Planning of Sustainable Land and Water Management in Mbulu and Karatu Districts in Tanzania

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1. Introduction

This paper treats experiences of the Mbulu-Karatu Land and Water Management Program. Being a part of the Mbulu-Karatu Rural Development Program, it is financed by the Mbulu and Karatu District Councils and the Tanzanian Government who receive financial and technical support from the Netherlands Government.

The area of operation is Mbulu and Karatu Districts, located in the East African Rift Valley in Arusha Region of Tanzania and bordered by the Ngorongoro Conservation Area in the North, Lake Eyasi in the West and Manyara National Park in the East.

Mbulu district is one of the districts in Tanzania where the land is scarce. The land users (*Iraqw* agriculturists, *Datoga/Barbaig* pastoralists and *Hadzabe* hunters/gatherers) find themselves competing in utilizing the limited land for their livelihoods. Traditional sustainable land use is violated due to increase of human and livestock population density. The intensive use of land and water which causes pressure on environment.

The area of the districts is about 7600 sqkms, divided in:

- Catchment forests: 72,000 ha;
- Crop land: 175,000 ha
- Grazing land: 375,000 ha
- Game and National Park: 10,000 ha
- Rivers & lakes (including Lake Eyasi): about 130,000 ha.

The elevation of the districts is between 600 m to 2000 m above sea level. Average rainfall varies between 600 and 1500 mm. The district population is estimated to be 347500 (calculated from the 1988 population census). Started by the end of 1993, to date the Land and Water Management Program operates in 22 (out of 104) villages which are situated within 15 (out of 29) Wards.

2. Environmental Problems

The district is facing many environmental problems, which demand counter measures from the people. The problems can be grouped as follows:

- Soil degradation
- Degradation of tree and shrub cover
- Degradation of grasslands
- Degradation of water sources and water availability

3. Planning of Sustainable Land and Water Management

3.1 Introduction

Land use is dynamic in nature. The present land use in the district is the result of many historical processes over a long period of time, which were not guided by sustainable plans but followed social and economic change. With the acceleration of change processes it becomes more and more clear that society is not always able to adapt spontaneously to rapidly changing circumstances. Planning of change and planning of adaptation to change becomes inevitable.

To reach sustainable land and water management we need proper interactive participatory planning. Improvement of land and water use development needs the consideration of interests of all users. A multi-level and inter-disciplinary stakeholder approach for the planning process is essential to obtain socially balanced results in which economic and ecological objectives have been taken into consideration. A result oriented land and water use plan can be obtained if the beneficiaries can reflect back on what happened in the past, on the reasons for the present situation and on their perspectives for the future.

How to reach such a planning? Textbooks teach us the logic sequence of preparation before implementation. In daily practice of 'opportunity management' preparation of certain activities takes place simultaneously to the implementation of others. In the following, a tentative is made to distinguish preparatory activities from implementation, but the reader must know that practice is intermixed.

3.2 Preparatory phase: upgrading of the planning base

A number of activities are undertaken to improve basic knowledge about the districts.

Aerial photograph survey
Aerial photographs were taken of all Districts. These photographs were used to select sample villages for a soil survey, for zonation of the districts and (recently) for the preparation of village land use planning.

District soil survey

A reconnaissance soil survey (scale 1:100.000) of the Districts was carried out by the National Soil Survey (NSS) on a contract of the District Rural Development Program. The survey was done together with district staff. As side-products of the survey NSS produced semi-detailed (1:20 000) soil and soil suitability maps of ten villages.

Zonation of the district

The Districts are diversified by different climatic and ecological factors. Based on information and maps from the soil survey and descriptions of farming systems, district zonation was possible. The zones were identified for planning and implementation purposes. A District is divided into 5 agro-climatic and 13 agro-ecological zones.

Village boundary survey
Land right or "land tenure" is a problem for people and for the use and maintenance of resources. The District faces many land disputes, which make people to be reluctant to invest into their lands. The results of the evaluation of its activities made the District to think about land security. The District Lands Department has a task to help people to get their land right. This work to assure land rights to villagers needs not only a participatory approach but also multi-disciplinary teams. To start with, a village boundary survey is carried out. The village boundary survey is conducted to enable the village communities to get land rights to own the village land and reinforce the proper utilisation of village resources. In a later stadium individual rights may be secured. Up to date, 56 village boundary maps are available.

In the village boundary survey, a number of working methods and steps are worthwhile to mention:

- The available aerial photographs, together with topographical maps (purchased from the Ministry of Lands, Housing and Urban Development) are used to prepare draft village boundary maps. The key people to identify boundary points and to prepare the maps are:
  - village authorities and elders (elders from the village in question as well as from the neighbouring village);
  - District and village extension staff;
  - Consultants, specialized in map making, photo-interpretation and reporting.
- With the help of above maps, a number of meetings were conducted in the villages to enable the villagers to give their experiences and their knowledge on the local village boundary.
- After agreement, beacons are put on agreed boundary points and their position is measured with Global Positioning equipment.
- The measured points are indicated on the topographical map, and boundaries are traced. Photo-mosaics are made for the village, and boundaries are indicated on the mosaic.
- After mapping of the village boundary the map has to be approved by the village assembly and signed by the village chairperson and the village executive officer.
- The maps, together with accompanying descriptions of boundaries and beacon positions, are sent to higher administrative levels (District, Regional and National) for approval.

Evaluation of the activities on natural resources done in the district
The District evaluated all activities in the district and identified technical, organizational and operational problems and ways of solving them.

3.3 Implementation phase

After the preparatory phase, the following steps were taken:

Integration of departmental activities
The District had to integrate different departmental activities into two programs:

- Land and Water Management program (L&WMP)
  The departments included were Agriculture and Livestock, Natural Resources, Lands, Water, Community Development and Administration.
- Health, Sanitation and Water program (HeSaWa)
  The departments included were Health, Community Development and Water.

The decision to integrate activities was aiming at:

- Systematic program introduction at village and farmer's levels;
- Greater involvement of farmers in problem analysis and decision making;
- Diversification in technical recommendations;
- Improved training activities;
- Better technical and logistical support to extension workers and farmers.

Selection of working methods
Right from the start, simple interactive participatory working methods were developed to:

- provide practical and effective results, in a way not too demanding for extension workers and staff.
- allow program expansion, in principle to all wards and later on to all villages.

Training of extension staff
After a training need assessment and other evaluations, the District decided to organize a "Comprehensive Participatory Training Program" (CPTP), conducted by the Tanzanian training institute Cooperative College.

In this training extension staff and elected representatives are taught the following:

- Adult psychology: understanding adult behaviour in terms of responses and reactions to different situations of interactions.
- Participatory field intervention techniques: the participants are equipped with techniques to enable the village people to participate actively in identifying and critically analyzing the cause of their problems and to support them in the finding of possible solutions.
- General overview of various technical recommendations from different departments: the participants learn about different technical recommendations for the working area (village), and how they can integrate these recommendations with the indigenous knowledge to tackle the problems.
- Simple research methodology: the participants learn some simple methods for participatory research (e.g. how to enter the community, how to get and analyze information with target groups).
- Participatory planning techniques: The participants have to know how to involve the target group in the whole planning process. Top-down and bottom-up planning techniques are discussed and explained.

In the CPTP the participants get both class room and field experiences in an alternation of one-week class and three weeks field. The total training takes 13 weeks.

Up to 1996, the training was given to 22 village extension teams with 147 participants.

Development of village natural resource management systems
The natural resources are within and utilized by the community. The management of the resources should be placed in the hands of the community. To do that the district has to provide support on:

- **Initiation of a village planning system**, an iterative process of careful analysis of available natural resources and their use, identification of priority problems, implementation of possible technical intervention and regulations to improve the situation, and evaluation of results;
- **Design and development of village natural resources use plans.**
  Such plans are developed gradually. Therefore participatory gradual planning of activities is proposed, based on available information, opportunities, people's needs and on evaluation of experiences gained together. Communities are encouraged to take decisions on components on which they agree rather than to discuss an overall plan, which is difficult to imagine. Little by little the various pieces are put together from sub-villages to form an overall village plan, which reflects the population's wishes, priorities, possibilities and limitations.
- **Monitoring of implementation and effects.**
  Close observations of program implementation and of effects in the field are required for evaluations and further planning. All these are done by villagers at all levels through facilitation given by ward and village extension teams. The village level monitoring should be well organized to allow people to undertake and discuss the results. Hence regular meetings of villagers and extension teams is inevitable.

Design and enforcement of village regulations.
Management of natural resources basically involves management of conflicts over scarce resources (in our case, land and water) between agriculturists and livestock keepers, hunters and woodcutters, poor and rich people. To solve these problems the communities are encouraged to

discuss and establish traditional rules *(Sheria za kimila)* which are controlled by informal leaders. In critical issues, legal village by-laws are established by the villages with help from the district council.

Building up of an appropriate village organization.
To build the capacity of the community, the program has to support the village level to be organized. Hence the community has to establish some structures e.g. 'field- activities follow-up committees' in each sub-village. The role of this structure is to make sure that agreed plans are implemented. In case of any problem they have to report to the sub-village chairperson then to the sub-village assembly to discuss the issue. Strong issues are taken to the village leaders for further discussion. For example, in water supply activities the users of a water source have to establish a water committee to look after the water source and to collect funds for maintenance. Users contribute per month or per year. The role of the water committee is to make sure that the water source is operational and water catchment areas are conserved by planting of trees and the areas are closed from grazing and cultivation. Village bylaws are made to enforce the implementation. Each committee opens a 'water source bank account'.

It is the philosophy of the program that the necessary institutions and capacities should be developed gradually through a ‘learning by doing’ process.

Development of technical interventions and implementation methods
We need appropriate technical interventions; that means: acceptable and implementable by the target groups. The technical interventions are determined after problem identification and analysis with farmers. This common identification and analysis of problems increases confidence of both extension staff and farmers.

Technical interventions are implemented by farmers in collaboration with extension teams. The extension teams receive regular training on technical matters and on approaches. Village staff is encouraged to assist newly created village structures, after having been trained by their superiors. If we take the example of soil conservation, the District Soil Conservation Officer trains Ward extension staff. The ward extension staff train village extension staff who train, in their turn, the village pegging teams. The village pegging teams will measure contours, and farmers do the uplifting and maintenance of contour buns.

Up to 1996, more than 8900 farmers were trained in different technical issues e.g. tree planting, soil conservation etc.

Village Land Use Planning
To make sure that land is used for the 'best' use and to avoid conflicts and confusion on land use, the District has decided to start tests on village land use planning. This is a way to capitalize on the village boundary survey and the introductory activities on land and water management. The expected outcome of a village land use planning exercise is a village land use plan and its accompanying reports.

Selection of test villages is based on the following criteria:

- Criteria related to the village itself:
  - Active village government
  - Land scarcity (high population density/ small scale farmers);
  - Good social coherence and good organizational capacities;
  - There should be activities in Land and Water Management Programme;
  - The village boundary survey should have been completed and approved;
- Criteria related to extension staff who should assist the village:
  - A ward extension team of good quality which has completed the comprehensive participatory programme (CPTP) training;
  - Village extension team should be of good quality.

A number of preparatory activities have been planned:

- Establishment of a District 'information packages';
- Establishment of a 'village description';
- Decision making on roles of different parties involved;
- Preparation of extension staff;

The steps foreseen to be undertaken in the village are the following:

- Preparatory meeting with village leaders and village extension staff
- Preparation of sub-villages meetings
- First sub-village meeting:
  - explanation of objectives
  - explanation of procedures
  - explanation of 'district information package'
  - check of 'sub-village description'
  - problem inventory
  - problem analysis
  - priority setting
- Write up of the findings of the sub-village meeting by the facilitators;
- Second sub-village meetings:
  - report first meeting;
  - identification of solutions to priority problems;
  - choice of solutions;
  - development of sub-village plan;
  - election for executive committees;
- Write up and drawing future (desired) land use map by facilitators, extension staff and elected representatives;
- Village council workshop: presentation of sub-village land use plans and development of village land use plan.
- Making of final maps and reports by facilitators, extension staff and village land use committee;
- Village council meeting: approval of plan and preparation to the village assembly;
- Village assembly meeting: final decision in village level.

Meetings in the sub-villages (an average 3-5 per village) may be done in a sequence or parallel to each other.

The official approval of village land use plans has to go through a number of decision making levels:

- the Ward Development Committee for discussion and approval;
- the District Council for discussion and approval;
- the Regional level for approval;
- the National level for approval;

The responsibility for the implementation of the action plans is situated within the village and sub-villages. The district has to support the implementations. Regular evaluation is necessary to improve the efficiency in implementation. The villagers and District are responsible for the monitoring and evaluation. This is done in a partnership system.

4. Land and Water Management Programme

4.1 Objectives

Overall objective
The natural resources of the District will be used in a sustainable way that permits agricultural, livestock, forestry and wildlife production to provide food and income to the users/producers and their families, at least to minimum standards (to be specified in each period).

Immediate objectives

- Agriculture and livestock production levels will increase, and be at least in pace with population growth (i.e. 2-3% per year) through intensification of production systems;
- Soil productivity will be maintained or increased;
- Soil erosion has to be reduced to acceptable limits;
- Wood production will be equivalent or greater than wood consumption;
- Fodder production of communal grazing lands will be equivalent or greater than fodder consumption by livestock, and grazing lands will provide a good soil cover;
- Wildlife production (including fisheries and beekeeping) will be maintained, at least at current levels;
- Water resources will not be exploited above their natural recharge;
- Natural resources management systems will put in place that guarantee the sustainable use of the natural resources in the District
- District will provide adequate support to individual users and producers, to villages and wards

4.2 General Strategies

Selection criteria for intervention villages are based on agro-ecological conditions and farming systems, level of village organization, possibilities for by extension staff and potential political support.

To achieve the objectives a strategy was developed, including the following points:

- Step by step, iterative development of the program.
- Farmers and village communities have to make their own problem analysis, decide on action to be taken, implement these decisions and evaluate their work.
- Simultaneous initiation of the program at all levels: district council, local administration, extension service, extension workers, villages, neighbourhoods, individuals;
- Gradual increase of the number of staff, extension workers and villages who participate in the program;
- Progressive incorporation of additional sectors: agriculture, livestock, forestry, community development, water, wildlife, public works, health, education and other related or dependent sectors.
- Reinforcement of village institutions autonomously managing their village natural resources;
- Introduction of District staff and extension workers in an advisory role to village organizations and farmers;
- Creation of a political and economical environment that generates and sustains local initiatives;
- Development of mechanisms and platforms to handle conflicting interests.

4.3 Technical Activities

4.3.1 Introduction

Currently the L&WMP undertakes technical activities in the villages in the field of soil conservation, agro-reforestation, dairy production, water supply, roads construction. Work with farmers research groups has started to tackle a number of identified constraints in crop production.

4.3.2 Soil Conservation

In soil conservation, the villagers discuss what the problems are and how to solve the problems. Sheet, rill and gully erosion are dominant in all agro-climatic zones except in the Eastern zone. In the identified solution the villagers have decided to do the following:

Terracing
Terraces are constructed on the farms and (sometimes) in grazing areas. To implement the terrace making, the District staff conduct training of village extension teams on how to measure contours, uplifting of terraces, recording and on how to train selected young boys and girls who will become responsible for contour measurements, field follow-up and recording of the length and the owner of terraces in the village. The construction of terraces itself is in the hands of individual farmers, who use their own or paid labour. Many villages make by-laws to compel farmers to construct and maintain terraces;

Gully Control
Planting of trees and sisal in the gullies. The sub-village organizes one or two days in a week during the rainy season to plant trees and sisal in the gullies that are not too deep to be controlled. To ensure the implementation of the activity, the location chairperson, village extension team and location field follow-up team are involved in implementation and in monitoring. Village bylaws are made to enforce the decision.

Closing-off of Aareas
Control of catchment areas by exclusion of grazing and cultivation. Villagers/location people decide to 'close-off' bare hills and heavily eroded areas to allow surface vegetation to come up and trees to regenerate. To ensure the implementation of the activity, the villagers or people of the location select a special committee responsible for looking after closed areas and to report to the people when necessary to open the area for some special uses e.g cutting of the grass for thatching and for livestock fodder. Village bylaws are made to enforce the decision.

Shifting of Grazing Pressure
Villagers or people of the location decide to send their livestock into other areas during the dry or the wet season, e.g. to the southern and western zones. These two zones are drier than other zones. Human population density is lower and there is less cultivation.

Conservation of Natural Trees
To encourage regeneration of natural trees, the village or location may decide on restrictions on tree cutting in some areas, either not to cut at all or to cut only after a special permit to cut trees for specific home use. To implement this the village/location selects a special committee to look after the conservation rules. The committee is responsible to give tree cutting permits. Village bylaws are made to enforce the decision.

Achievements up to 1996: Contour making has been done on 4197 ha, 183 pegging teams have been trained and are operational, 11 village land use committees are operational, 16 kms of gullies have been controlled and 20 kms cut off drains have been constructed. Most of the participating villages have closed-off one or more areas.

4.3.3 Agro-afforestation

To combat the deforestation problem the villagers decided to plant trees. Village, school and individual nurseries have started to provide seedlings of different species. To enable the villagers, schools and individuals to start their own nursery, the program provides nursery and tree planting training. The program also supports the owners with polythene tubes, chemicals and some seeds (seeds that the owners can not get in their surroundings. The village extension team supports the tree planting by training. To transfer the process to the villagers, the input support to nurseries is provided following a 'phasing-out' system. This means that the program support for nursery inputs is gradually decreasing while the responsibility of nursery owners increases.

Achievements up to 1996: 2,381,502 fruits and other tree seedlings (different species) were produced in 52 village, 76 school, 22 NGO and 123 individual nurseries. The survival rate ranges from 40% to 70%.

4.3.4 Reduction of Wood Consumption

The program has started the introduction of improved woodstoves to reduce fuel wood consumption. Women and women groups are trained by foresters and community development workers. More than 600 improved wood stoves (about 30% more efficient than locally used wood stoves) were constructed in the households and are operational.

The Diocese of Mbulu Development Program is experimenting with house building techniques that use less construction wood.

4.3.5 Dairy Development (under a zero grazing system)

Dairy production under zero grazing may increase farm incomes, diminish pressure on the grazing areas and improve the food situation. Programme activities are training of women, procurement/distribution of heifers and bulls and distribution of grass seedlings to establish pastures.

Achievements up to 1996: The District has more than 600 heifers and bulls.

4.3.6 Water Supply

Water is the first priority to most of the villages in the District. To combat the problem, the villagers requested the District to support them with water pipes, boreholes, shallow wells and improvement of natural springs. Since water is the problem of the people the villagers agreed to pay 25% of the total construction cost of shallow wells. The running and maintenance cost are met by the people who use the water.

Achievement to 1996: 10 shallow wells and 9 medium and deep boreholes were constructed and are operational; 25 kms of pipeline was made and 42 domestic points and 3 cattle troughs are operational.

4.3.7 Feeder Roads

Villages have to be accessible. Hence the villages made a decision to construct and maintain feeder roads. The District supports the villages to construct e.g culverts, bridges and drifts. The District also train the 'village-road headmen' to supervise road construction and maintenance

Achievement in 1996: 144.3 kms were maintained by villagers.

5. Experiences Obtained

5.1 Learning Points

So far a number of learning points may be formulated:

- Participatory working methods encourage both farmers and extension staff to work together;
- Gradual introduction and development of a new working method create a feeling of " ownership" of the new approach among all parties involved;
- Working simultaneously at District Departments and village levels result in reciprocal influences on priority setting;
- In Tanzania, local government structures and decentralized, democratic decision making bodies provide an opportunity for community-based natural resource management;
- Not so much the motivation or know-how of farmers but the ability of the local administration and extension services to provide the necessary support for farmers is a major constraint on improved natural resources management.
- Aerial photos and topographical maps have facilitated the village boundary work.
- The empowerment of natural resources planning and management to the community is the best way of looking and utilizing the resources.

5.2 Constraints

It should be recognized that implementation of such a program is not always easy. We have met the following constraints:

Identification of Problems
It was difficult for the extension team to distinguish between problem, need and want. Some teams came with the needs or needs of the community, which automatically gave simple and direct answers/solutions, e.g they came with dispensary as a community problem. The solution of dispensary is to build the dispensary; but in the actual sense the dispensary is not the problem, it is the felt need of the community after being affected by diseases. Hence the problem of the community is a particular disease such as diarrhea. In the first time the facilitation team came with wants/needs; hence the solutions identified did not solve the problems.

Selection of Priority Problems
Every body in the community has his/her priority hence to find priority of community problems was a difficult task. The poor participation of women or youth influences the bias in priority setting.

Implementation
Implementation of the program in some villages was slow compared to other villages. This was caused by the following:

- It is difficult to extension staff to change the attitude from directing or to behave like 'experts' on what has to be done. To change this attitude, it is promoted to discuss and to be partners with villagers in planning, implementing, monitoring, evaluating and sharing results of their different activities.
- It is difficult to change the attitude of village leaders from 'planning for their villagers' to participatory planning. It is a difficult task and time consuming to enable the leaders to see the importance of planning, implementing, monitor and evaluate together with their villagers. It is true that participatory planning takes a lot of time; however participatory planning increases participation in implementation, and it avoids the waste of time to explain to the villagers what, how, when, why and who to supervise the activities.
- Adult people want to get quick results, even though it is difficult to get quick results because participatory plans depend very much on the available local resources, which need community contributions first and then the support from outside.

Planning Progress

People were not used to the participatory planning from sub-village, village, ward to the District council level. Hence the process to date has not yet been fully adopted by all 22 villages. The biggest problem is with the leaders at ward level where the village development plans are discussed before being forwarded to the District council. At this stage, some leaders do change the village plans and add what they call ward plans. In the same planning stage, the NGOs and other development supporting agencies are not well coordinated. This brings confusion on development of strategies and policies behind the District and village development.

Approvement of Village Boundary Maps

The approvement of village maps takes a long time due to the fact that any map has to be approved at the Regional and National level. At each level there are many maps to be approved. Delays discourage the villagers.

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