projects, every custodians agreed this cost sharing and share the use of breeding stocks and results are satisfactory.

3.1.4 Establishment or Strengthening of Committee/association (assistance by FEW, Preparation of By-laws)

- Initiate a study tour in order to motivate the community and provide them with practical farmer to farmer lessons on benefits arising from use of improved practices
- Facilitate coming together of a modest group who are willing to pool resources in order to install livestock improvement facilities (dip, bucks, bulls, veterinary drugs etc)
- Assist the group in formulating relevant by-laws that will guide their co-operation in joint implementation, operation and maintenance their common facilities
- By-laws to include criteria for membership, members fees, management committee, meetings and elections, members rights and obligations, disciplinary framework

3.1.5 Disease Control

1) Tsetse fly control

When tsetse flies bite animals or humans, they transmit the disease of trypanosomosis. Tsetse flies can be controlled by preventing the spread of trypanosomosis. In the past, this has been done using various methods, including bush clearing and tall grasses clearing which remove their resting and breeding sites, or by spraying insecticides on their resting sites. Recently more environmentally friendly methods have been developed. These include traps and targets.

Tsetse fly control is more effective when community works collectively. This could be done through making or buying traps &

screens and servicing them all together. This can reduce the fly population. Farmers should contact their local veterinary officers. The officers may ask the farmers to contribute in certain ways as above indicated. It is important that the farmers follow officer's advice keenly.

2) FMD control

Livestock raising, especially cattle, is still village-based resulting in non-systematic movement for trading. Therefore, it is difficult to properly control the livestock movement. With the strict movement control, most of the livestock venders become impacted, causing a strong objection to cooperate with the Government.

Manpower shortage is also an unavoidable problem that the MOARD is now facing. As the Government currently limits the number of civil services; MOARD may have to hire village-based key men to work (on temporal basis) for certain jobs such as vaccination and animal movement control. It is also necessary to have cooperation with other authorities such as policemen, military officers, etc., to efficiency control the livestock movement.

In order to prevent the disease from spreading, it is very important to report suspected case immediately, so that vaccination on other cattle in the locality can be done as soon as possible. In order to control the FMD, there is a need to set up an information exchange network composed of concerned veterinary authorities with the emphasis on animal diseases and movement control and to set up a sub-regional level joint committee for the animal movement and disease control which meets regularly.

3) Anthrax control

There is no treatment for Anthrax. Should anthrax take place on a

farm, the area where the animal or animals died should be shut off for as long as possible with every trace of the carcass being burnt and the ashes being buried. One vaccination against anthrax protects animals for life, therefore the vaccination should be promoted.

3.2 Rained Agriculture

3.2.1 Manual on Stabilization of Rainfed Agriculture

1) Introduction

In semi-arid area, almost all land are covered by communal grazing land because water source of irrigation is very limited. The people depends upon the pastoral life, facing on crisis of severe land deterioration due to overgrazing and soil and water erosion. In this context the rainwater harvesting have to be promoted not only to have supplemental food production but also to change the pastoral land use to create sustainable agriculture with growing drought resistant crops and establishing pasture and agro-forestry.

2) Methodology

Rainfed agriculture relies on rainfall water to grow crops throughout all the stage, even though rainfall is limited to less than evaporation with a wide variation by year and month. The rainwater harvesting aims to have enough soil moisture to grow crops. Also soil and water conservation is required to stabilize rainfed agriculture. There is no single approach to stabilize rainfed agriculture , which can be adopted in all situations.

The main biophysical factor to be considered area rainwater harvesting, soil conservation and adoption of drought tolerant crop cultivation. Rainwater harvesting consists of two components, namely effective diversion of runoff from the external catchment and retention of diverted runoff water and conserved rainwater in soils. . By nature the available soil moisture is limited and unstable,

comparing to that in irrigation area. Therefore application of drought tolerant crop cultivation is indispensable

3) Procedure

a) Selection of Suitable Sites

Following points have to be taken into account to select suitable area with proper area size.

External Catchment Area

The ratio of catchment area to total cropping area(C:CA ratio) should be designed from crop water requirement, design rainfall, run-off efficient of the catchment area and efficient factor representing the proportions of harvested rainfall water through seepage and overflow. External catchment systems with the higher C:CA ratios (for instance 7:1) should be designed with spill way an check dams allow excess water to be discharged safely during heavy storms.

Farm Land

Farm land shall be manageable, taking into account construction of related structures and also operation and maintenance of rainwater harvesting systems collectively by group. The farm land shall have favorable soil property in terms of favorable infiltration capacity as well as retention capacity of water aside from the general physical and chemical soil properties. Also social aspects shall be taken into account, including land tenure system regarding collective activities for construction and operation and maintenance.

b) Designing of Rainwater Harvesting Structures

There are three kinds of major structures in rainwater harvesting systems, which are main diversion canal, lateral canals, spillway and check dams in the mainstream. The main diversion canal shall be designed to divert necessary amount of runoff discharge according to crop water requirement. “An Outline of Soil Conservation in Kenya” can be referred to design the runoff discharge as well as dimension of main diversion canal. The lateral canals may have conveying capacity of diversion water to distribution area.

c) Survey Works

Following survey works are required to design the rainwater harvesting structures as well as terrace structures.

- Survey on area and vegetation of catchment area
- Longitudinal and cross sectional survey of main diversion canal and lateral canals
- Topographic and area survey for terracing

d) Design of Terraces

Contour farming using runoff water from uncultivated land can be applied in the rainfed agriculture. Bench terraces is typical one in the contour farming to conserve soil and water. So called “Fanya Juu” terraces can be constructed to hasten the formation of a bench terrace by throwing the soil uphill. The ridges in Funya Juu terraces can be used to distribute the diverted water , when large discharge comes out. The small volume of diverted water can be distributed by small ditched which are constructed along the ridges.

e) Construction of Rainwater Harvesting Structure and Terraces

The engineering assistance may be provided regarding to survey works and designing and supervision to construct the rainwater harvesting system. The use of incentives or subsidizes in the form of food for works shall be avoided as it create dependency where the systems are likely abandoned once the assistance ends. The level of canal bed shall not be lower than the level of farm to distribute diverted water efficiently especially when the lateral canal distribute the diverted water to each plot.

f) Operation and Management of Rainwater Harvesting System

The operation and management of rainwater harvesting system may pay attention on the following points for the efficient rainwater harvesting.

- To receive as much large and stable runoff from catchment area
- To control the velocity of runoff discharge in the streams
- To divert proper amount of discharge and make spill away excess water
- To distribute diverted water efficiently and equitably to each block
- To spill away safely excess water at the tail of diversion canal

The above operation and maintenance works for the supply of stable soil moisture even though rainfall the limited and unreliable rainfall. Because that the volume of runoff discharge varies with wide range and it is difficult to manage in case of heavy rainfall, the

regular maintenance is indispensable. Also it is important to keep record on the volume and duration of runoff and the operation and maintenance activities

g) Drought Tolerant Crop Cultivation

Selection of Crop and Varieties

The drought tolerant and short maturing crop and varieties should be selected basically to stabilize rainfed agriculture. The seeds of early maturing drought resistant crops and varieties were collected from various source of seed supply, KARI, Prekerra and Katumani stations, International Crops Research Institute for the Semi-Arid Tropics(ICRISAT), the Kenya Seed Company(KSC) for the Partalo verification project. The farmers prefered to grow maize, finger millet, field bean, green gram, cowpea, and groundnut. Although sorghum and bulrush are tolerant about drought, farmers have less interest. One of the reason was that the these crops area easily damaged by birds. Among leguminous crops, pigeon pea were well accepted due to the drought tolerance and the palatability. The hybrid 513 maize can give high yield when enough soil moisture area available throughout the growth period. However, it is recommendable to grow drought more tolerant varieties under the rainfed condition. Among the drought tolerant varieties DLC I performed better production because it is also tolerant about diseases.

Cultivation Practices

Improvement of cultivation practices should focus on efficient use of limited soil moisture, which may include following measures;

- To make deep plowing
- To keep soil moisture in the deeper furrows

- To apply dry planting prior to on-set of rain (in case of maize 5cm depth)
- To apply mulching to suppress evaporation
- To apply inter cropping with leguminous crop to utilize the fixed nitrogen by legumes

3.2.2 Establishment or Strengthening of Committee/association (assistance by FEW, Preparation of By-laws)

- Facilitate a study tour to an area already practising Rain Fed Agriculture in order to motivate the community and provide them with practical farmer to farmer learning
- Facilitate a number of neighbouring farmers (not exceeding 30) to form a group that will pool efforts in installing water harvesting structures
- Facilitate formulation of group by-laws that will regulate the co-operation within the group particularly with regard to: turn-out for labour in excavating water channels; penalties for failing to attend communal labour; pooling cash resources for purchase of seed and other inputs; guarding crop against wild-life; desilting water channels and carrying out other maintenance activities

3.3 Irrigation

3.3.1 Manual on Water-Saved Irrigated Agriculture

1) Introduction

The water shortage in the irrigation area happens almost every years in the semi-arid area because the irrigation systems have very limited water resources. In the Sandai irrigation area, where verification project of “Participatory Water Management” was implemented, crops are irrigated with adequate water only long main canal in the upper stream of the irrigation area. The chronic water shortage occurs in more than 50 percent of the irrigation area. The current irrigation area has reached to 287ha(710 acres), equivalent to about 3.6 times of original command area and the irrigation area is still expanded year by year. These problems are observed in almost all other irrigation areas in the Study area. In order to solve these problems, the verification project of “Participatory Irrigation Management” included canal lining and construction of diversion boxes to improve water management with applying rotational irrigation, but the improvement of water management at on-farm level are required to increase irrigation efficiency as a total. This manual covers to the improvement of irrigation at on-farm level.

2) Methodology

In the Study area, the irrigation land has uneven topography, which causes taking much time in water distribution at plot level. So far as gravity irrigation is applied, land leveling is effective without decreasing crop yields. In the said verification project of “Water-Saved Irriigated Agriculture”, the irrigation time per week decreased by 51 % from 7.02 hour to 3.45 hours per acre because

irrigation time per acre as well as irrigation times per week are decreased. At the same time crop yield of maize was raised by 30 % due to timely and adequate irrigation to each hill.

Though not only participant farmers but also other farmers realized the necessity of water saved irrigated agriculture by applying land leveling, the result of the verification project has a problem of cost effectiveness. The verification project site has only in 3.6 ha, which is scattered into three locations, the upper, mid and lower areas of the irrigation system. The land leveling costs at Sh 5,200 per acre, which are equivalent to two times of custom based plowing price. The high cost is derived from three factors, namely the higher transportation cost of tractor and leveler for long distance from Marigat town to the site, the large size of leveler which is generaqlly suited to level such large scaled land as seen in the USA and scattered locations. It may be worth to make a trial to introduce such light leveler as animal driven lebeler, which area used in India with low leveling cost. Although any dradting animal is not yet used in the Study area, it is considered that there is a possibility to introduce animal use as seen in the Kitui area.

3) Procedure

a) Selection of Sites

In Egypt, the scraper type leveler is widely used. Generally the operation area of scraper typed leveler should be larger than more than 16 ha(20 acres) for the economical operation with plot size of lower than one acre The smaller operation area is applicable when animal driven typed leveler area will be introduced.

b) Designing of Rainwater Harvesting Structures

According to the data on uneven topographic condition in the Nile

delta, Egypt, the level of farm land varies from –7cm to +14 cm. The topographic survey was made in the verification area, which shows that most of plots have almost similar uneven topographic conditions. The uneven topography after leveling may be designed –5cm to +5cm tentatively, although the accuracy of land leveling should be increased up to +-3cm to +3cm for higher irrigation efficiency.

c) Survey Works

Topographic survey works was made required to estimate the uneven topographic condition before operation of land leveling in the said verification project, which may have spot elevation by100 sq. meter. However, actual land leveling operation can be made without topographic survey.

d) Operation of Land Leveling

In the verification project, a USA made land leveler was hired from KARI, Perkerra, which were driven by the tractor which has two hydraulic pressure hoses. The scraper typed leveler requires common tractor which has single hydraulic pressure hoses. Animal driven levelers may be operated in the smaller plots. Even in case mechanical land leveling is applied, The large plot with the size of more than one acre shall be divided into smaller plots, which make leveling smaller. Especially the smaller plot land leveling can be applied for animal driven leveler.

e) Cultivation Practices and Operation and Maintenance of Leveled Farm

The mechanical ridging is preferable to have the benefit of land leveling in uniform distribution of furrow irrigation. However, if the scraper typed leveler or animal driven leveler are applied the land

leveling is no so accurate and the mechanical leveling is not effective. The plowing operation shall be done to keep the level in the leveled farms by keeping plowing depth in the following seasons.

3.3.2 Establishment or Strengthening of Committee/association (assistance by FEW, Preparation of By-laws)

- Discuss with Community leaders (Chief, local elders) about arrangements for a meeting where the community can discuss their intentions on forming an self-hep irrigation group/association if one does not already exist
- Arrange a visit to an a successful farmer-managed irrigation scheme in order to stimulate build-up of motivation and confidence
- Facilitate drawing of irrigation group by-laws particularly on the role of management committee and other irrigation members, water allocation procedures including rotation schedule, membership and annual maintenance fees; penalties for infringing by-laws, annual general meeting and election of committee members
- Support follow-up training by front line extension officers of the Ministry of agriculture and Rural Development
- Pay special attention to record keeping (meetings, members' attendance during communal labour, received cash and disbursements etc)
- Encourage end-of-season community evaluation of irrigation project's performance and indication of remedial action

3.4 Small-Scale Industry Promotion

Since resources to stabilize major livelihood is limited in ASAL areas due to scant and erratic rainfall and limited natural resources, it is required to diversify people's way of living to survive in the area. Promotion of small-scale industry could be one of the options for it to stabilize their life. Followings are the items to be considered during the planning of the industry development.

3.4.1 Selection of Small-Scale Industry

When the industries to be improved or developed are selected, available resource, marketing and diversification should be considered.

1) Resource Assessment

Though the fundamental resources for the major activities such as water, fertile soil and vegetation are limited in ASAL areas, there should be some resources, which are specialized in dry area. For example, the areas where acacia trees are grown, high quality of honey could be harvested. Women from different ethnic groups might be producing very unique handicrafts that are preferred by tourists. On the other hand, the availability of concerned resources is also important in case of sharing them with another activities. Water, for example, is the most essential resource for any activity, so that the industry that consume big amount of water should not be introduced in the ASAL areas. Full utilization of existing and unique resources and great consideration on resource balance and environment condition are important.

2) Marketing

Since many people in the area have less chance to visit outside of their area where the big market exists, their mind tend to be self-centered, but not market-oriented. Therefore, it is necessary to shift their mind before selecting what to be promoted and how should it be improved. A study tour is one of the useful activities for the people to feel and realize what are the problems they have, what are the advantages or unique resources they have, what are the needs of customers, and how to improve their activities.

3) Diversification

After identifying existing valuable resources and their limitation, industries to be improved or developed in the target area will be identified. Since natural condition fluctuates sharply year-by-year, the resource utilized this year might not be available in the following year. In this regard, diversification of adopted industry should be considered, so that another activity could make up for the deficiency of the year. The relationship between rainfall and resource availability should be comprehensively studied and several number of activities, which would make well balance, should be selected to stabilize income.

For example, if the one doing farming selected the industries of B and C to promote, he/she has to endure great hardship during the drought year. Instead, Industry A would supplement the low crop production.

Activity	Heavy Rain	Drought
Agriculture and Livestock	↑	↓
Industry A	↓	↑
Industry B	↑	↓
Industry C	↑	↓

A Case in Baringo

Study Tour

During the verification period, two study tours were organized and that experience was an eye-opener to shift women's mind from self-centered to market-oriented. Selected women visited several souvenir shops and open market in Nairobi as well as the organization, which is assisting people in technical/marketing training and designing of products. Women used to claim about the lack of market and external problems were the reasons for their low income. However, they realized their internal problem and understood the necessity of improving their products after the study tour. As a result, they requested for the technical training to improve their skill in handicraft making and designing.

Diversification

Construction of a multipurpose building and promotion of three businesses, namely honey, handicraft and restaurant were selected as verification project at Kampi ya Samaki. Thought comprehensive resource assessment was not carried out, selected activities were somehow balanced. Fish is available even during the drought years unless the Lake dried up, while production of honey and some materials of handicraft become scarce. Instead of that, fish production after the drought year decreases due to over catch of the previous year, while other industries recover. These selected businesses could complement each other.

3.4.2 Strengthening of Committee/Association

The necessary activities to promote industries such as obtainment of working place, procurement of materials, information gatherings, are easier to work in a group base. If their interests are the same, existing organization is utilized, or new group could be established with highly motivated members. Followings are the activities to strengthen such organization to be formed.

- Facilitate a meeting where prospective members can discuss objectives of forming a small scale industry self help group and where they can elect an interim committee if one does not exist
- Arrange a learning visit to similar small-scale industries by a representative sample of group members
- Facilitate a meeting of the interim committee for formulating by-laws of the small scale industry group (membership qualifications, registration fees, business/ development contributions, election of management committees and its composition, annual and special general meeting, discipline, records and annual accounts etc)

3.4.3 Implementation of Trainings

After identifying the industry to be developed, technical as well as capacity building trainings are required. Training course should be basically selected by the target group instead of the provision of already prepared curriculum. After the training course, continuous, but ad-hock type of on-the-job training is indispensable to follow up the issues. Intermittent and long-term support provides people with some chances of try and error, and additional support at the right timing helps them remember and practice the obtained

knowledge.

A Case in Baringo

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 basically chosen by the Study Team, and many courses were quite effective, but some had a poor reputation. 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.

Training Courses Provided to the Women's Group

Date	Item	Trainer/Facilitator
April 2000	Leadership Training	Social Service
May 2000	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

3.4.4 Other Information

1) Refining Process of Honey

Following is the simple method to refine honey.

1) Soak crude honey in a warm bath (Do not heat crude honey directly)
2) Strain honey with a mesh cloth
3) Wait for one day until refined honey gets cold
4) Bottle refined honey to jars

Land Allotment from County Council

Following procedures are required for land allotment from the County Council.

Procedure of Land Allotment

Procedure	Amount (Ksh) *1
1. Submission of Application Letter (indicate purpose of land allotment)	-
2. Approved in Town Planning Committee Meeting	200
3. Issue of Allotment Letter from CC	-
4. Payment of Rental Fee	500*2
5. Site Planning	500
6. Submission of Application Form of Development	-
7. Submission of five (5) copies of Building Design	-
8. Survey of CC and approved	1,000
9. Construction of the building	-
10. Inspection of CC and Issue of Occupation Certificate	1,000

Note: *1 required amount is as of September 2001.
*2 Yearly collected

3.4.5 Establishment or Strengthening of Committee/association (assistance by FEW, Preparation of By-laws)

- Facilitate a meeting where prospective members can discuss objectives of forming a small scale industry self Help group and where they can elect an interim committee if one does not exist
- Arrange a learning visit to similar small-scale industries by a representative sample of group members
- Facilitate a meeting of the interim committee for formulating by-laws of the small scale industry group (membership qualifications, registration fees, business/ development contributions, election of management committees and its composition, annual and special general meeting, discipline, records and annual accounts etc)

3.5 Jiko

Due to the scarcity of wood resources in ASAL areas, fetching firewood is time-consuming work for women, and its condition is getting worth year by year due to population pressure. Most households in the area use a traditional three-stone fireplace for cooking. An improved cooking stove, therefore, can be installed to save energy and to fulfill many others. Enzaro Jiko, which can save a considerable amount of firewood and introduced by the Population Education Promotion Project in the model village Enzaro and expanded later to other areas, will be introduced in the followings as one of the alternatives to save firewood.

Followings are the advantages and disadvantages of the Enzaro Jiko. They will be explained to women before installing one.

Advantages

1. Materials are locally available
2. It can save a considerable amount of firewood (about two thirds are saved)
3. Water can be boiled since there are extra fireplaces
4. It can save cooking time as there are three fireplaces and create extra time
5. Food can be kept clean since cooking place is high
6. It can keep children away from fire
7. It can ease back pain since one can stand while preparing food.

Disadvantages

1. It cannot warm house since fireplace is not open
2. It cannot be moved to other place
3. It requires more space
4. It requires maintenance
5. And others?

3.5.1 Construction of Jiko

Followings are the guide to construct an Enzaro Jiko.

1) Materials

1. Mud (sticky soil such as anthill soil and clayey soil is appropriate)
2. Water
3. Stones/Bricks

2) Construction Procedure

1. Make the base with mud and stones. Prepare mud base first and stone/brick layer next. Build the base with these layers up to appropriate heights.
2. Prepare top fireplace with stones and cover with mud.
3. Smoothen the surface with mud.
4. Wait for a week or so. Cracks should be smeared with mud mixed with cow dung.
5. If it dries completely, one can start using it.

Setting Base with Soil

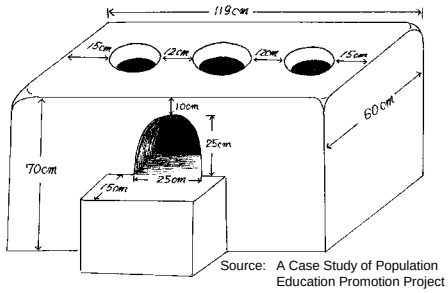
Prepare Stone Layer

Arrange Stones

Smearing and Completion

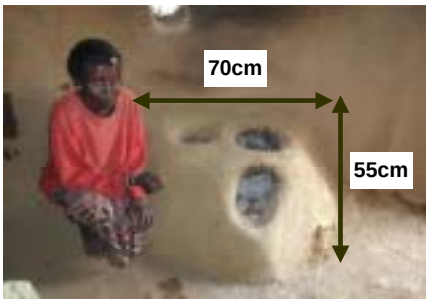
3) Notes

1. Keep a distance of at least 90cm from the ceiling to avoid a fire
2. If the owner does not have enough space to install full size of Enzaro Jiko, or has difficulties to prepare water to maintain, she can construct a small sized one as seen in the picture below.



Source: A Case Study of Population Education Promotion Project

Standard Size of Jiko



Small Size of Jiko (2 cooking places)

4) Maintenance

Enzaro Jiko requires regular maintenance, especially rim of the fireplaces, otherwise it starts cracking and falling down. Maintenance is done by smearing the Jiko with soil mixed with cow dung. Once-a-week maintenance is good enough for keeping the Jiko in sound condition. 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 ASAL areas. In very dry area, small sized Jiko, say modified Enzaro or Maendeleo type, should be explored.

3.5.2 Dissemination of Jiko

Following steps are recommended to disseminate Jikos.

1) 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.
2) 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. Individual or family based construction is also applicable.

3) 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.

4) 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.

A Case in Baringo: Promotion of Enzaro Jiko

Initially, four Enzaro Jiko were constructed by the experts from Vihiga District and three local women were trained as the Jiko expert. Then merry-go-round scheme was introduced to promote the improved Jiko. Training local women invited community members' jealousy, thereby the expert became regarded as a member or an agent of JICA. Community members 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. Merry-go-round 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. 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.

3.6 Pan Dam

3.6.1 Planning and designing of Pan Rehabilitation (Capacity estimation, Surveying)

Following items are needed to design the size and elevation of pan, to estimate the volume of excavation and to determine a method on earthwork.

- Plane table survey and cross section survey
- Soil survey for seeing how hard soil is

Dimensions, structures types of pan and implementing (rehabilitating) schedule are proposed by results of mentioned items taking into the consideration of existing pan size, numbers of community people to be able to participate to rehabilitation works and climate condition etc.

The drawing of outlet/well of rehabilitation of Lekiricha Pan is shown as Figure 3.6-1.

3.6.2 Establishment or Strengthening of Committee/Association (Association by FEW, Preparation of By-Law)

1) Formation of Pan Management Committee

The new committee for pan management is formulated with concerning representative persons among the participating villages. The each community use several criteria in selecting the committee members such as:

- Leadership qualities,
- Ability to reconcile with other community members,
- Possession of livestock

The pan management committee will deal with operation and maintenance works/schedule, preparation of By-Law, management of the tools for maintenance, making plan for conservation works of the pan basin and so on.

A Case in Baringo

Leadership Appreciated by Community

Compared with other parts of the Study Area, the Rugus community seems to rely more on the local chief, councilor, Kanu chairman and local primary school teachers in that order. Actually, the Chief has been very active mobilizing the community people. In other areas, the existing of the person who has strong leadership, such the Chief like here, implies that it has influence on infiltration and progress of the project for community people.

2) Strengthening of Pan Management Committee and Other Support Persons

There are two main ways of increasing the capacity of a community-based organization.

- Exposing the organization to challenging task
- Imparting knowledge and skills to key members of the organization

Both strategies are complementary and were used in strengthening both the Pan Management Committee and other support persons.

3) Preparation of By-Low

The pan management committee has to prepare the By-Low under the participation of community peoples. A Contents of the By-Low is supposed as follows; to make a plan of maintenance work schedule, to arrange organization structure of the pan committee, to determine how to levy the maintenance cost from villagers etc.

3.6.3 Implementation of Rehabilitation (Implementation methods)

Implementation methods, which is available whether manual and/or using machinery for excavation of sedimentation of main pan, should be determined through some trial because that excavation of main pan is a large part to carry out for rehabilitation working smoothly.

A Case in Baringo

Manual or Machine?

Excavation of Lekiricha Pan and its silt trap with 3,000 cu.m in volume was initially planned to do by manual work from 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. Furthermore, the community people were unused to handling tools for digging. such as shovels, mattocks and wheelbarrows, etc. supplied by the Study Team. This, however, indicates difficulty of sustainable maintenance by community only.

3.6.4 Operation and Maintenance (O&M organization and costs)

To rehabilitate and maintain the pan or some extent for any other project in the area, occasional assistance by outsiders as a way like food for work will be the significant way. This is because men have to take their livestocks far away during dry season, which is the suitable time for desilting. Accordingly, the pan management committee lost its function. It is therefore evaluated that the sustainable maintenance of the pan by the community seems very difficult.

A Case in Barinbo

Diversified activities of people lived in Semi-Arid

People in Rugus are far diversified in their living because of the harsh Semi-Arid conditions. Though the rehabilitation was once complemented, maintenance work has not been done and silting is again proceeding. Men disappeared from the village several time during the rehabilitation work and after finish the work for animal herding, farming, fishing, hunting etc. They are very busy for their survival life. People here have to be engaged in various activities. Therefore, to sustain the regular maintenance of pan by community themselves, periodical intervention and/or cost-sharing on heavy machinery by GOK/Donor will be needed.

The importance of role to be done by women

Traditional attitudes and cultural practices within the project area place women at a comparative disadvantage (limited education opportunities, early marriage etc.). consequently, at the time of planning session of pan rehabilitation, wamen tend to be passive and were content to follow men's lead. Women, however, had played an important role during implementation in such a way of contribution labor. Women had participated for fencing and grass planting and even for earthwork such as digging trench, moving soil etc., which basically should men's work. The lesson arising from this observation is that under the condition, women can effectively spearhead development activities. Project success is therefore likely to be enhanced if the latent energy of women is sought and harnessed. Gender issues should, therefore, be coordinated in the community-based project.

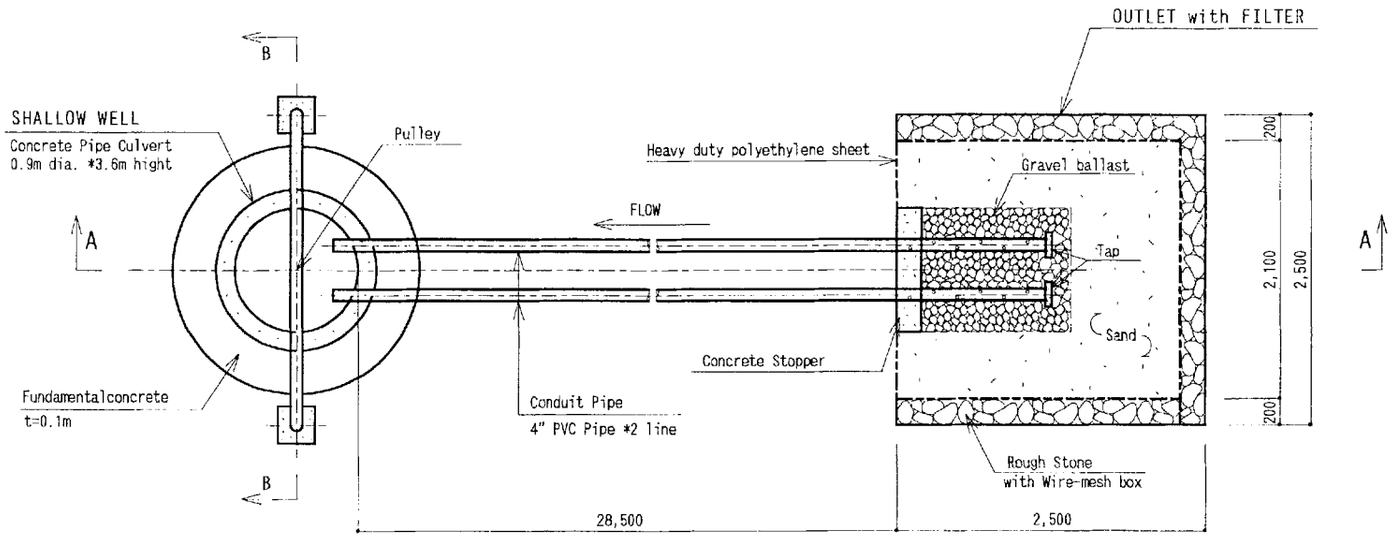
3.6.5Establishment or Strengthening of Committee/association (assistance by FEW, Preparation of By-laws)

- Facilitate meeting of Pan beneficiaries and encourage discussion on Pan objectives and problems
- If a committee does not already exist encourage community members to elect one taking care that those elected are representative of geographical coverage of the Pan
- Support committee members in formulating Pan by-laws which, among other things, should include: membership criteria, role of members and management committee, implementation procedures, operation maintenance guidelines, membership and user charges, penalties for

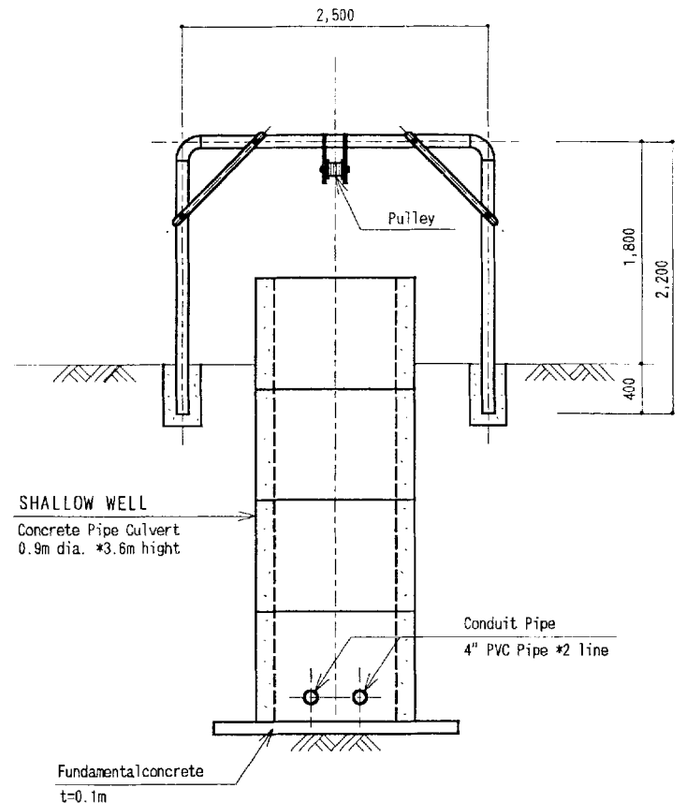
breaking by-laws, election of committee members, annual community evaluation of pan performance at general meeting

Figure 3.6-1 OUTLET and WELL WORKS of LEKRICHHA PAN

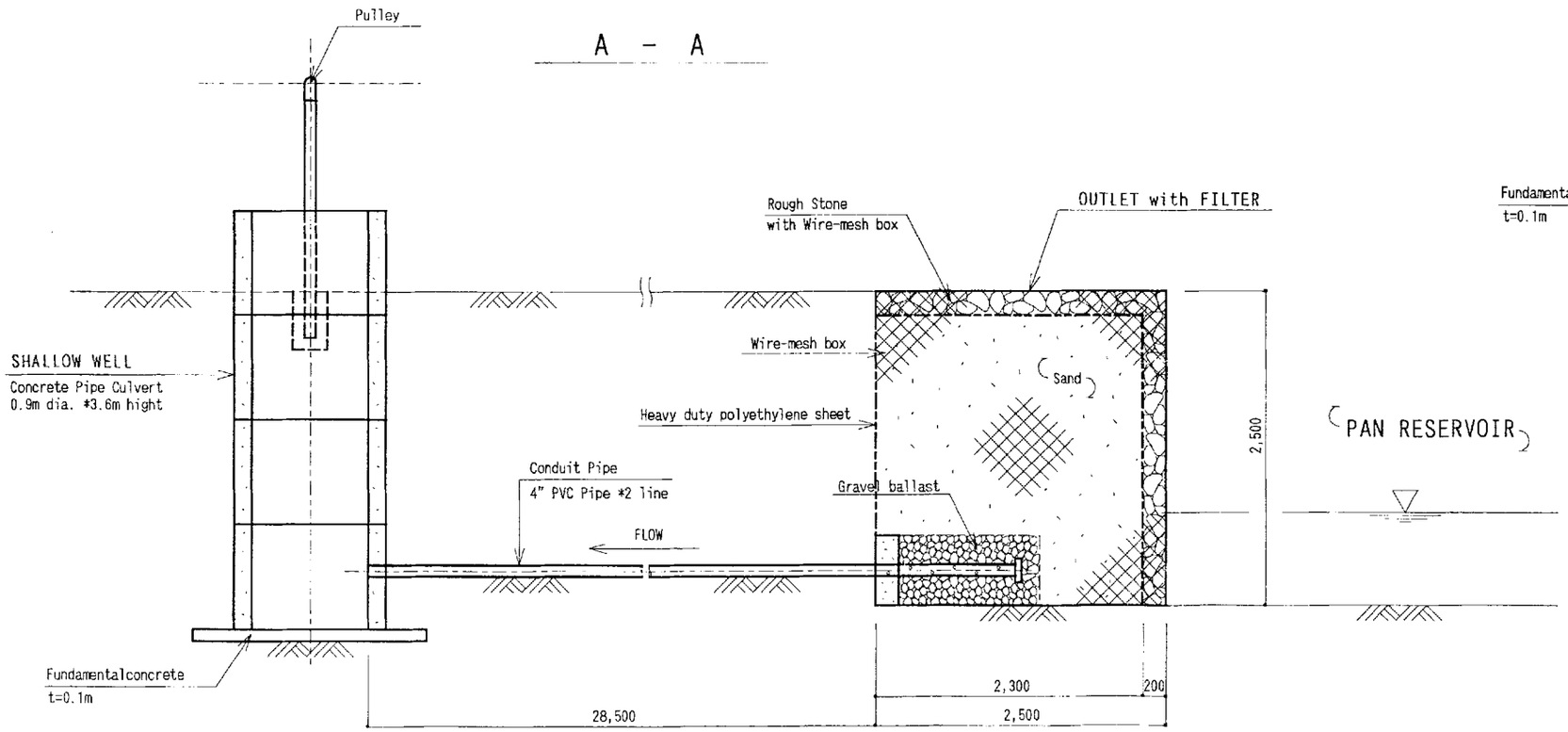
P L A N E



B - B



A - A



JAPAN INTERNATIONAL
CO-OPERATION
AGENCY

REPUBRIC OF KENYA
RIFT VALLEY PROVINCE
BARINGO DISTRICT

JICA STUDY TEAM
(SANYU CONSULTANTS INC.)

LEKIRICHA PAN REHABILITATION
OUTLET AND WELL WORKS

SCALE
1 / 50
All units in mill metres

Sura Ya 3 Mambo ya (Uagalizi wa) Kiufundi

3.1 Uimarishaji wa Mifugo

Sura hii imenufaika sana kutokana na nakala zilizotayarishwa na Shirika la Kimaendeleo ya Kimataifa ya Japan (JICA) kuhusu Miradi Ya Kujaribia (yaani Verification Projects) ya ustitawishaji wa mifugo. Pia waliochangia chanzo cha nakala hizi ni Maafisa wa kutoka ofisi ya Afya ya Mifugo huko Marigat and wakulima walioko nyanjani waliohusika na utekelezaji wa Miradi Ya Kujaribia (MYK).

3.1.1 Uchaguaji wa aina ya Mifugo

1) Kufinya (au Kufifisha Nguvu za Kiume Katika) Mifugo wa Kiume

Shida ile kubwa zaidi katika sehemu kame ni kuwa na asili mia kubwa ya mifugo wasiokuwa na mazao au wenye mazao duni/hafifu. Wanyama wa kiume wasiofuzu kuzaana wanafaa kufinywa. Mifugo wa kike wasioweza kuzaa ni kwa sababu ya shida ya kukosa nguvu za uzazi au kuwa tasa. Kwa hivyo makogamano maalum zinaweza kuandaliwa ili kutibu mifugo wa kike wasio na nguvu za uzazi ili kuwafanya wazaane. Pale inapokubalika kijamii, mifugo wa kiume wasioweza kazalisha wafaa wafinywe na kutumiwa kama chakula (nyama).

Kuna njia tofauti za kufinya mifugo wa kiume, zingine na za kale na sizizofaa kwa sababu maumivu mengi kwa mifugo. Kuvunjavunja au kusagasaga ule mshipa unapitisha nguvu za kiume (seminal cord) kwa mawe na kadhalika ni njia ambazo hazipaswi kutumika. Kutumia kisu lili kutoa nguvu za kiume za mifugo ni njia inayokubalika. Shida iliyoko ni kwamba kuna hatari kubwa ya kuambukizwa magonjwa ikiwa kisu au kifaa kingine kinachotumiwa si kisafi. Njia zile ambazo zinakubaliwa ni kutumika kifaa cha

kufinya kisichotoa damu (yaani ("Bundizzo bloodless castrator") kiitwacho Bundizzo. Ubora wa kufinya ni kwamba mifugo watanona haraka kuliko wale wengine kwa sababu hawatapoteza nguvu nyingi wakikimbizana na wale wa kike.

2) Kuinua Hali ya Mifugo wa Kienyeji kwa Kutumia Mifugo wa Hali ya Juu)

Ili kuinua kiwango cha idadi ya mifugo kutokana na kasoro yoyote inayotokana na aina hiyo ya mifugo, mifugo hao wanapaswa kufanyiwa wazaane na wengine wa aina nyingine ya hali ya juu wasio na kasoro hiyo. Kasoro zingine za mifugo hupitishwa kutoka kizazi kimoja hadi kingine na zingine hujitokeza polepole kwani kukua na kuendelea kwa kasoro hii kunategemea mazingira ambapo mifugo hawa wanakaa.

Wakati mifugo wasio na uhusiano wa kidamu wanazaana, hali hii huitwa "Upandishaji" yaani ("cross breeding"). Kizazi kinachotokea kitakuwa cha hali na sifa za juu bila kasoro zilizokuwa na wazazi wao na watakuwa na afya zaidi. Wale mifugo wanaozaliwa kupitia njia hii ya kuzalisha mifugo ya aina moja kutoka jamii tofauti huwa na sifa nzuri kushinda wazazi wao wote. Kizazi cha mbali kitakuwa na tofauti kubwa na wazazi wake kwa kila namna.

Vizazi vipya vinavyozaliwa hurithi sifa na tabia nzuri za wazazi wa asili huku wakijaribu kuepuka kasoro na hitalafu yoyote iliyo kuwa na wazai wao huku wakiwa na nguvu zaidi. Nguvu na sifa zanazotokana na kuzalishana kwa mifugo wasio wa jamii moja zinapotea haraka sana ikiwa mifugo wa jamii moja wataendelea kupandana na kuzaana. Kwa hivyo wazazi (wa kiume au wa kike) wengine wapya kutoka jamii hizi tofauti wanapaswa kubadilishwa mara kwa mara ili kudumisha kizazi kipya kizuri kisichokuwa na udhaifu au kasoro kama zile za wazazi wao.

Kuzalisha mifugo kwa njia ya "Upandishaji" kuna manufaa kwa wakulima wa sehemu zenye joto kwa njia tatu

Kwanza kizazi cha hali ya chini kinaweza kufanywa kuzaana na wale wa hali ya juu (yaani gredi) na kizazi kitakachotekea kufanywa kuzaana ili kuibuka na kizazi kingine kipya chenye sifa nzuri.

Pili, watu wanaweza kujaribu kuzalisha mifugo ya kiasili na wale hali ya juu au waliozaliwa kizazi cha pili au baadaye halafu kuchagua aina ya mnyama wanayetaka kupandisha wale wa kiasili.

Tatu, mifugo wa kiasili wa hali ya juu wanaweza kutumiwa kwa kupandisha na kuzalisha wale wa kiasili wa hali ya chini na kutoa mifugo wa hali ya juu.

3) Ufugaji wa mbuzi wapaswa kuzingatiwa.

Wa leo kuna upungufu wa nyama kwa sababu mifugo wanaofugwa kwa madhumuni ya nyama hawawezi kutosheleza mahitaji ya idadi ya watu nchini Kenya inayozidi kuogezeka.

Suluhisho lolote la shida hii ya nyama litachukua muda kwa sababu uimarishaji wa ngombe za kienyeji za nyama hutatizwa na ukosefu wa mifugo nzuri wa kupandishwa na kuzaana, ukosefu wa chakula cha mifugo na muda mrefu unaotakikana ili kuimarisha ngombe hawa na wakomae ukilinganisha na mifugo wale wengine.

Mbuzi ni muhimu sana hasa kwa ukulima mdogo kwa kuwa zinaweza kudumu na kuvumilia mazingara magumu. Mbuzi wa kienyeji/kiasili wanatoa nyama, wanastahimili mahali pakavu na si rahisi kupatwa na magonjwa. Mbuzi wengi wanafungwa kwa sababu wanatoa nyama hata katika mazingara agumu ambapo mifugo wale wengine wataona ugumu kuishi. Mbuzi hujipatia chakula chao wenyewe kwa kula majani ya miti na mimea midogo

midogo na nyasi ngumu inayokataliwa na ngombe na kondoo.

Mbuzi pia hula vyakula ambavyo vingieachwa viharibike kama vile wishwa (maganda ya mahindi) na vyakula vingine kama maganda ya viazi vitamu vyenye vitawasaidia kunona haraka.

Mbuzi wana manufaa zaidi kushinda mifugo wale wengine kwa sababu wanakua haraka, wana nguvu nyingi za uzazi, wanaweza kupata mapacha mara kwa mara na huchukua muda mchache kupata watoto wengine. Mbuzi wanaweza kuzaa baada ya miezi minane. Mbuzi wanatoa maziwa miezi mitano baada ya kupata mimba. Kizazi cha kwanza cha mbuzi kinaweza kuuzwa baada ya muda usiozidi mwaka mmoja.

Ongezeko la maziwa na nyama linasuluhisha shida zinazosababishwa na ukosefu wa chakula cha kujenga mwili (yaani "protein"). Kuzaana haraka kwa mbuzi kunasababisha ongezeko la maziwa na nyama baada ya muda mfupi.

Mwisho, nyama ya mbuzi inatamaniwa sana na wakenya wote pale ambapo ni chakula cha kitamaduni hupendwa zaidi kuliko nyama ya ngombe au ya kondoo. Hii ni kwa sababu ina nyama laini sana isiyo na mafuta mengi ikilinganishwa na ya ngombe na kondoo na pia ni kwa sababu ya sifa maalum ya nyama ya mbuzi ya juu kupita ya nyama ya kondoo. Nyama ya kondoo, pia, huwa na mafuta yaliotapakaa mwilini wote, ili mafuta ya mbuzi ikiwa tu katika sehemu chache, ina ulaini ulio sawa na rangi yake ni nyekundi kidogo kushinda ya kondoo.

Hapo awali kulikuwa na mtafaruku (hali ya kutofautiana) kuhusu dhamana ya mbuzi kwa sababu iliaminika wanafanya uhalifu mkubwa wa miti na mazingira - hasa katika sehemu kame - na hii ilidunisha matumizi yake ya chakula, maziwa na ngozi. Hata hivyo, kuna imani na mawazo mengine kwamba sifa baya za mbuzi si za

kimaumbile bali huletwa na uchungaji mbaya na ukiimarishwa, mbuzi wana faida nyingi katika maendeleo kilimo na ukuzaji wa chakula.

4) *Utunzaji wa Afya ya Wanyama*

Kutunza afya ya mifugo ni jambo la muhimu zaidi katika mipango ya ufugaji. Ijapokuwa wakulima hujifunza mbinu za uzalishaji, ulishaji na utunzaji kwa kujihusisha, hii huwapa ujuzi wa kujitegemea/kujisimamia na nyakati zingine wanahitaji huduma spesheli za afya za wataalamu. Mazao mengi hupotea kwa sababu ya magonjwa na baa. Haya ni baadhi za shida zinazowapata na kwa hivyo afya ya mifugo na maadalazi yake ni jambo muhimu sana.

Pole pole, mtindo wa kusaidiana utaundwa na wanaonufaika wa kugawa gharama ya malipo ya madawa, chanjo na vifaa kama kile cha kufinya mfugo wa kiume, cha kunyunyizia na kadhalika.

Huduma ya Kuchunguza magonjwa na serekali zitaimarishwa na kupanuliwa. Vifaa (Mashine) za kuchunguzia shida za magonjwa kidogo kidogo zafaa kutolewa kwa wakulima. Mipango ya kutoa chanjo bora inafaa kuhakikishiwa. Mbinu za kutambua na kuchunguza papo hapo pamoja na kutabiri magonjwa ya mifugo zinafaa kuwekwa.

3.1.2 Kuweka Rekodi
(Jinsi ya kuweka rekodi na Uangavu/Uajibikaji/)

1) Kanuni/Tarabiki

Jambo hili la kuweka rekodi ni la muhimu sana kwa sababu mambo mengi katika shamba huamuliwa yakitegemea rekodi hizi. Uwekaji wa rekodi unaonyesha kufaulu au kufifia kwa maendeleo pale

shambani. Rekodi zapaswa kuwa rahisi zenye kueleweka haraka, zimekamilika na zenye ukweli.

Mambo muhimu ambayo yanafaa kurekodiwa ni kama vile: Jinsi ya kutambulisha mifugo, mazao, uzalishaji, afya, vyakula na daftari (orodha) ya mambo yote pale shambani. Mambo mengine yaliyorekodiwa kama vile wakati wa kuzalisha mifugo, kuachicha dama kunyonya, kuondoa mifugo wazee, mifugo wanatarajiwa kuzaa, kutibu mifugo magonjwa fulani na udhaifu/kasoro zingine na kadhalika ni ya manufaa kwa uamuzi na utunzaji wa mifugo wa kila siku. Kufuatilia mambo haya kila mwezi, miezi mitatu au kila mwaka kunamwezesha mkulima kujua kufaulu kwake, udhaifu wake and faida ya mazao ya shamba lake.

Uwekaji wa rekodi sahihi unafaa sana kwa utunzaji bora. Sura hii inaeleza kanuni na inatoa mapendekezo kwa vile kuna njia nyingi tofauti za kuweka rekodi ambazo zinaweza kutumiwa.

Ili kukata shauri bora, mkulima anapaswa kuwa na habari yote kuhusu shamba lake.

Ili rekodi ziwe za kufaa, zinapaswa kuwa safi, taratibu, kamili, sahihi na za mambo ya kila siku. Rekodi haipaswi kuwa na mambo ya kukisia au kukadiria, lakini zionyesha kama vile uzani, vipimo, tarehe, idadi na kadhalika kulingana na kinachorekodiwa. Hakuna haja ya kuweka rekodi zisizotoa habari muhimu na za manufaa kwa mkulima.

Ili kutunza shamba vizuri, aina za rekodi zinazopaswa kuwekwa ni kama;

1. *Maelezo bora ya yale yaliotendeka shambani wakati wa kuweka rekodi hizo; kulinganisha rekodi ya mwaka mmoja na mwingine, faida na maendeleo yanaweza kulkadiriwa.*

2. *Habari ni muhimu katika kupanga miradi pale shambani na kukadiria matumizi ya pesa vizuri kulingana na mapato au rasilmali mkulima anayo na kufanya mipango ya kuzalisha mifugo.*

3. *Kupima na kuona kama kwamba miradi pale shambani inaendelea kama ilivyopangwa.*

4. *Habari muhimu inayohitajika wakati wa kuomba mikopo kutoka Serikali, mabenki ya kibiashara na ya ushirika.*

2) *Mifano ya Kitabu cha rekodi za mifugo*

Hizi ni rekodi safi za kudumu na zinatumiwa kuzingatia na kupanga mipango ya uzalishaji na kadhalika. Jambo la muhimu ni kuandika habari yote inayohusu mfugo awe ni wa kiume au kike katika ukurasa mmoja au cheti kimoja ili historia na meadeleo ya mfugo anayehusika itambulikane na inonekane kwa urahisi.

Jambo hili linahitaji kitabu kimoja kilichoandikwa kurasa au vyeti vilivyoandikwa nambari katika kila ukurasa. Nambari hizo zinapaswa kufuatana kutoka moja, mbili, tatu, n.k.

Kila ukurasa unapaswa kuwa na ujumbe ufuatao katika sehemu ya juu.

Jina la mfugo, nambari, aina/ukoo, na kitambulisho

Siku ya kuzaliwa kwa mfugo

Jina la mfugo wa Kiume (Beberu)

Jina la mfugo wa Kike (Mzazi)

na historia ya mfugo huyo katika fedwali.

3) Rekodi ya Uzalishaji

Rekodi za uzalishaji ziwe za kila mfugo au kikundi la mifugo na zionyeshe mazao yote kwa jumla na chakula wanachotumia katika muda fulani. Hata mkulima mwenye mifugo wachache anapaswa kuweka rekodi ya idadi na mazao ya mifugo shambani mwake kutoka juma moja hadi lingine ili kuchunguza mambo ya kupotea au wizi. Rekodi za mifugo tofauti zaweza kuwekwa katika kitabu kimoja lakini zapaswa kuonyeshwa (kuandikwa) kando.

<u>REKODI YA BEBERU (MBUZI WA KIUME WA KUPANDISHA)</u>
Jina la mwenyewe subngura huyo: ----------
Mahali anapokaa: ----------
Nambari ya Beberu (Kitambuslisho_____ Asili_____.

	Tarehe ya kuzaliwa	*Nambari yake*	*Umri wake*	*Idadi ya watoto wake*	*Kipimo (kg) (uzani)*	*Maoni*
1						
2						
3						

4) Rekodi za Chanjo, magonjwa na tiba (pamoja na kuchovya[1])

Ni hatua nzuri kuweka rekodi ya mifugo wa kike katika kurasa tofauti kila mmoja katika ukurasa wake. Hata hivyo kitabu tofauti chapaswa kuwekwa ili kuonyesha chanjo za magonjwa hatari ya mifugo kama vile Magonjwa ya Miguu na Midomo (Foot and Mouth Diseases – FMD), Magonjwa ya Mapafu/Mayavuyavu (Contagious

[1] ***Kuchovya ni kutumbukiza mnyama kwa kidimbwi chenye maji yaliochanganywa na dawa, yaani "dipping kwa Kiingereza.***

Calprine Preuro-Pneumonia – CCPP) na kadhalika kwani hii inahusu mifugo yote pale shambani.

Rekodi yapaswa kuwekwa ya idadi ya mifugo wanaochovyeshwa kila siku ya kuchovyesha.

REKODI YA TIBA (Kuchovyesha, Kuwapa dawa za minyoo, chanjo, kunyunyizia, kudunga sindano n.k.)

Tarehe	Tiba	Idadi ya mbuzi	Pesa zilizolipwa	Maoni

5) Rekodi ya Mazao ya Kuuza na Yayotumika nyumbani

Wakulima wengi hutumia baadhi ya mazao kujilisha wao wenyewe na familia zao. Hii inapaswa kurekodiwa kando na mazao yale ya kuuza lakini yapewe dhamani ionekane kama kwamba mazao yote yaliuzwa. Hii ni kuonyesha mazao sahihi ya shamba.

REKODI YA MAZAO (MAPATO BAADA) YA KUUZA

Tarehe	*Idadi (iliouzwa)*	*Dume au Kike*	*Mnunuzi (Mnada)*	*Umri*	*Bei (Ksh)*	*Maoni*

6) Kanuni Stadi na Uangavu/Uajikibaji

Madhumini ya kuweka rekodi hizi na hesabu ya pesa (zilizotumika) ni kuinua hali ya kujisimamia na kuendeleza shamba. Kuna maana kidogo sana ya kuweka rekodi kama hazitatumikwa kuhakikisha kuna maedeleo. Matokeo yanapopatikana yapaswa kulinganishwa na matokeo ya mashamba mengine ama vile Washauri wa Serikali wanavyosema. Kulinganisha matokeo na kujadiliana na wakulima wale wengine walio katika hali sawa kunasaidia sana katika kuinua usimamizi bora.

Kitabu cha rekodi kinapaswa kuambatanishwa kila kilichorekodiwa na rekodi ya wageni kwa kitabu kimoja. Wageni wanaweka sahihi na pia wanaweza kuona rekodi tofauti zilizoko ili kuendeleza uajibikaji.

Mkulima anayetumia rekodi zake inavyopasa ataweza kugundua upungufu na udhaifu katika njia zake za ukulima. Inawezekana kuwa anatumia njia zisisofaa zanazopaswa kugeauzwa au anaweza kupata mazao mema kupitia kubadilisha aina ya mifugo anayofuga na aina nyingine.

3.1.3 Utekelezaji na Udumishaji (Mpangilio wa Utekelezaji na Udumishaji na Gharama yake)

1) Kufinya (Kufifisha nguvu za kiume za Beberu)

Mifugo wa kiume wasiohitajika kufugwa kwa madhumini ya uzalishaji wanapaswa kufinywa ikiwezekana kwa muda usiozidi mwezi mmoja. Inakuwa vyema zaidi wanyama wakifinywa mapema. Katika sehemu nyingi kame ufinyaji unacheleweshwa sana; mara nyingi ngombe hufinywa wakiwa na umri wa miaka 3-4. Kufinya kunafanywa kwa kutumia kifaa kinachoitwa "birdizzo". Njia hii ndiyo inayofaa kwa mifugo. Wakati jambo hili linatekelezwa kwa kutumia njia hii kwa mifugo wachanga walio chini ya umri wa miezi mitatu inasababisha uchungu mchache. Kifaa hiki "Burdizzo" hakina hatari sana na ni sawa kwa umri wowote.

2) Kuchagua mifugo wa Kupandisha

Kufaulu kwa mradi wa ufugaji kunategemea sana aina na namna ya mifugo wanaotumiwa kupandisha na kuzalisha. Aina za mifugo zinazotakikana na kutumiwa katika mazingira ya kiasili inaoyoshwa katika jedwali hapa chini kama jedwali la kwanza (1)

Jedwali 1: Baadhi ya aina za mifugo katika sehemu kame

Mazingira/wanapo kuzwa/wanapoishi	*Ngombe*	*Mbuzi*	*Kondoo*
Sehemu Kame	*Borana.* *Sahiwal.* *Zebu za kiasili.*	*Galla.* *Mchanganyiko wa Galla na Boer.* *Mbuzi kiasili.*	*Aina ya kimasai* *Aina ya kisomali*

Chanzo za Habari: JICA Study Team 2001.

Kuna sehemu nyingi katika zile kavu ambapo ngamia wanaweza kufugwa kwa kiwango kidogo. Kuna baadhi ya sehemu kubwa ambapo ngamia wanaweza kufugwa ikiwa kuna mpangilio mzuri na kufaulu kuwa kiwanda cha kutoa kiasi fulani cha nyama na maziwa. Kwa bahati baya, sehemu yetu ya uchunguzi ina ngamia wachache sana na basi kuna elimu haba sana juu ya ufugaji wa ngamia.

Hakuna ukosefu wa mifugo. Ukweli ni kwamba mifugo wa kiasili wanalishwa na kutunzwa vibaya kiasi cha kwamba wakichinjwa wanakuwa na kilo kumi au kumi na sita (10-16kg) lakini uzito unaweza kuongezwa ikiwa watapandishwa na kuzalishwa na wale wa hali ya juu kama vile mifugo ya aina ya (sahiwal na galla) ama (galla X boer) ambao wanapatikana katika Idara ya Kilimo, KARI, na Kituo cha Uzalishaji wa Mbuzi (yaani Goat Multiplication Center).

Ni jambo la muhimu kuzigatia kwamba vile mfugo aliyezaliwa wa hali ya juu ndivya anaweza kuadhiriwa vibaya au anaweza kuvumilia vizuri katika mazingira na hali baya. Kwa hivyo ni beberu wa hali ya juu kama vile (gall x boer) inapendekezwa.

3) Kuanzisha Ufugaji

Mifugo wa gredi na wale wa kiasili ndio wazuri kuanza nao.

Ukaguzi kamili wa mifugo wa kiume ni muhimu kabla ya kuwanunua. Hii inapatia mtu kufahamu hali ya mazingira ambapo mifugo hao

wamekuzwa.

Mambo ya maana ya kuzingatia wakati mkulima anataka kuchagua mifugo wa kwanza ni aina ya mchanganyiko wa damu ya mifugo, uwezo na nguvu, sifa na uwezo wa kuvumilia magonjwa na mazingira makavu na uhodari. Beberu hawa wapaswa kuwa na uzito mwingi kushinda wale wengine, wapaswa kupitisha sifa zao nzuri kwa kizazi kipya watakaozaa, wapaswa kuwa hodari na kuwa tayari wakati wowote kuhudumia mfugo wa kike atakayekuwa katika hali ya kuandamwa.

Kwa upande mwingine, mbuzi wa kike wanapaswa kuchaguliwa kulingana na kiwango cha maziwa wanayotoa, vile wanaweza kuzaana haraka, kuwa na tabia na uwezo wa kukaa katika hali ya kutoa maziwa na pia kuwa mama. Kiwele (kifuko cha maziwa) kinapaswa kuwa kikubwa na kilichoshikilia vizuri mwilini, inapaswa kuwa laini moja. Chuchu za maziwa zanapaswa kuwa kubwa kiasi ili kuwezesha kukamua maziwa kwa urahisi. Ikiwezekana zinapaswa kuwa zaelea upande wa mbele kidogo.

Mwili wa mbuzi wa kike unapaswa kuwa mrefu katikati ukiwa na bavu zilizoachana kiasi ili kuwezesha kuwa na nafasi ya chakula anachokula. Upande wa kifuani anapaswa kuwa mpana ili kuwezesha miguu ya mbele kuwa mbali kidogo.

Kwa mbuzi wote wa kiume na wa kike, ukubwa wa mwili, uwezo wa kula vizuri, uwezo wa kuishi kwa muda mrefu na uwezo wa kuzaa wa hali ya juu ni mambo ya kutiliwa maanani.

Kadi za mbuzi wa kiume na wa kike ilioko katika jedwali la C na D zitaweza kusaidia sana katika uchaguzi wa mbuzi wazuri.

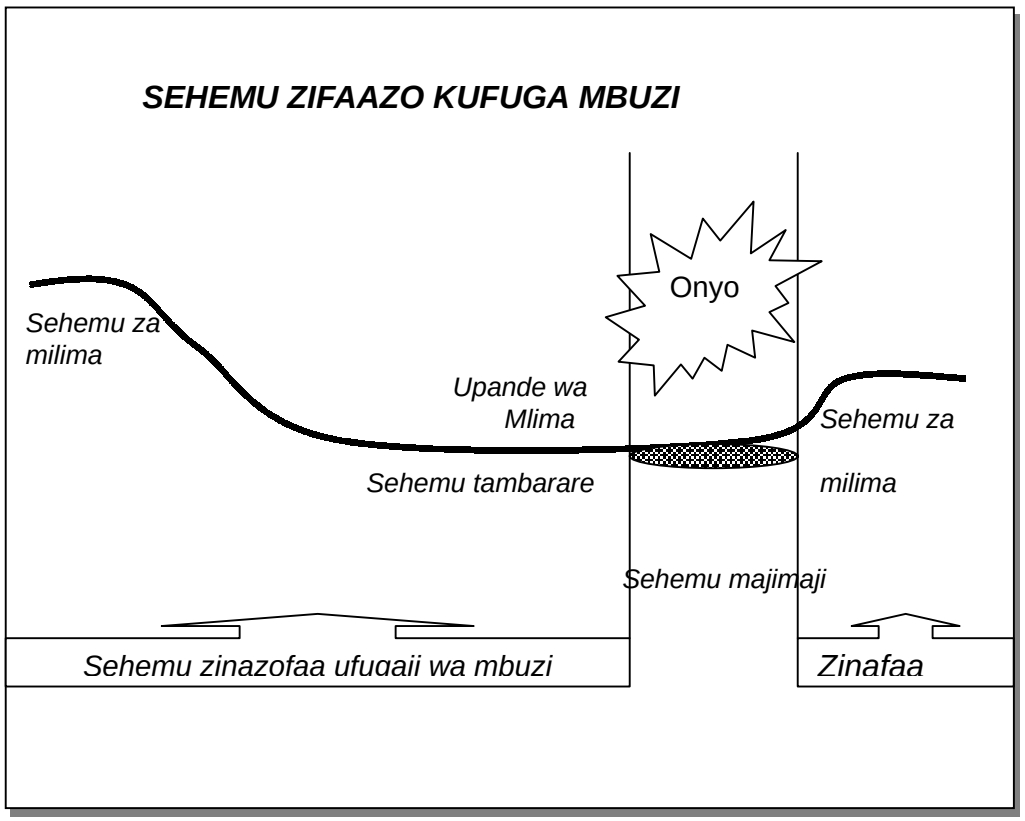
Rekodi za kusaidia kuchagua na kujua umri kabla ya kununua mifugo bado haziko katika mashamba ya kibinafsi nchini Kenya.

Hata hivyo umri wa mifugo unaweza kutambulika kwa kuangalia idadi ya meno ya mnyama.

4) Sehemu Zinazofaa kwa ufugaji wa mbuzi

Baadhi ya sehemu nyingi kame zinafaa sana kwa ufugaji wa mbuzi. Sehemu hizi mara nyingi haziwezi kutumika kwa shughuli zingine zozote za kilimo. Miti midogo inayokua katika sehemu hizi kavu inakuwa chakula kizuri zaidi kinachotumiwa na mbuzi.

Mbuzi wasilishwe sehemu zenye majimaji kwa sababu kuna hatari ya kushikwa na minyoo. Pia kuna vijimea (yaani bacteria) wanaovimbisha tumbo na mara na kuharisha (yaani gastroenteritis) au kuoza kwa miguu.



5) Fuga mbuzi kando na ngombe

Ijapokuwa ufugaji wa mbuzi hauhitaji ujuzi wa hali ya juu, kuna shida kadha wa kadha zinazofaa kutiliwa maanani. Shida moja kubwa ni kufuga ngombe na mbuzi pamoja kunakofanywa na wakulima wengi kwa sababu ya ukosefu wa sehemu za kulisha. Jambo hili linasababisha mbuzi na magonjwa makali kama vile kopooza kwa mbuzi (yaani goat paralysis).

Aina ya minyoo changa huenda kuishi katika akili au katika uti wa mgongo hivyo kusababisha ugonjwa huu wa kupooza. Wakati huo huo kuna udhaifu na ukosefu wa nguvu katika miguu ya nyuma au yote minne. Mara nyingine ugonjwa huu hutokea mara moja na mbuzi anapatikana amelala kwa upande mmoja akijikokota kujaribu kuinuka mpaka anakufa kwa muda wa siku moja au mbili, ama mara nyingi dalili ya ugonjwa huu ya kwanza ni kutokuwa na nguvu kwa mikono au miguu.

Hatua ya mwisho ya ugonjwa huu inapatikaka katika utumbo wa ngombe na huambukiziwa mbuzi ukiwa na matokeo mabaya ijapokuwa hakuna pigo lolote linalosababishwa kwa ngombe. Hakuna tiba ya ugonjwa huu. Kwa sababu hii ufugaji wa mbuzi unafaywa sehemu zile hazifai kwa ufugaji wa ngombe.

6) Utunzaji wa mbuzi wakati mvua

Mbuzi hukua vizuri katika sehemu kame na kavu. Kwa hivyo wakati wa mvua au kufuga mbuzi sehemu za unyevu huwa hatari sana kwa sababu husababisha magonjwa ya tumbo (gastroenteritis) unaoletwa na vijimea (bacteria) na ugonjwa wa kuoza miguu (foot-rot).

Mbuzi wana minyoo inayokaa kwa mara na minyoo wanapokomaa kiasi hutaga mayai yanayotoka pamoja na kinyesi. Ikiwa mahali

yanapoanguka ni pakavu na pana jua kali, mayai haya hukauka na kufa. Machache sana hukua kuambukiza mbuzi. Kunapokuwa na nyasi ndefu wakati wa mvua au kwenye sehemu za unyevu, mayai ya minyoo hukua kwa wingi na kuambukiza mbuzi siku nne baada ya kutagwa. Hii ndio sababu mbuzi walionekana kuwa na afya bora wakati wa kiangazi hubadilika na kuonekana wamekonda wakati wa mvua au analishwa sehemu za unyevunyevu hata kama kuna chakula kingi. Hali hii hasa hupata watoto wa mbuzi.

Njia ya kuzuia kwa hivyo ni, kuwatibu mbuzi nyakati za mvua au kutowalisha katika sehemu nyevunyevu badala ya kungojea mifugo wawe wagonjwa kabla ya kuchukua hatua yoyote.

Vile mifugo wenye afya bora wanaendelea kuwa wagonjwa na kukonda wakati wa mvua au kwa kulishwa katika sehemu nyevunyevu, kwa sababu ya vidudu, wanaweza kushindwa na kutembea au kulemaa miguu kutokana na ugonjwa wa kuoza kwato. Wakati wa kiangazi au kwa kulishwa sehemu kame, kwato huwa kavu na vijimea haviwezi kuingia ndani ya kwato kwa urahisi. Wakati wa mvua au lulisha sehemu nyevunyevu hufanya kwato kuwa nyororo na hivyo vijimea huingia ndani kwa urahisi.

7) Kujengea mbuzi

Nyumba maalum si lazima kama ilivyo katika ufugaji maziwa. Mbuzi wanahitaji vibanda (boma) rejareja muradi viwe vimekauka ndani, vyenye paa la kutosha kuzuia mvua na mvuto wa upepo. Kibanda kilichoezekwa vizuri huzuia maji, joto na baridi na kitadumu kwa miaka mingi. Mbuzi sana sana wanaungua homa ya mabafu (pneumonia) kwa sanbabu ya sakafu nyevunyevu, kukosa hewa ya kutosha na kujazanwa kwa wingi katika boma ndogo. Ikiwa boma (zizi) itafagiliwa kila siku, itakuwa ya safi na yenye afya kwa muda mrefu. Mbolea inayokusanywa inapaswa kuwekwa shambani. Mbolea ya mbuzi ni nzuri lakini inachukua muda mrefu kama mwaka

mmoja kuingiliana na mchanga mpaka.

8) Kunywesha Dawa

Mbuzi wanapaswa kupatiwa dawa mara kwa mara ili kuzuia minyoo na vijidudu vingine. Kunyweshwa dawa hizi na kupewa chanjo ni mambo yanayopaswa kutekelezwa kupitia kuwasiliana na Maafisa afya ya mifugo.

9) Kuzuia Kupe (Kuchovya)

Kupe huwa katika sehemu zote za dunia, kwa dunia nzima, kupe wanasambaza magonjwa kwa idadi kubwa ya mifugo kushinda mbung'o (tsetse fly). Wanasambaza magonjwa mengi hatari ya virusi na vitundu vya uhai (cells) katika nchi nyingi zenye joto. Kwa hivyo kuzuia kuenea kwa kupe ni jambo moja muhimu kwa ufugaji katika sehemu kame. Basi ni muhimu sana kwa mkulima kufahamu njia za kuzuia kupe. Kuchoma nyasi, kufyeka shamba na kutolisha zenye mbung'o ni mambo yanayopendekezwa ili kuzuia ongezeko la kupe, lakini kuwaangamiza kwa kutumia madawa ya kemikali ndiyo kuonafaa zaidi. Madawa haya yanatumiwa kwa kuchovya au kunyunyizia.

Sheria inaagiza kwamba hakuna mifugo watasafirishwa kutoka sehemu moja hadi nyingine bila kibali cha kutoka kwa serikali au ofisi ya afya ya mifugo, na kwamba mifugo wote warachovyeshwa kabla ya kusafirishwa. Mkulima pia anahitajika na sheria kunyunyizia mifugop wake dawa au kuwachovya mara kwa mara kama inavyotakiwa. Hii inapaswa kufanywa mara moja kwa (juma) siku saba kama hakuna magonjwa yaliotekea pale shambani.

Ili kupata matokeo ya kuridhisha, ni jambo la maana kuhakikisha kuna kiwango kinachofaa cha dawa katika chovyo (dip). Lapaswa kuhakikishiwa kwamba hakuna maji yasiotakikana yanaingia ndani

ya chovyokupitia kwa milango au mitaro ya nje. Mfugaji anapaswa kuzingatia hili kwani jambo hili linaweza kuotokea. Pia anapaswa kuangalia kwamba nguvu za dawa au kiasi cha dawa kinacho hitajika ndicho kimetumiwa. Akiwa na tashwishwi kwamba dawa anayotumia haifanyi kazi inavyotakikana anapaswa kufahamisha mtaalamu wa afya ya mifugo mara moja.

Hivyo matumizi ya dawa dhaifu ya chovyo yaepukwe na mkulima anaweza kubadilisha na kuanza kunyunyizia au kupaka dawa kwa mikono. Kunyunyizia huwa kunachukuwa muda mfupi kukilinanishwa na kuchovya hakusubuhi mifugo sana.

Mwisho inapaswa kueleweka na mkulima kwamba kuangamiza kupe si jambo rahisi na katika kupanga mradi wa aina hii, mambo yafuatayo yanapaswa kutiliwa maanani kama vile nyakati/mara mifugo wanavyonyunyiziwa au kuchovyeshwa, kama tiba hiyo yapaswa kutolewa mara chache au kwa mwaka mzima, njia ile nzuri zaidi ya kunyunyizia, kutumia na kuchanganya dawa. Uamuzi unategemea mambo kama vile aina ya mifugo, mazingira yale kupe hukulia na kama madhumini ya mradi huo ni kupunguza kupe tu kwa mifugo wanaoambukiza magonjwa ama ni kukinga magonjwa yanayoletwa na kupe.

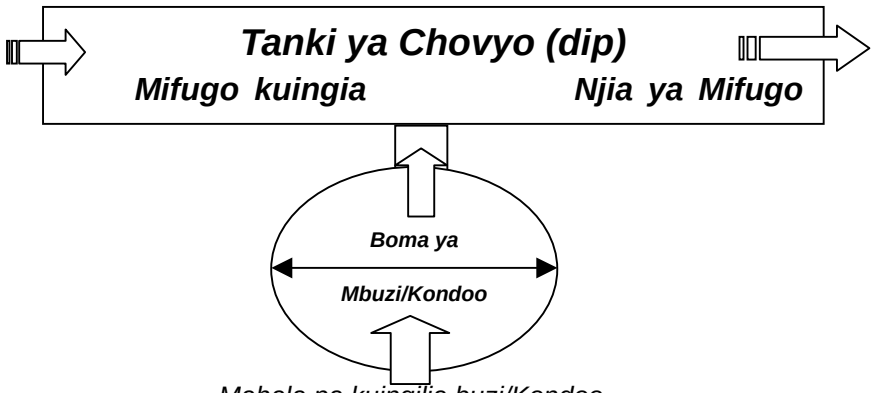
Ni vizuri kutafuta na kufuata mashauri ya wataalumu wa Serikalii walioko nyanjani.

10) Boma/Zizi ya Mbuzi/Kondoo kando ya Chovyo

Kabla ya kuchovya mifugo, boma/zizi la kukusanyia ngombe zinatengenezwa kila mahali kuna chovyo. Hata hivyo, boma/vibanda nyingi vya kukusanyia mbuzi/Kondoo hazijajengwa katika sehemu kubwa ya tarafa za Marigat na Mukutani. Hii ndiyo sababu inakuwa taabu kukusanya na kuchovya mbuzi/Kondoo.

Sisi (pamoja na wenzetu) tulibuni boma la mbuzi/Kondoo kando ya Chovyo huko Arabal. Boma hili liliyojengwa kwa ustadi na linawezesha kuchukua dakika chache sana kwa kila mnyama kuingizwa kwa chovyo. Boma pia linaweza kutumiwa na mbuzi/Kondoo 120 kwa wakati mmoja. Mchoro huu wa boma unaonyeshwa katika picha hapa chini.

Mchoro wa Boma ya kukusanyia Mbuzi/Kondoo



Mahala pa kuingilia buzi/Kondoo

Vifaa vya kujengea vizuri na vya kudumu vinahitajika. Mbao nyingi hasa mbao zile gumu na seng'enge zinazotumika kujenga ua (fence) zinafaa.

11) Kunyunyizia Dawa kwa Mikono

Vifuatavyo ndivyo vifaa vinavyohitajika kwa kunyunyizia dawa kwa mikono ambako kunafanywa na wakulima wadogo wadogo::

1. *Kibanda kilicho na umbo la herufi "V" kilicho na viambaza viwili kwa ngombe au boma kwa mbuzi/kondoo ili kuwezesha kufikia mnyama kwa haraka*
2. *Kifaa kizuri cha maji chenye mdomo cha kubebea mgongoni cha kunyunyuzia, na*
3. *Dawa za kuaa kupe (acaricides)*

Kwanza nyunyizia sehemu ya mgogo yote ukitumia mtindo wa zigizagi kuelekea kichwani pande zote, masikio na sehemu zile zingine. Fuatisha kunyunyizia sehemu inayoning'inia iliyo chini ya shingo, miguu yote minne moja baada ya mwingine, tena kwa tumbo, chuchu, na sehemu ya uzazi kwa mifugo wa kiume. Nyunyizia chini ya mkia, mwisho nyunyizia kichwa, shingo na masikio.

Ili kuzuia kupe, kuna njia zinazofaa kimazingira ambazo sasa zapatikana kama vile kudunga mfugo mmoja mmoja dawa ili kuzuia kupe (inermecctin injection), na hizi hazima madhara yeyote kwa mazingira. Uchunguzi mwingi unahitajika kuhusu njia za kuangamiza kupe.

12) Mbuzi wa maziwa katika sehemu kame

Kuna mahitaji ya mbuzi wa maziwa lakini kutokana na nakala zilizoko, utoaji wa maziwa ya mbuzi katika sehemu kame haujafaulu. Shida moja kubwa inayosababisha hili, ni ukosefu wa nyasi na majani ya kutosha kulisha mbuzi wa maziwa, ukosefu wa aina ile nzuri ya kutoa maziwa na kukosa ujuzi waa ufugaji na ukuzaji. Pia, kuwa na shida ya joto, chakula cha hali ya chini, ukosefu wa maji, ukosefu wa kinga asili dhidi ya magonjwa yanayoambukizwa na kupe, yote yamesababisha shida hii. Kutafuta suluhisho la shidahili kutachukua muda lakini mkulima anashauriwa kuendelea na kujaribu kwa vile atapata ujuzi wa ufugaji na utunzaji mwema kwa muda fulani.

Ufugaji wa mbuzi za maziwa bado ni changa. Kuna fikira (itikadi) kuwa mbuzi ni mbuzi na si wa kutoa maziwa. Ikiwa imani hii haitakwisha ukuzaji wa mbuzi za maziwa utaendelea kuwa wa hali ya chini.

13) Mipangilio

Kwa sababu mabadiliko makubwa ya wakulima wadogo wanaofuga mifugo yanatokana na kubadilisha njia zao za kiasili za ufugaji na kutumia sana ushauri wa wataalamu kama wale wa afya ya mifugo, kuwekwa kwa mpango ambao njia hizi mpya zinaweza kutambulika na kuhusishwa kwa wakulima walio nyajani kunapaswa kuanzishwa.

Hatua ya kwanza ya miradi ya kilimo ni kuibuka kwa vijiji vilivyo na vikundi vya wakulima wenye nia moja, wenye wanaweza kufanya kazi pamoja na kuanzisha mbinu za kiasili zinazoweza kusaidia na kufaidi mkulima wa kawaida.

Mahitaji ya mwanachama mmoja yatabainika baada ya huyo mwanachama kutembelea mashamba mengine kijijini na kwingine kama vituo vya uzalishaji wa mifugo (Breeding/Multiplication Centers). Matembezi haya husaidia kikundi kutambua uwezo wao wa kimaendeleo. Wanakikundi wanajihusisha kwa kufanya uchunguzi wa matokeo yao na uamuzi baada ya kujadiliana na watalaamu, maafisa walio nyajani, wanabiashara, maafisa wa afya ya mifugo na watu wengine waliohusika. Kutokana na matokeo haya, mradi wa ufugaji na uzalishaji unaweza kuundwa, na mpango wa kuutekeleza kukubaliwa pamoja na jukumu za maafisa walio nyanjani na waudumu wengine.

Utekelezaji na upanuzi wa wafugaji wadogo unahitaji uchaguzi wa kizazi kipya kilichoimarika. Mifugo hao wanauzwa kwa bei kama shilingi 2,500/= kila mmoja (beberu). Wakulima wengi katika mpango huu hawana pesa za kutosha kununua (wanyama) beberu. Kwa hivyo, wanapaswa kugawa bei hii kati yao wenyewe katika kikundi kwa kutoa malipo kidogo na kugawanya matumizi ya beberu kati yao ili kuzalisha mbuzi wa hali ya juu. Baadhi ya vifaa muhimu, kama vile “burdizzo”, kile cha kunyunyizia, n.k. zaweza kununuliwa

kwa njia ya kugawa gharama kwa kuchanga pesa kidogo kidogo kutoka kwa kila mwanachama wa kikundi.

Hivi sasa wakulima wananunua beberu mmoja au wawili kwa njia ya kukopa pesa ili kujihusisha na mradi wa kuimarisha mifugo. Mradi huu wa kuinua hali ya mapato kwa njia ya ufugaji unaweza kutofaulu ikiwa mnyama/wanyama watakufa kwa magonjwa au ajali na ikiwa pesa ya kununua beberu ilikuwa mkopo. Jambo hili likitokoe mkulima hapotezi tu mifugo wake na kukosa njia yake ya mapato, bali na hayo anashindwa kulipa mkopo.

Kwa hivyo ni vizuri kuwe na aina ya mpango wa kuchanga pesa kutoka kwa wakulima wafugaji. Pesa hizo zinanunua mbuzi (beberu) atakayetumiwa na wakulima wote kwa kuzalisha.

Katika miradi iliyoko ya kuimarisha mbuzi, kila mwekaji wa beberu alikubali kugawa gharama ya kununua beberu na kutumia pamoja na matokeo ilikuwa ya kuridhisha.

3.1.4 Kuanzisha au Kuimarisha Kamati/Halmashauri usaidizi kutoka kwa Maafisa wa Nyanjani (Uundaji wa sheria za Kuongoza Kikundi)

- *Anza na matembezi ya kimasomo ili kuwapa jamii motisha kusoma kutoka kwa mkulima hadi mwingine kuhusu manufaa yanayotokana na kutumia mbinu za kisasa za kilimo.*
- *Saidia kuunda kikundi, amapo wanakikundi wana ari ya kuleta rasilmali (vifaa na pesa) pamoja ili kuanzisha na kununua vifaa vya ufugaji (chovyo, beberu, fahali (ngombe), madawa ya magonjwa ya mifugo, n.k).*
- *Saidia kikundi kutunga na kuandika sheria za kuwaongoza wanakikundi katika kutekeleza kwa pamoja, kuendeleza na kudumisha vifaa na miradi ya kila siku.*

- *Sheria hizi zihusu jinsi ya kuwa mwanakikundi, kiwango cha pesa za kuwa mwanachama, kamati ya kuendeleza mambo chamani, mikutano na uchaguzi, haki za mwanachama na kazi yake chamani, na jinsi ya kudumisha adabu na adhabu chamani.*

3.1.5 Kukabili Magonjwa

1) Kukabili Mbungo

Mbungo anapouma mnyama au binadamu, huwapa ugonjwa wa "trypanosomiasis". Mbungo wanaweza kukabiliwa kwa kuzuia usambazaji wa "trypanosomiasis". Hapo awali, hii ilifanywa kwa kutumia njia mbalimbali, kama vile kukata misitu na nyasi ndefu, njia ambazo zilizondoa maeneo yao ya kukaa na kuzalishana., au kwa kunyunyiza madawa katika makazi yao. Hivi karibuni, njia bora kwa mazingira zimegunduliwa. Baadhi yao ni kutumia mitego na malengo.

Kukabili mbungo itafaulu vyema iwapo jamii nzima itajumuishwa katika hiyo shughuli. Hii inawezekana kwa kutengenza au kununua mitego, mizani na kuzihudumia kwa pamoja. Kwa kufanya hivyo, idadi ya mbungo inaweza kupunguzwa. Wakulima wanahitajika ku wasiliana na madaktari wao wa mifugo. Hao madaktari huenda wakawauliza wakulima kuchangia kwa njia fulani. Ni muhimu kwa wakulima kufuata mashauri ya madaktari wa mifugo kikamili.

2) Ugonjwa wa Miguu na Midomo

Ufugaji wa mifugo, hasa ng'ombe, bado hufanyika katika vijiji, jambo ambalo husababisha mienendo kwenye mauzo bila mpango maalum. Kwa hivyo, bado ni vigumu kukabili mienendo ya mifugo. Panapo udhibiti imara wa mienendo ya mifugo, wengi wa wafanya biashara wa mifugo huathirika, jambo linalosabibisha wao kupinga ushirikiana na serikali.

Upungufu wa wafanyakazi katika Wizara ya Kilimo na Maendeleo ya Mashambani (MOARD), ni jambo lisiloweza kuepukika. Serikali inapopunguza idadi ya maofisa wa serikali, itabidi wizara hiyo kuwaajiri vibarua kutoka vijijini kufanya baadhi ya kazi kama kupiga chanjo na ukaguzi wa usafirishaji wa mifugo. Vile vile, itakuwa muhimu kupata ushirikiano na idara ya polisi, jeshi na kadhalika, ili kuwezesha kudhibiti mienendo ya mifugo.

Ili kuzuia ugonjwa huu kuenea, ni muhimu kupiga ripoti ugonjwa unaposhukiwa, ili chanjo itolewe kwa mifugo mingine katika eneo hilo mara moja. Ili kupunguza kuenea kwa ugonjwa wa miguu na midomo, itahitajika kuunda mtando wa kubadilishana habari. Watakao jumuishwa kubadilishana habari ni maofisa wa mifugo wanaofahamu magonjwa ya wanyama na uthibiti wa mienendo. Vile vile, iundwe kamati ya pamoja katika nchi ya kuchunguza mienendo ya mifugo na kukabiliana na magonjwa, itakayokutana mara kwa mara.

3) Kukabili Kimete(Anthrax)

Hakuna tiba ya Kimete. Kimete ikitokea katika shamba, eneo ambalo mifugo hiyi imekufia, itahitajika kufungwa kwa mudaa mrefu iwezekanavyo, na kila kipande cha nyama hizo kikichomwa na kuzikwa. Chanjo moja dhidi ya Kimete hukinga mnyama kwa maisha. Kwa hiyo, chanjo inastahili kupewa umuhimu.

3.2 Kilimo Cha Mvua

3.2.1 Makala ya Kilimo kinachotegemea mvua

1) Utangulizi

Katika sehemu kame, karibu kila mahali pamefunikwa na sehemu za kufuga mifugo na jamii kwa jumla kwa sababu ya uhaba wa maji ya kunyunyizia. Watu hapa hutegemea ufugaji, kwa sababu ya kudhoofika kwa mchanga kunaosababishwa na mmonyoko wa udongo na kuweka mifugo wengi kupita kiasi. Maji ya mvua yafaa kuwekwa vizuri si tu kwa sababu ya kukuza chakula, bali na kubadilisha matumizi ya ardhi kutoka ufugaji hadi kilimo cha kudumu wakati wa ukame kwa kupanda mimea inayostahimili ukame na kuanzisha upandaji wa nyasi na miti mashambani.

2) Namna ya Kufanya

Kilimo cha mvua kinategemea maji ya mvua ili kupanda mazao wakati wote, ijapokuwa mvua inapungua kwa kiasi kikubwa kwa kukauka kutoka mwezi mmoja hadi mwingine, mwaka na mwingine. Maji haya ya mvua yanakusudiwa kuupa mchanga unyevunyevu wa kutosha wa kuwezesha mbegu/mimea kumea. Pia kuzuia mmonyoko wa udongo na maji ni muhimu ili kuwezesha maji ya mvua kutumika vizuri. Hakuna njia moja inayotegwa kuhifadhi na kutumia maji ya mvua katika kilimo hiki yenye inaweza kutumiwa katika hali zote.

Mambo ya kisayansi (biophysical) yana yofaa kuzingatiwa ni kukusanya maji ya mvua, kuzuia mmonyoko wa udongo na kukuza mimea inayostahimili ukame. Kukusanya kwa maji ya mvua kunahusu mambo mawili muhimu ambayo ni kupindua njia ya mtiririko wa maji kutoka eneo ya juu ya mtiririko wa maji na kuhifadhi na kudumisha maji haya yaingie mchangani. Kwa kawaida, unyenvunyevu ulioko mchangani ni kidogo kuotesha mbegu

ukilinganishwa na sehemu zilizonyunyizwa. Kwa hivyo matumizi ya mimea inayostahimili ukame hauwezi kuepukika.

3) Kanuni/Taratibu

a) Uchaguaji wa sehemu zifaazo

Hoja zifuatazo zafaa kutiliwa maanani katika kuchagua sehemu zinazofaa zenye nafasi nzuri.

Eneo la nje la mwinuka la maji

Sehemu itakayohusishwa (uhusiano wa eneo la maji na sehemu inayolimwa) inategemea mimea itakayopandwa, maji inayohitajika na mimea, kiasi ya maji ya mvua, maji inayotiririka kutosha sehemu inayokusudiwa kulimwa, mchanga unavyopenya maji na yale yanayotiririka kupita eneo inayolimwa.

Ikiwa sehemu ya eneo la maji ni kubwa mara 7 ikilinganishwa na sehemu inayolimwa, basi mtaro wa kutoa maji nje au kusimamisha maji wakati wa mvua nyingi utachimbwa ili kuzuia kuharibika kwa Fanya Juu/Fanya Chini.

Ardhi ya Kulima

Ardhi ya kulima inafaa kuwa linaweza kumudiwa, ukizingatia ujenzi mitaro (Fanya Juu/Chini) inayohitajika na jinsi ya kuhifadhi na kudumisha maji ya mvua. Ardhi hii pia iwe na vitu/mambo muhimu mchangani vinavyohitajika kama vile iwe upenyaji wa maji mzuri, uwezo wa kudumisha unyevunyevu bali na vitu vingine muhimu vya kemikali zinavyohitajika mchangani. Pia mambo mengine muhimu kama vile utumiaji na umilikaji wa ardhi/shamba unaoadhiri miradi ya jamii ya kujenga, kutekeleza na kudumisha.

b) Uundaji wa Miundo/Mitaro

Kuna aina tatu za miunda/mitaro ya kuifadhi maji ya mvua. Hii ni mtaro mkubwa wa kupindua mtiririko wa maji kuyaleta kwa shamba kulingana na mahitaji ya mimea; mitaro midogo ya kutoa maji kwa mtaro mkubwa na kuingiza kwa mitaro ya shamba (Fanya Juu/Chini); na mtaro wa kutoa maji yakiwa mengi kuliko yanayohitajika na kuyatoanje ya shamba au kidimbwi cha kuhifadhi hayo maji.

"An Outline of Soil Conservation in Kenya" yaani "Makala inayoeleza hali ya Kuhifadhi Mchanga Nchini Kenya" yaweza kuzingatiwa ili kuwezesha ujenzi wa mitaro ya kuondoa maji yasiohitajika kutoka mtaro kubwa. Mitaro mingine midogo midogo inaweza kuchimbwa kuelekeza maji shambani yanapohitajika

c) Kazi za Usorofea/Uchunguzi

Uchunguzi ufuatao unahitajika ili kuunda njia za uhifadhi maji ya mvua na pia matumizi ya mitaro

- *Uchunguzi wa sehemu husika, eneo lake na mimea iliyoko katika sehemu/eneo la maji.*
- *Kuangalia vipimo vya mtaro kubwa na vijitaro vidogo, urefu na upana kutoka juu mpaka chini, kutoka kushoto kwenda kulia.*
- *Hali ya sehemu hiyo kwa jumla kama (ni mlima, mteremko, tembarare, mawe, n.k) inaweza kuchimbwa mitaro.*

d) Muundo wa Mitaro

Ukulima wa kutumia maji ya mvua kutoka sehemu zisizolimwa unawezekana kwa kuzingatia hali ya mteremko. Miundo ya tembarare (bench terraces) ni kawaida na ya kufaa kuhifadhi udongo na maji. Fanya Juu zinaweza kuundwa zisaidie kuweko kwa miundo ya kutupa mchanga upande wa juu. Matuta ya Fanya

Juu yanaweza kutumiwa kutawanya maji kwa shamba wakati maji yanapokuwa mengi. Maji yakipunguka yatawanywe na mitaro midogo katikati ya matuta.

e) Ujenzi wa Miundo/Mitaro ya kukusanya maji ya mvua

Usaidizi wa elimu ya uhandisi katika kuchunguza, kubuni na kusimamia wa miundo/mitaro ya kuifadhi maji ya mvua vinaundwa unaweza kupatikana. Wanaokusudia kujenga hii miundo/mitaro hawapaswi kupatiwa chakula au pesa au aina zingine zenye mwelekeo huu ili kuepusha utegemeaji kwa sababu misaada hiyo ikikosekana miradi ya aina hii itasimama. Kina cha mitaro kisiwe kikubwa kushinda kile cha shamba lenyewe kwa sababu maji hayataingia kwa shamba.

f) Utekelezaji na utunzaji wa Mbinu Kukusanya Maji ya Mvua

Utekelezaji na utunzaji wa mbinu za kukusanya mvua unafaa kuzigatia mambo muhimu yafuatayo.

- *Kukusanya maji mengi inavyowezekana kutoka kwa sehemu ya eneo la maji.*
- *Kuzuia mbio za maji yanavyotiririka vijitoni.*
- *Kugeuza na kuweka kiasi cha maji kinavyohitajika na kuachilia kiasi kisichohitajika kutumika na kwenda kwingine.*
- *Kutawanya maji iliyoingizwa kutumia mitaro vizuri na kwa kiasi sawa katika kila shamba.*
- *Kwachilia maji iliyozidi kiasi mwishoni mwa mtaro ule mkubwa.*

Utekelezaji na utunzaji ulioelezewa hapa juu unawezasha mchanga kuwa na unyevunyevu wa kutosha ijapokjuwa wakati mwingine mvua huwa haba sana na isiyotosha. Kwa sababu maji ya mvua

inategemea kiasi kilichonyesha na pia wakati mwingine maji inayotokana na mvua nyingi haiwezi kuhifadhiwa, kutengeneza mitaro tena na kuitunza mara kwa mara ni jambo haliwezi kuepukika. Pia ni jambo la muhimu kuweka rekodi ya wingi wa maji haya, muda ambao maji yanatiririka chini na utekelezaji na utunzaji wa kazi tofauti za shamba.

g) Upandaji wa Mimea Inayostahimili Ukame

Uchaguzi wa mimea na aina zake

Mimea ya inayostahimili katika sehemu kame na ile inayokua haraka inafaa kutumiwa kwa kilimo kinacho tegemea maji ya mvua. Mbegu za mimea inayostahimili na kukua haraka katika sehemu kame ilikusanywa kutoka kutoka vituo vya kusambaza mbegu kama vile KARI, Perkerra na Katumani, kile cha Kimatiafa cha Uchunguzi wa Mimea ya Kukua katika Sehemu Kame na Nchi za Joto (yaani International Crop Reserach Institute for the Semi Arid Tropics (ICRISAT), Kampuni ya Mbegu ya Kenya (Kenya Seed Compnay) n.k. na kupandwa katika mradi wa Partalo. Wakulima walipendelea kupanda mahindi, mtama, maharagwe, ndegu, mbaazi na njugu karanga. Ijapokuwa wimbi/mawele na mtama zinaweza kustahimili ukame, wakulima hazipendelei sana. Sababu moja ya kutozipanda ni sababu zinavamiwa na kuliwa na ndege sana. Mbaazi walizipenda na zilifaulu kwa sababu hulika na pia hustahimili ukame. Aina mahindi ya Katumani (hybrid 513) inaweza kutoa mazao mengi wakati mchanga unapokuwa na unyevunyevu au mvua ya kutosha. Hata hivyo inapendekezwa kwamba mimea ambayo inastahimili ukame ipandwe katika miradi ya kutumia maji ya mvua. Kati ya mimea inayokua katika sehemu kame, aina iitwayo Dry Land Composite 1 (DLC 1) ilifanya vizuri kwa kuwa pia inastahimili magonjwa.

Desturi za Ukulima

Uimarishaji wa desturi za ukulima unapaswa kulenga matumizi bora

ya unyevunyevu ulio mchangani ambao unaweza kuhusu mambo yafuatayo:

- *Kuchimba sana na kulima chini ya mchanga*
- *Kudumisha unyevunyevu kwa mitaro iliyochimbwa kwa kimo kirefu kidogo chini ya mchanga.*
- *Kupanda wakati wa jkiangazi kabla mvua haijaanza kunyesha. (kwa mahindi sentimita tano kwenda chini).*
- *Kuweka nyasi na majani (mulching) ili kuzuia kutoweka kwa unyevunyevu kwa sababu ya jua kali.*
- *Kupanda mimea tofauti pamoja na mimea ya familia ya maharagwe katika sehemu moja ili kuhakikisha kwamba mbolea na aina zingine zenye manufaa zinazoletwa na maharagwe au familia hiyo inatumiwa na mimea mingine.*

3.2.2 Kuanzisha au Kuimarisha Kamati/Halmashauri usaidizi kutoka kwa Maafisa wa Nyanjani (Uundaji wa sheria za Kunngoza Kikundi)

- *Wawezeshe jamii kwenda safari/matembezi ya kimasomo katika sehemu ambayo tayari kilimo kinachotegemea maji ya mvua kinakuzwa ili kuwapa motisha na elimu kwa kufundishwa na wakulima wenzao.*
- *Wawezeshe wakulima walio katika sehemu jirani (wasiozidi 30) kuunda kikundi na wenye watakuja pamoja na kuunganisha juhudi zao kutengeneza mitaro/miundo ya kuzuia na kuhifadhi maji.*
- *Wezesha kikundi kuunda na kuandika sheria zitakazo waogoza na kuwaunganisha wanakikundi; hasa tunapoingia maswala ya kufanya kazi ya mikono ya kuchimba mitaro, kuchanga pesa za kununua mbegu na vifaa vile vingine vinavyotumika shambani, kuzuia mimea isiliwe na kuharibiwa na wanyama wa porini, kuchimbua mitaro ya maji na kutekeleza kazi zile zingine za pale shambani.*

3.3 Unyunyiziaji

3.3.1 Nakala kuhusu kilimo cha Unyunyiziaji Maji yakihifadhiwa

1) Utangulizi

Kuna uhaba wa maji ya kunyunyizia katika sehemu kame karibu kila mwaka kwa sababu miradi ya kunyunyuzia iliyoko sehemu hizi ina maji chache sana. Katika sehemu ya kunyunyizia ya Sandai, mahali ambapo mradiwa kujaribia wa kujihusisha katika utumiaji bora wa maji (yaani "Participatorty Water Management) ulitekelezwa, mimea inapata maji yakutosha ni ile imepanwa sehemu za juu na karibu na mtaro au mto. Ukosefu wa maji unatokea katika sehemu asili mia hamsini ya sehemu inayonyunyiziwa. Sehemu ambayo inanyunyiziwa sasa imefika hekari 287 ama (710 acres) sawa na mara 3.6 za sehemu asili na sehemu ya unyunyiziaji inapanuliwa kila mwaka baada ya mwingine. Shida hizi zinapatikana pia katika sehemu zile zingine zote za unyunyiziaji katika tarafa za Marigat na Mukutani. Ili kutatua shida hizi, mradi wa Sandai ulihusu ujenzi na kulkorogea saruji (kulainisha) mitaro na kujenga masanduku kwenye mitaro ya kutambaza maji ili kuinua hali ya kuhifadhi maji hasa kupitia kunyunyuzia kila sehemu wakati wake. Nakala hii inahusu uimarishaji wa unyunyiziaji katika kiwango cha shamba.

2) Namna ya Kunyunyizia

Katika sehemu ya uchunguzi, ardhi inayonyunyiziwa si laini. Ardhi ina miinuko, miteremko, n.k. na inachukua muda mrefu kusambaza maji katika shamba. Ikiwa kilimo cha unyunyiziaji kutumia maji yanayojiteremsha (gravity irrigation) kinatekelezwa, kusawazisha ardhi kunafaa ili kuongeza mazao. Katika kilimo cha aina hiyo ya kunyunyizia ili maji yakihifadhiwa, wakati wa kunyunyizia ulipunguka kwa asili mia hamsini na moja (51%) kwa juma mmoja (kutoka masaa 7.02 hadi masaa 3.45) kwa hekari kwa sababu wakati wa

kunyunyizia kwa hekari na idadi ya unyunyiziaji kwa juma moja pia hupunguka. Pia mavuno ya mahindi yaliongezeka kwa asili mia thelathini (30%) kwa sababu ya maji ya kutosha na kwa wakati unaofaa kwa kila tuta.

Si tu wakulima waliohusika na mradi huu bali pia wakulima wale wengine waligundua umuhimu wa maji yaliyohifadhiwa ya kunyunyizia mimea kwa kutandaza na kutambaza mchanga. Matokeo ya mradi huu pia yalileta shida ya kuwa na gharama ya juu. Mradi huu ni wa eneo la hekari 3.6 tu na uko katika kata tatu, upande wa juu, upande wa katikati na upande wa chini ya sehemu inayonyunyiziwa. Kutandaza na kumbaza mchanga ni shilingi 5,200 kwa hekari moja ambayo ni sawa na mara mbili ya gharama ya kulima kwa njia za kawaida. Bei hii ghali inatokana na mambo matatu ambayo ni bei ghali ya usarishaji wa trekta na mashine ya kutambaza mchanga kutoka mji wa Marigat mpaka sehemu ya mradi, umbo mkubwa wa mashine (chombo) ya kutambaza mchanga ambao kwa kawaida unafaa kwa kutambaza mchanga katika mashamba makubwa kama yale yanapatikana merikani na sehemu zingine. Inaweza kuwa jambo la busara kujaribu kutumia mashine nyepesi ya kutambaza mchanga kama ile inaofutwa na mnyama inayotumiwa India na ya gharama ya chini. Ijapokuwa hakuna mnyama wa kuvuta mashine hii anayetumiwa katika sehemu husika, inatarajiwa kwamba kuna uwezekano wa kuanza kutumia wanyama kama vile inavyoonekana katika sehemu za Kitui.

3) Kanuni/Utaratibu

a) Uchaguzi wa sehemu zinazofaa

Nchini Misri, aina ya mashini inayoitwa “Scraper” inatumiwa sana katika kutandaza na kutambaza mchanga mashambani. Sana sana sehemu inayotumiwa ya chombo hiki inapaswa kuwa kubwa zaidi

ya hekari 20 (16 hectares) ili kutumika vizuri. Ni hasara kutumia mashine hii kwa mashamba ya chini ya hekari moja. Inafaa basi kutumia mashine ya kutandaza na kutambaza mchanga ya kuvutwa na wanyama kwa sehemu ndogo.

b) Kuunda Mitaro/Miundo ya Kukusanya maji ya Mvua

Kiligana na habari ya sehemu isiyo tambarare katika mdomo wa mto Nile (Nile Delta) huko Misri, kipimo cha usawa wa ardhi kinatafautiana kutoka sentima -7 mpaka +14. Usorofea (chunguzi) wa ulaini/usawa wa ardhi ulifanywa katika sehemu za miradi ya kujaribia ukaonyesha kwamba mashamba mengi yana miinuko na miteremko. Sehemu isiyo laini/tembarare baada ya kutambazwa mchanga inaweza kutengenezwa sentima -5 mpaka +5, ijapokuwa kutambaza ardhi vizuri kunapaswa kuongezwa sentima + -3 hadi sentima +3 ili kuweza kunyunyizia vizuri.

c) Kazi Usorofea (Kuchunguza)

Uchunguzi ulifanya ili kujua umbo na hali (miteremko, miinuko, n.k.) ya ardhi ili kukadiria hali ya kutolainika kabla ya kutandaza na kutambza mchanga katika mradi wa kujaribia, yenyewe inaweza kuwa na eneo la mwinuko la mita 100 mraba. Hata hivyo, kutambaza shamba kunaweza kufanywa bila uchunguzi wowote wa ulaini wa ardhi.

d) Utekelezaji wa kutambaza Ardhi (Mashamba)

Katika mradi wa kujaribia, mashine ya kutambaza ilioundiwa huko merikani iliakodishwa kutoka KARI, Perkerra, kuvurutwa na trekta yenye mabmba mawili ya kupitishia maji kwa mshurutisho/mkazo. Aina ya mashine ya “scraper” ya kutambaza mchanga inahitaji trekta ya kawaida yenye bomba moja ya kupitishia maji kwa mkazo. Mashine za kuvutwa na wanyama zinaweza kutumiwa katika

kutambaza mchanga katika mashamba madogo. Hata pale mashamba ni makubwa zaidi ya hekari moja, yanaweza kugawanywa na kilimo cha kutandaza na kutambaza kutumika huku vyombo vinavyovutwa na wanyama vikitumiwa.

e) Desturi za Ukulima, Utekelezaji na Uhifadhi wa Ardhi (Mashamba) Yaliyotambazwa

Kutumia mashine kuchimba matuta/mitaro kunapendekezwa ili kuwezesha shamba inayotambazwa kuwa katika hali sawa ndio maji yapite katika njia za mitaro au katikati ya matuta. Hata hivyo, ujenzi wa mitaro/matuta kutumia mashine aina ya "Scraper" au inayovutwa na wanyama, ardhi utambazaji hautakuwa mzuri na matuta/mitaro haitasaidia. Wakati wa kulima na ngombe ihakikishiwe kuwa (kifaa) chombo cha kulima kinaenda na kuelekezwa chini ya mchanga /ardhi kama ule wakati mwingine uliopita.

3.3.2 Kuanzisha au Kuimarisha Kamati/Halmashauri usaidizi kutoka kwa Maafisa wa Nyanjani (Uundaji wa sheria za Kuongoza Kikundi)

- *machifu, viogozi wa mitaa) kuhusu mipango ya mkutano pale ambapo jamii wanaweza kujadiliana mambo ya kuunda kikundi cha ukullima wa unyunyiziaji cha kujisaidia wao wenyewe ikiwa hakuna kikundi tayari.*
- *Panga safari/matembezi ya kimasomo kwenda kuona miradi ya unyunyuziaji inayoongozwa na wakulima/mkulima ili kuwezesha kuwapa wakulima motisha na hali ya kujiamini wenyewe kwamba wanaweza kuumudu mradi kama huo.*
- *Saidia kuunda/kuzua sheria za kukiongoza kikundi chama hasa kuhusu kazi ya kila mwanakamati, wanachama wale wengine, jinsi ya kugawa maji, hali ya kunyunyizia kila sehemu kwa wakati wake, malipo ya uanachama na yale ya mwaka ya kutunza miradi, ada ya kuvunja sheria, mikutano ya mwaka na uchaguzi*

wa wanakamati

- *Saidia katika kufundisha wakulima kuyafuata mambo waliofunzwa na maafisa wa huduma walio nyanjani kutoka kwa idara za kilimo na huduma za jamii.*
- *Kutilia maanani uwekaji wa rekodi zinazohusu mikutano, idadi ya wanachama waliohudhuria mikutano, wakati wa jamii kufanya kazi pamoja, pesa zilizopatikana na jinsi zilivyotumiwa.*
- *Himiza jamii wazingatie baada ya kufanya kazi fulani ili kujidadisi kuona kama mradi wa unyunyiziaji unafaa kama ulivyotarajiwa au kuna mageuzi na marekebisho ambayo yanahitajika kufanywa.*

3.4 Kuimarisha/Kuinua Viwanda Vidogo Vidogo

Kwa vile rasilmali ya kuwezesha kujimudu kimaisha ni haba katika sehemu kame kwa sababu ya mvua kidogo na nadra na pia uhaba wa rasilmali za kaisili, tunapswa kuzua njia zingine za uwezekano wa watu wanaokaa katika sehemu hizi kuishi. Kumarisha viwanda vidog vidogo kunaweza kuwa moja katika baadhi ya zingine nyingi za kujisaidia. Yafuatayo ni mambo ya kuzingatia wakati wa kupanga maendeleo viwanda.

3.4.1 Uchaguzi wa Viwanda Vidogo Vidogo

Wakati viwanda vya kuimarishwa au kuendelezwa vimechanguliwa, mambo kama vile rasilmali ilioko, hali ya masoko na upanuzi wa bidhaa yanafaa kufikiriwa.

1) Utambuzi wa/Makadirio ya Rasilmali

Ijapokuwa rasilmali zile muhimu kama vile maji, mchanga wenye rotuba na uoto (mimea) ni haba katika sehemu kame, kuna rasilmali zile zinapatikana katika sehemu kame. Kwa mfano, mahali ambapo miti ya aina ya mkakaya (yaani "acacia") humea kwa wingi, kiasi kingi cha asali kinaweza kuvunwa. Akina mama kutoka sehemu tofauti wanaweza kuwa wakitegeneza vitu vizuri vya dhamani wakitumia mikono yao vyenye vinaweza kuuziwa na kutumiwa na watalii. Kwa upande ule mwingine kuwepo kwa rasilmali zinazotumika kwa haja au wakati tofauti ni vizuri ili kusaidiana wakati wa upungufu wa aina moja au nyingine. Maji, kwa mfano, ni rasilmali muhimu kwa kazi nyingi. Kwa hivyo, mradi ambao utatumia maji mengi haupaswi kuanzishwa katika sehemu hizi kame. Matumizi kikamilifu ya rasilmali zilizoko, uzingatifu wa kukadirisha rasilmali hizi na hali ya mazingira ni mambo ya muhimu kuzingatia.

2) Uuzaji/Hali ya Masoko

Kwa vile watu wengi katika sehemu hizi hawana nafasi ya kutembea nje ya kwao kule masoko makubwa yako, mawazo yao mara nyingi huwa yanajikita tu na hali ya pale nyumbani na wao hawaoni maana ya kuuza bidhaa zao nje. Kwa hivyo inafaa wabadilishe mawazo yao kabla ya kuchagua watachoimarisha wauze na jinsi ya kukiimarisha. Kutembelea viwanda vidogo vidogo ni baadhi ya njia moja ya kuwawezesha watu kujua taabu/matatizo yao, rasilmali zao za kipekee, kinachowafaa, mahitaji ya wateja na jinsi ya kuimarisha miradi yao wenyewe

3) Upanuzi (wa Miradi/Bidhaa)

Baada ya kugundua rasilmali za dhamani zilizoko na uhaba wa hizi rasilmali, viwanda vitakavyoimarishwa au kuendelezwa katika sehemu husika (tarafa za Marigat na Mukutani) zinatambuliwa. Kwa vile hali ya anga inabadilika kutoka mwaka mmoja hadi mwingine, rasilmali zilizotumika mwaka huu huenda zikakosekana mwaka unaofuata. Kwa hivyo upanuzi wa viwanda na matumizi kwa njia nyingine wakati rasilmali aina fulani inapokosekana unafaa kuzingatiwa ndio kiwanda kitumike kila wakati. Uhusiano ulioko kati wa kuweko kwa mvua na kuwepo kwa rasilmali zingine kunapaswa kuchunguzwa na kazi nzingine mbalimbali ambazo zitaendeleza viwanda ili kuhakikisha kuna mapato wakati wote.

Kama mkulima, kwa mfano, anayefanya kilimo amechagua viwanda B na C ili kuziimarisha, atapata taabu/hasara kubwa wakati wa ukame. Kiwanda A kingemsaidia kuinua mazao/mapato ya chini ya kilimo.

Mradi	*Mvua nyingi*	*Ukame*
Kilimo na Ufugaji	↑	↓
Kiwanda A	↓	↑
Kiwanda B	↑	↓
Kiwanda C	↑	↓

Uchunguzi uliofanywa huko Baringo

Matembezi ya Kijifunza

Wakati wa (uchunguzi) kutekeleza miradi ya kujaribia, sfari mbili za kimasomo zilifanywa, na elimu waliopata akina mama iliwazidua kugeuza mawazo yao kutoka kwa kutegemea vitu vya kutumia nyumbani hadi uzalishaji wa kupeleka masoko. Kina mama waliochaguliwa walitembelea masoko na maduka ya vifaa vya kumbukumbu na masoko ya nje huko Nairobi pamoja na vile yanaadaliwa, ambako kunawasaidia watu kuunda bidhaa za kiufundi au uuzaji. Akina mama walikuwa wanalalamikia kuhusu ukosefu wa masoko na shida zinazotoka nje kuwa ndivyo vikwazo vya mapato yao haba/duni. Hata hivyo walikuja kugundua shida zao za kindani na kuelewa umuhimu wa kuimarisha bidhaa zao baada ya safari hizi. Kutokana na hayo, waliomba wapatiwe mafundisho ya kiufundi ili kujaribu kuimarisha ujuzi wao na katika kuunda na kutengeneza bidhaa (finyango ama vitu kwa kutumia mikono) zao.

Upanuzi (wa Viwanda/Bidhaa/Mapato/Mazao)

Kujenga jengo la kazi mbalimbali (Multipurpose building) na kuimarisha biashara tatu za asali, sanaa (kazi za mikono) na hoteli/mkahawa zilichaguliwa katika mradi wa Kampi ya Samaki. Ingawa makadirio kamili ya rasilmali hayakufanywa, kazi mbalimbali zilionekana kwenda sambamba na katika hali ya kupendeza. Samaki hupatikana hata wakati wa ukame kama ziwa halijakauka wakati uvunaji wa asali na malighaji (materials) ya vifaa vya sanaa zinapokuwa haba. Badala ya hivyo, uvuaji wa samaki hupunguka baada ya ukame kutokana na uvuaji kupita kiasi mwaka uliotangulia huku viwanda vile vingine vinaanza kunawiri. Wakati ambao hakuna samaki ufugaji wa nyuki na uundaji wa sanaa hutoa mapato/mazao. Miradi hii mitatu iliyochaguliwa inaweza kusaidiana na kuinuana kwa nyakati ngumu.

3.4.2 Kustawisha Kamati/Halmashauri

Mambo ya muhimu katika kuimarisha viwanda kama vile kupata pahali kufanyia kazi, kununua vifaa vya kuunda bidhaa, kukusanya habari vinaweza kufanywa vizuri ikiwa vinafanywa na watu katika kikundi. Ikiwa matamanio yao ni sawa, muungano au shirika lilioko au kikundi kingine kinaweza kuundwa kikiwa na wanakikundi walio na motisha nyingi. Yafuatoayo ni mambo muhimu ya kufuata hili kuimarisha kikundi hiki.

- *Wezesha kufanyika kwa mkutano pale ambapo wanachama watajadiliana madhumuni ya kuungana na kuanzisha kiwanda kidogo cha kujisaidia wao wenyewe na pale ambapo*

watachagua kamati ya muda kama moja haiko.

- *Panga safari ya wawakilishi ya kujifunza na watembelee viwanda vodogo vidogo.*
- *Wezesha wanakamati kukutana ili kuzua/kuunda sheria za kuongoza wanachama wa kikundi. Sheria zihusu kufaulu kuwa mawnachama, ada ya kuwa mawanachama, michango ya kuendeleza mradi, uchaguzi wa wanakamati wakusimamia kikundi, mchanganyiko wa wanakamati, mikutano ya mwaka na ile mingine ya muhimu, adabu na adhabu za wanachama, rekodi, na hesabu ya pesa, n.k.*

3.4.3 Utekelezaji wa Mafunzo

Baada ya kutambua kiwanda kitakachoendelezwa, mafundisho ya wanachama na ya kiufundi yanahitajika. Mafunzo yanapaswa kuchagulkiwa na kikundi husika badala ya kuchaguliwa na wataalamu au watu wengine. Baada ya mafunzo haya ya kitaalamu, mafunzo mengine hayaepukiki wakati wa kutekeleza kazi. Usaidizi wa muda mrefu unawapa watu nafasi ya kujaribu kufaulu au kutofaulu. Usaidizi zaidi wakati ufaao husaidia watu kukumbuka na kujaribu ujuzi waliopata.

Mfano huko Baringo

Wakati wa kutekeleza mradi wa kujaribia, mfululizo wa mafunzo ya uongozi, ujuzi wa kibiashara, uwekaji wa rekodi, ujuzi wa kazi za sanaa n.k. ulitolewa kwa vikundi vya Akina mama. Kwa mara nyigni, kilichokuwa kikifundishwa au wakufunzi walichaguliwa na kikundi kilichokuwa kinafanya uchunguzi (Study Team), na mafunzo mengi yalikuwa ya faida sana, lakini mengine yaliwuwa na sifa baya. Ingawa gharama ya mafunzo ilisimamiwa na Shirika la JICA, walioudhuria wangejitafutia mkufunzi (mwalimu) au angao wangechagua kutoka kwa orodha.

Mafunzo yaliyipewa Kikundi cha akina Mama

Tarehe	*Mafunzo/Funzo/Somo*	*Mkufunzi*
Aprili 2000	*Mafunzo ya uongozi*	*Huduma ya Jamii*
Mei 2000	*Usimamzi wa Mapato/Pesa*	*Mtalaamu(Consultant)*
	Elimu ya Kibiashara	*Mshauri/Mtaalamu*
Juni 2000	*Uongozi/Usimamizi kwa jumla*	*Mshauri/Mtaalamu*
Julai 2000	*Utengenezaji/Utayarishi wa samaki*	*Idara ya Uvuvi*
Agosti 2000	*Kuengenezaji/Kuchunja asali*	*Mshauri/Mtaalamu*
Novemba 2000	*Sanaa/Kazi za Mikono*	*Mshauri/Mtaalamu*
Decemba 2000	*Ujuzi wa kibiashara*	*Huduma ya Jamii*
Februari 2001	*Kukadiria pesa/rasilmali*	*Kikundi cha JICA cha Uchunguzi*
Mei 2001	*Mafunzo kuhusu uchaguzi*	*Huduma ya Jamii*

3.4.4 Habari Nyinginezo

1) Njia ya Kusafisha/Kukamua Asali

Ifuatayo ni njia rahisi ya kusafisha na kukamua asali.

1. *Tumbukiza mkebe wa asali mbichi ndani ya mkebe wenye maji moto (Usitie moto moja kwa moja asali mbichi).*

2. *Chunja asali na kitambaa kisafi*

3. *Ngojea kwa siku moja ili asali iliyochunjwa iwe baridi*

4. *Weka asali iliyochunjwa na safi kwa chupa.*

Taratibu za Kupewa Ardhi (plot) na Baraza la Jimbo (County Council)

Utaratibu	*Kiasi cha pesa (Ksh)* [*1]
1. Kutuma barua ya maombi, (onyesha sababu ya kuhitajiardhi hii)	*-*
2. Kukubaliwa na Kamati ya Mipango ya Mji	*200*
3. Kupeanwa kwa barua ya ugawaji kutoka kwa Baraza la Jimbo	*-*
4. Malipo ya upangaji (rental Fee)	*500*[*2]
5. Mpangilio wa pahali husika (plot)	*500*
6. Kutuma maombi ya Kusitawisha ardhi/plot	*-*
7. Utoaji wa nakala tano ya jinsi mjengo utakavyojengwa	*-*
8. Usorofea (survey) na kibali cha Mbaraza la Jimbo	*1,000*
9. Ujenzi wa mjengo	*-*
10. Ukaguzi na Mbaraza la Jimbo na kupewa cheti cha umiliki	*1,000*

*Taubiki: *1 Kiasi kinachotakikana kulipwa (Septemba 2001)*

*Taubiki: *2 Kiasi kinachotakikana kulipwa kila mwaka*

3.4.5 Kuanzisha na Kuimarisha Kamati/Shirika Usaidizi Kutoka kwa Maafisa wa huduma nyanjani, (Uundaji wa Sheria za kuongoza Kikundi)

- *Wezesha kufanyika kwa mkutano pale ambapo wanachama watajadiliana madhumuni ya kuungana na kuanzisha kiwanda kidogo cha kujisaidia wao wenyewe na pale ambapo watachagua kamati ya muda kama moja haiko.*
- *Panga safari ya wawakilishi ya kujifunza na watembelee viwanda vodogo vidogo.*
- *Wezesha wanakamati kukutana ili kuzua/kuunda sheria za kuongoza wanachama wa kikundi. Sheria zihusu kufaulu kuwa mawnachama, ada ya kuwa mawanachama, michango ya kuendeleza mradi, uchaguzi wa wanakamati wakusimamia kikundi, mchanganyiko wa wanakamati, mikutano ya mwaka na ile mingine ya muhimu, adabu na adhabu za wanachama, rekodi, na hesabu ya pesa, n.k.*

3.5 Jiko

Kutokana na uhaba wa kuni katika sehemu kame (ASAL areas), kutafuta kuni kunachukua muda mwingi wa wanawake, hali hii inaendelea kuzorota mwaka baada ya mwingine kwa sababu ya ongezeko kubwa ya idadi ya watu. Nyumba nyingi katika sehemu hizi hutumia lile jiko la kitamaduni linalotumia mawe matatu kwa kupikia. Kwa hivyo, jiko lililotengenezwa kwa hali ya juu linaweza kutumiwa ili kutumia kuni chache na faida zingine. Jiko la Enzaro, lenye linaweza kupunguza kiasi cha kuni zinazotumiwa na lililoanzishwa na Mradi wa Kuimarisha Elimu ya Idadi ya Watu (yaani "Population Education Promotion Project') katika kijiji cha Enzaro na pia kuigwa katika sehemu zile zingine, lilianzishwa kama njia moja ya kupunguza kuni zinatotumika.naweza kutumiwa kama aina moja ya namna zingine za kutotumia kuni nyingi.

Yafuatayo ni mazuri na mabaya ya jiko la Enzaro. Ni vizuri akina mama waelezewe kabla ya kujenga lile jiko.

Uzuri/Manufaa

1. *Malighafi (raw materrials) ya kutumia kuliunda jiko yanapatikana na karibu.*
2. *Linaweza kutumia kuni chache kushinda yale mengine. Hupunguza matumizi ya kuni kwa thaluthi tatu (2/3).*
3. *Kwa wakati huo huo wa kupikia hata mpishi anaweza kuchemcha maji kwani lina sehemu nyingi za kupikia*
4. *Linaweza kupunguza muda wa kupikia kwani lina sehemu tatu za kupikia na uwezesha kuwa na wakati mwingi wa kazi zingine.*
5. *Chakula kinawekwa kwa usafi kwa sababu sehemu ya kupikia imejengwa kwa juu.*
6. *Linazuia watoto kuchomeka na kuwa mbali na moto.*
7. *Inazuia maumivu ya mgongo kwani mpishi hupikia akiwa*

amesimama

Ubaya/Upungufu

1. *Haliwezi kutia nyumba joto kwani mahali pa kupikia hapajafunguliwa*
2. *Haliwezi kupelekwa mahali kwingine*
3. *Linahitaji nafasi kubwa*
4. *Linahitaji kutunzwa vizuri*
5. *Na mengine*

3.5.1 Kuunda/Kujenga Jiko

Yafuatayo ni maelezo ya kufuata wakati wa kuunda jiko la Enzaro

1) Malighafi (Vitu Vinavyotakikana)

1. *Matope (mchanga wenye sifa ya kushikamana kama wa vilima vya mchwaunafaa).*
2. *Maji*
3. *Mawe/matofali*

2) Utaratibu wa Kuunda

1. *Jenga sehemu ya chini ya jiko kwa matope na mawe/matofali kwanza. Tengeneza sehemu ya chini na matope kisha fuatilia na sehemu nyingine ya mawe/matofali. Unda sehemu hii ya chini kwa matope na mawe mpaka hatua fulani ya urefu kwenda juu.*
2. *Tayarisha sehemu ya juu ya moto (top fire place) na mawe na ufunike kwa matope.*
3. *Lainisha sehemu ya nje na matope*

4. *Ngojea kwa juma moja au zaidi. mianya itakayotokea inatandazwa na matope yaliochanganywa na kinyesi cha ngombe.*

5. *Ikiwa limekauka kabisa, mpishi anaweza kuanza kulitumia*

Kuanzisha msingi na mchanga

Tengeneza au tandaza mawe

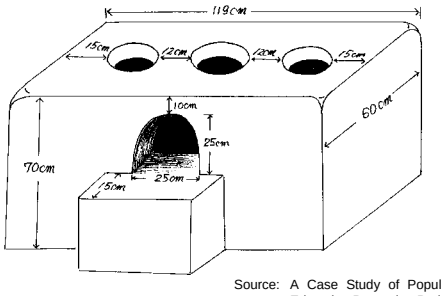
Panga Mawe

Kuweka matope, kulainisha na kumalizia

3) Mambo ya Kuzingatia

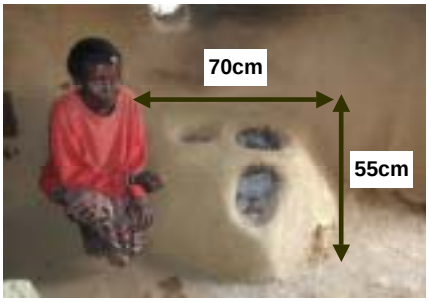
1. *Acha hatua ya karibu sentima 90 kutoka kwa paa ili kuepusha kutokea kwa moto.*

2. *Kama mwenye jiko hana nafasi ya kutosha ya kuunda jiko lote la Enzaro, au ana shida ya kupata maji ya kudumisha jiko hili, anaweza kuunda jiko ndogo kama ile inayoonyeshwa katika picha iliyo hapa chini.*



Source: A Case Study of Population Education Promotion Project

Kimo cha Jiko la Kawaida la Enzaro



Jiko ndogo lenye meko mbili

4) Utunzaji wa jiko

Jiko la enzaro linahitaji kutunzwa mara kwa mara hasa katika midomo ya sehemu ya kutokezea moto, la si hivyo litaanza kupasuka huko matope yakianguka chini. Utunzaji unahusu kupaka jiko hili matope yaliochanganywa na kinyesi cha ngombe mara moja kwa juma. Utunzaji wa kawaida unahitaji, bali na mchanga na kinyesi cha ng'ombe, maji ya kiasi cha lita tano. Hii inaweza kuwa tatizo katika sehemu kame. Katika sehemu kame zaidi, jiko la kimo kidogo la aina ya Enzaro linaweza kujengwa.

3.5.2 Kueneza Jiko la Enzaro

Hatua zifuatazo zinapendekezwa ili kueneza Jiko la Enzaro.

1. *Maonyesho yanapaswa kufanywa kama hatua ya kwanza kama tulivyofanya. Maonyesho haya yafanywe kwa boma inayovuma kama ya chifu, naibu wa chifu au viongozi ambao wana uwezo wa kualika watu kwa wini kujionea.*

2. *Wakati mwingine baada ya maonyesho, Maafisa wa*

Serikali/Wafadhili watatembelea akina mama vijijini na kuwasaidia kuunda kikundi na wataunda jiko wao wenyewe. Wageni wapeane mawaidha ya kitaalamu tu wakati wa kuunda jiko. Ujenzi huu unapaswa kufanywa huko waundaji wakiwa na nia ya kufaulu au kutofaulu jambo ambalo linawafanya wawe na hali ya umilikaji na pia kukuza ujuzi wa kutunza jiko hili. Katika sehemu zile hakuna watalaamu wa Serikali, usaidizi utatokea pale ambapo wanakijiji wataungana na kuanza kuundiana meko hayo mmoja baada ya mwingine. Mtu kujiundia jiko au kuunda kama familia pia kunapendekezwa

3. *Ili kuhakikisha kwamba hakuna kasoro ya kiufundi katika upanuzi/uenezaji wa jiko kwa wanachama wa kikundi, itafaa kufuatilia na vijiji majirani kutembeleana. Katika sehemu za mashambani sana kama vile sehemu ya tarafa ya Makutani, akina mama huwa na wakati mugumu kuendeleza kazi hii nje ya kijiji chao. Kwa hivyo Maafisa wa Serikali/Wafadhili wanapaswa kutembelea kila kijiji na kuwapatia angaa jiko moja kwa kijiji ili waweze kuliunda kwa pamoja kwa madhumini ya kuwapatia ujuzi kwa kutengeneza jiko hili pamoja nao.*

4. *Sambamba na hayo, aina nyingine mpya ya jiko la Enzaro, ambalo lina sehemu mbili za kupikia, linapaswa kujaribiwa/kutumiwa ili kuwasaidia watu walio masikini. Jiko hili la kimo kidogo pia linaweza kutumiwa katika sehemu kame zaidi kwa sababu linahitaji kuni chache na maji kidogo ya kulidumisha.*

Mfano huko Baringo

Uimarishaji wa Jiko la Enzaro

Kwanza meko manne ya Enzaro yaliundwa na wataalamu kutoka wilaya ya Vihiga na kina mama wa vijiji watatu walielimishwa na wataalamu hawa kuwa wataalamu pia. Baadaye watu kijijini walianza kusaidiana kuunda meko haya mmoja baada ya mwingine (merry-go-round) ili kuendeleza jiko hili la kisasa. Kuelimisha akina mama wa vijiji kuwa wataala kulileta uchoyo kati yao na hili lilifanya mradi huu uonekane kama akina mama hawa walikuwa waudumia Shirika la JICA. Jamii walitegemea sasa Mtaalamu ili kufunzwa jinsi ya kuunda jiko hili na kazi ikamzidia na kuacha. Kuundiia mwanakijiji mmoja jiko hili baada ya mwingine hakukuendelea vizuri kwa sababu moja kuwa wanakikundi wengine hawakutaka kuokota na kukusanya mchanga/udongo na mawe yaliopatikana nje ya nyumba zao, lakini walikuwa wanangojea wanakikundi wale wengine kufanya kazi hiyo. Kwa sababu ya haya mambo, kutembeleana vijijini au kata kwa kata, watu walijiundia kikundi na kujenga au wale wenyewe walitaka kuunda meko yao walihimizwa waendelee huku wakielekezwa na wataalamu walio vijijini. Hili liliwanfanya kina mama wengi kutamani kuunda meko haya.

3.6 Siranga (Boma sinia la Maji)

3.6.1 Kupanga na Kubuni Urekebishaji wa Siranga (Kukadiria Ukubwa na Usorofea)

Mambo yafuatavyo yanahitajika katika kuunda kipimo na mwinuko wa Siranga na kuwezesha kujua njia ya kuchimba na aina ya mashinie za kutumia.

- *Usorofea au uchunguzi wa ulaini wa ardhi kwa urefu na upana.*

- *Utafiti/uchunguzi wa mchanga kujua mgumu wake*

Vipimo, aina ya umbo wa siranga na muhula wa kutekeleza (kurekebisha) zinajulikana baada ya mambo haya huku mengine kama ukubwa wa siranga ilioko, idadi ya watu watakaohusika katika kurekebisha na hali ya anga n.k.

Mchoro wa mtaro wa kuingiza maji kwa kisima kinachotekelezwa cha siranga ya Lekiricha unaonyeshwa katika Mchoro 3.6.1

3.6.2 Kuanzisha au Kuimarisha Kamati/Muungano, Usaidizi Kutoka kwa Maafisa wa huduma nyanjani, (Uundaji wa Sheria za kuongoza Kikundi/wanachama)

1) Kuunda Kamati ya Kusimamia Siranga

Kamati mpya ya kusimamia siranga inaundwa na watu wanaowakilisha vijiji vyote vinavhohusika. Kila jamii hutumia njia zao tofauti za kuchagua wanakamati kama vile:

- *Hali au uwezo wa kuwa na sifa za uongozi*
- *Uwezo wa kuelewana na wana kijiji wale wengine*
- *Kuwa na mifugo*

Kamati ya kusimamia siranga inatekeleza kazi ya utekelezaji na urekebishaji, mipango ya kazi, kutayarisha sheria za kuongoza jamii na kamati, vile vifaa viitakavyotunzwa na kupanga mipango ya mchanga usizibe siranga n.k.

Mfano huko Baringo

Uongozi uliokubalika na Jamii

Ikilinganishwa na sehemu zile zingine zilizofanyiwa uchunguzi, ilibainika kwamba Jamii ya Rugus walitegemea sana chifu wao, kiongozi wa KANU, waalimu wa shule za msingi na diwani wao na viongozi wengine wa namna hii. Kwa hakika, chifu amefanya kazi nyingi na ni hodari sana katika kuleta wanakijiji pamoja. Katika sehemu zingine, kuwepo kwa mtu aliye na sifa nzuri za uongozi, kama vile chifu Rugus, inaonyesha ana uwezo wa kuunganisha watu na kuufanya miradi ufaulu.

2) Kuimarisha Kamati ya Usimamizi wa Siranga na Watu wengine wanaosaidia

Kuna njia mbili muhimu za kuongeza uwezo wa kujimudu wa Shirika la Kijamii/kikundi.

- *Kufanya wanaohusika kukumbana na kutekeleza mambo magumu*
- *Kuwapa elimu na ujuzi kwa wanachama wenye kushikilia nafasi muhimu katika Shirika/Kikundi*

Njia hizi mbili zinaenda sambamba na zilitumika kuimarisha Kamati yakusimamia Siranga na watu wale wengine wale wengine waliohusika.

3) Kuzua/Kuunda sheria za kuongoza wanachama/Shirika

The pan management committee has to prepare the By-Laws under the participation of community people. A Contents of the By-Low is supposed as follows; to make a plan of maintenance work schedule, to arrange organization structure of the pan committee, to determine how to levy the maintenance cost from villagers etc.

Kamati hii ya Usimamizi wa siranga inatayarisha sheria ikishauriana na jamii inayohusika. Sheria hizi zinahusu mipango ya kazi za kuitunza siranga, kutayarisha kugawa kazi za wanakamati, kuamua vile watapata pesa kutoka kwa wanakijiji za kuendeleza mradi huu, n.k.

3.6.3 Utekelezaji na Urekebishaji (Njia/Namna za Utekelezaji)

Njia za kutekeleza, ziwe ni za kutumia mikono au mashine ili kuchimba na kuondoa mchanga katika siranga, zinapaswa kujaribiwa kwa hatua kwa sababu kuchimba sehemu kubwa ya urekebishaji wa siranga ni kazi gumu na inayochukua muda.

Mfano huko Baringo

Kutumia Mikono au mashine?

Uchimbaji wa siranga ya Lekiricha na kidimbwi kidogo cha kuzuia udongo unaoweza kuingia ndani (silt trap), zote za kiasi cha ukubwa wa mita 3000 (3,000 cu.m in volume), hapo awali ulikusudiwa kufanywa na mikono kwa madhumini ya kujaribu kuanzisha hali ya wanainchi kudumisha mradi bila kutegemea misaada. Lakini baada ya majaribio, jamii na kikundi cha JICA kilichokuwa kinafanya uchunguzi walikubaliana kutumia mashine kubwa huku Shirika la JICA likigharamia asili mia tisini (90%) kwa sababu mchanga ulikuwa umeshikamana na hivyo kuwa mgumu kuchimba kwa mikono. Mbali na hayo, jamii hawakuwa wamezoea kutumia vifaa kama vile miiko, majembe shoka, kasha za kusukuma kwa mikono ('wheelbarrows'), n.k. zilizotolewa na Shirika la JICA. Hii inaoyesha shida ilioko katika jamii ya kuweza kutekeleza, kusimamia na kudumisha mradi huu.

3.6.4Utekelezaji na Utunzaji, (Mpangilio wa Utekelezaji na Utunzaji na gharama)

Ili kurekebisha na kudumisha siranga au kwa mradi mwingine wo wote katika sehemu hiyo, usaidizi kutoka kwa watu wengine hasa wa chakula utasaidia. Hii ni kwa sababu wanaume huwa wanaenda kuchunga mifugo wao mbali sana na nyumbani wakati wa ukame na ambao ndio wakati mzuri wa kuchimba. Hivyo hivyo kamati ya siranga ilikuja kuacha kazi yake. Kwa hivyo imebainika kwamba kudumisha mradi huu itakuwa ni vigumu.

Mfano huko Baringo

Kupanua Kazi tofauti za Watu wanaoishi Katika sehemu kame

Watu katika sehemu ya Rugus wana kazi/shughuli tofauti tofauti za kimaisha kutokana na mazingira magumu ya ukame. Hata kama urekebishaji wa mradi huu ulisaidiwa, mradi haujaifadhiwa na mchanga unaendelea kuziba siranga. Wanaume waliama vijijini wakati wa kuondoa mchanga kisimani na kwenda machungani, kulima, kuvua samaki, kuwinda n.k. Wako na shughuli nyingi za kujitafutia njia/namna za kuishi. Watu hapa wanajishughulisha na shughuli mbalimbali. Kwa hivyo, ili jamii waweze kudumisha na kutunza siranga wao wenyewe, usaidizi kutoka kwa Serikali/Wafadhili utahitajika mara kwa mara kwa njia ya kugawa gharama ya mashine.

Umuhimu wa Kazi/Jukumu za akina mama

Mawazo na imani za kimila, pamoja na tabia za kitamaduni katika sehemu iliyoanzishwa mradi (tarafa za Marigat na Mukutani), wanawake huwa katika hali duni (elimu duni, kuozwa mapema na kwa lazima, n.k.) Kwa hivyo wakati wa kupanga kurekebisha siranga, wanawake mara nyingi hutengwa/hawajiusishi na kazi hii wala kutoa mawazo yao na huwaacha manaume wawaongoze huku wao wakifuata. Wanawake, hata hivyo, walisaidia sana katika kujitolea kufanya kazi ya mikono. Walisaidia katika kuweka ua (fencing), kupanda nyasi, kuchimba mitaro, na hata pia kuondoa mchanga ambayo ni kazi inayofaa kufanywa na wanaume. Ilikuwa funzo kwamba akina mama wanaweza kuanzisha na kutekeleza miradi ya maendeleo wakipewa nafasi na usaidizi. Kwa hivyo kufaulu kwa mradi kutategemea maoni na nguvu zitakazotolewa na akina mama. Hii inaonyesha akina mama wanaweza kuongoza katika nyanja za maendeleo. Kwa hivyo maswala ya kiume au kike katika nyanja za maendeleo yanapaswa kuzingatiwa katika mipango ya miradi vijijini.

3.6.5Kuanzisha au Kuimarisha Kamati/Muungano, Usaidizi Kutoka kwa Maafisa wa huduma nyanjani (Uundaji wa Sheria za kuongoza Kamati/Shirika/Muungano)

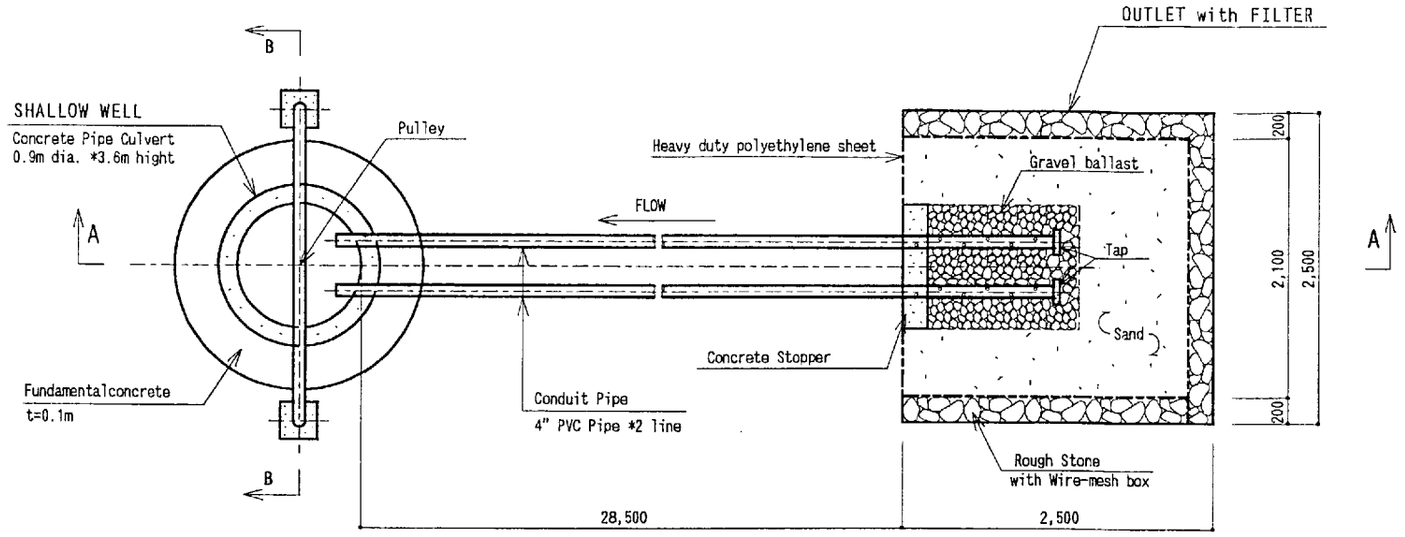
- *Kupanga na kuw* Jiko ndogo lenye meko mbili *ezesha wanaonufaishwa na mradi wa siranga kukutana na kuwahimiza kujadiliana kuhusu maazimio na shida zinazokabili mradi huu.*

- *Kama hakuna kamati mojailiyoko kwa sasa, wahimize jamii kuchagua moja huku wakitilia maanani kuwa watakaochaguliwa watatolewa kutoka kwa sehemu zote zilizohusika na mradi huu.*

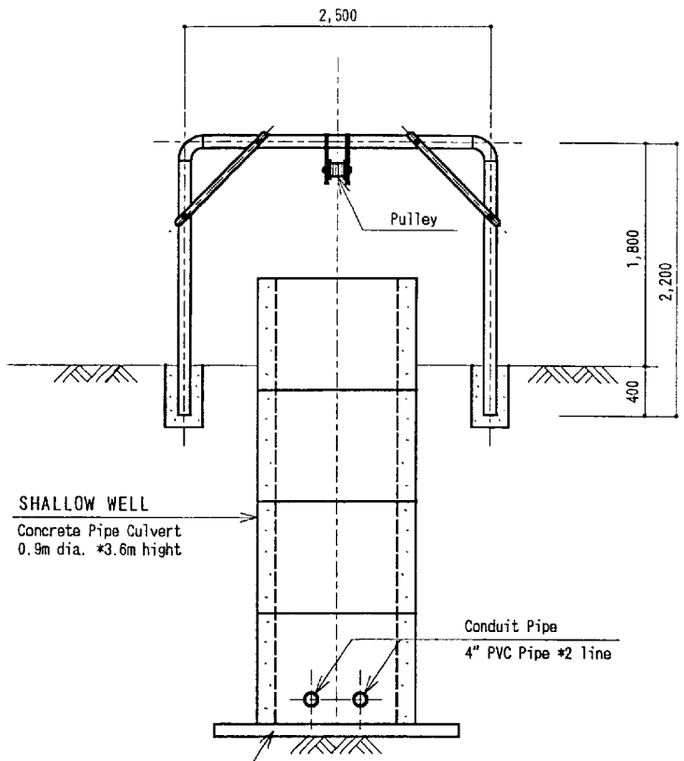
- *Kusaidia wanakamati katika kuzua sheria zitakazoongoza wanachama ambazo zitahusu mambo kama kuwa mwanachama, jukumu/kazi za wanachama, Kamati ya Usimamizi, jinsi ya kutekeleza na kutunza mradi, ada/malipo ya kuwa mwanachama na malipo ya matumizi ya maji, ada/malipo yatakayotozwa wanachama wakivunja sheria, uchaguzi wa wanakamati, uamuzi na kuzingatia kazi za mradi zilizotekelezwa mwakani katika mikutano ya mwaka.*

Figure 3.6-1 OUTLET and WELL WORKS of LEKRICHHA PAN

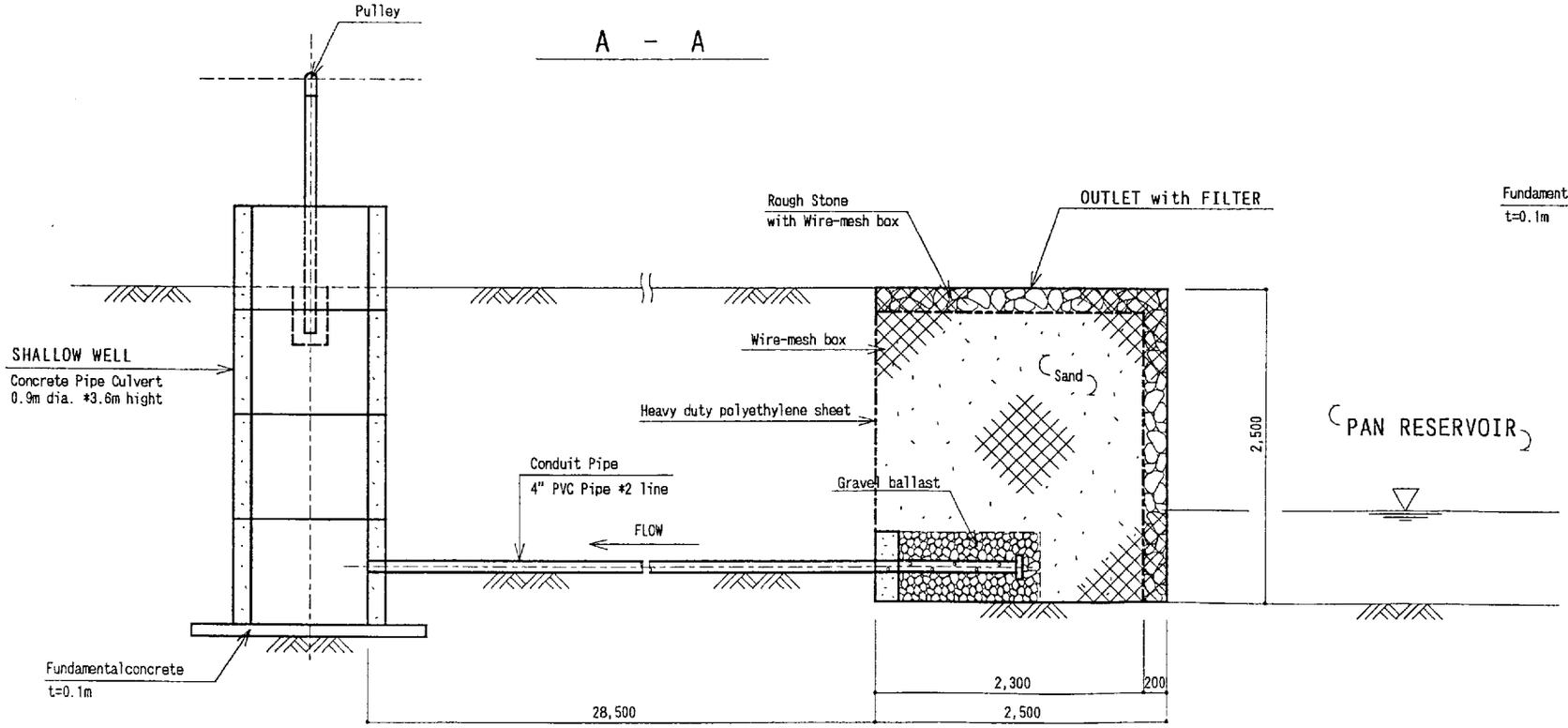
P L A N E



B - B



A - A



JAPAN INTERNATIONAL CO-OPERATION AGENCY
REPUBRIC OF KENYA RIFT VALLEY PROVINCE BARINGO DISTRICT
JICA STUDY TEAM (SANYU CONSULTANTS INC.)
LEKIRICHA PAN REHABILITATION OUTLET AND WELL WORKS
SCALE 1 / 50 All units in mill metres