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Annex B8

Catchment Level Participatory Planning

A Case Study of Runoff Reservoir Project in Makanya Catchment, Western Pare Lowlands, Tanzania

SWMRG

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SUMMARY

A catchment level participatory planning study was conducted in Makanya catchment, Western Pare Lowlands. Participatory approaches have been shown to be effective in natural resource planning and management. Therefore, the purpose of the study was to use participatory approaches in order to combine local knowledge and external knowledge in initiatives that are action oriented and problem specific and which address locally identified concerns or opportunities. The study approach involved: i) institutional development at the local level ii) development of capacity of community groups and local leadership iii) the acquisition of (or access to) technical and management skills and enabling political environment. The implementation involved Village Governments Joint meeting, Sub-village meetings and General Village Assembly, meetings with Representatives from Mohammed Enterprise Sisal Estate and Tanzania Railway Cooperation, Ward Development Committee meetings and Joint Village Committee meetings. The results show that:

- There are challenges facing catchment approaches to management of CPR. These challenges stem from the existence of a variety of stakeholders, some looking similar but with diversified interests in water use. For example within a village there are different interests in water needs and priorities. Location of village/sub-village in the toposequence of a catchment and type of production enterprise make them to have different water needs. In most cases their needs are competing.
- There is a limit to both participatory and technical approaches in water management. Whereas scientific approach will be biased towards top-down approach, participatory methods may only assist in exposing the conflicts of interest without providing concrete answers to the problems. We learnt further that the combination of the two methods is useful in arriving at solutions to water management problems. Whereas the participatory approaches assist in identifying the conflicts along the catchment, the use of scientific approaches can lead to compromise of the different interests.
- Despite the differences in water needs among various stakeholders, the study has shown that use of non-biased external party, as dialogue mediator, can be essential for ensuring common understanding among the stakeholders. However, the process of establishing the conditions for agreement can be time consuming.

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1. Introduction

Participatory approaches have been shown to be effective in natural resource planning and management. The purpose of participatory approaches is to combine local knowledge and external knowledge in initiatives that are action oriented and problem specific and which address locally identified concerns or opportunities. Any participatory approach should lead to community empowerment. Empowerment here can be interpreted as the gaining of confidence and capacity of individuals and communities to take charge of their own development. In order to build this confidence, a number of key areas must be addressed. These include the following:

i) Institutional development at the local level
ii) Development of capacity of community groups and local leadership
iii) The acquisition of (or access to) technical and management skills and enabling political environment

In most examples of participatory planning, however, the planning unit has been a village. This close association with single communities leads to the problem of how to "scale up" a participatory approach to groups larger than the local community when catchment level planning is needed. Catchment level planning is generally necessary for water resources development because runoff is regarded as a Common Pool Resource (CPR) to both upstream and downstream communities. The actions of one local community located upstream affect the availability of water for local communities downstream. The linkage of runoff water resources systems within a water basin make it important that water resource development planning be undertaken by multi-community groups so that the interests of all the communities can be properly fulfilled.

This report describes an approach to participatory multi-community water resources planning based on a case study of Makanya catchment, in the Western Pare Lowlands (WPLL), Tanzania. The report describes the steps and results of the planning process, and draws some general conclusions about the advantages of this approach and about the institutional and policy support needed to make it more widespread in natural resource planning and management.

2. Background to the Process

2.1. The Study Area

The Makanya catchment, in the Western Pare Lowlands (Figure 1), is located 150 Km to the southeastern part of Moshi. The catchment runs from the peaks of south pare mountains westward to Pangani River. The lowland part of the watershed is about 500m to 700m above sea level while the upper part reaches 2462 m above mean sea level.

The annual rainfall in the lower zone of the catchment is low to support agricultural production without water management interventions. It ranges between 250mm and 400 mm, falling in two seasons: short rains (*vuli*) between November and January and long rains (*Masika*) between March and May. Agricultural production in this zone is only possible through Rainwater Harvesting (RWH) using supplementary water mainly from ephemeral flows during the rainy season. The rains fall mostly in the upper zone of the catchment as heavy showers (storms) which produce a lot of runoff. The runoff flows downstream where it is diverted to the farms through canals. The storms are, however, very few and far between. According to key informants, the storms normally occur three times during short rainy seasons. In November they do last for about a day or three days while those in December can last up to seven days. Sometimes manageable floods occur in January too. However, in the last three years (2001, 2002 and 2003) there have been no big storms. During long rains big storms occur three to four times. Generally, storms that occur during the short rains are bigger and more reliable.

Dry spells are very common in the area especially during long rains. The most dangerous dry spells are those occurring in January and February when maize is tussling. Farmers lament that “just one more storm would have been sufficient to realise a good crop”. This is why most of the farmers, particularly in Makanya village, do believe that a water reservoir is key to improvement of crop yields in the area. Stored water could be used to bridge the gap between rainfall events and thus reduce the effects of dry spells.

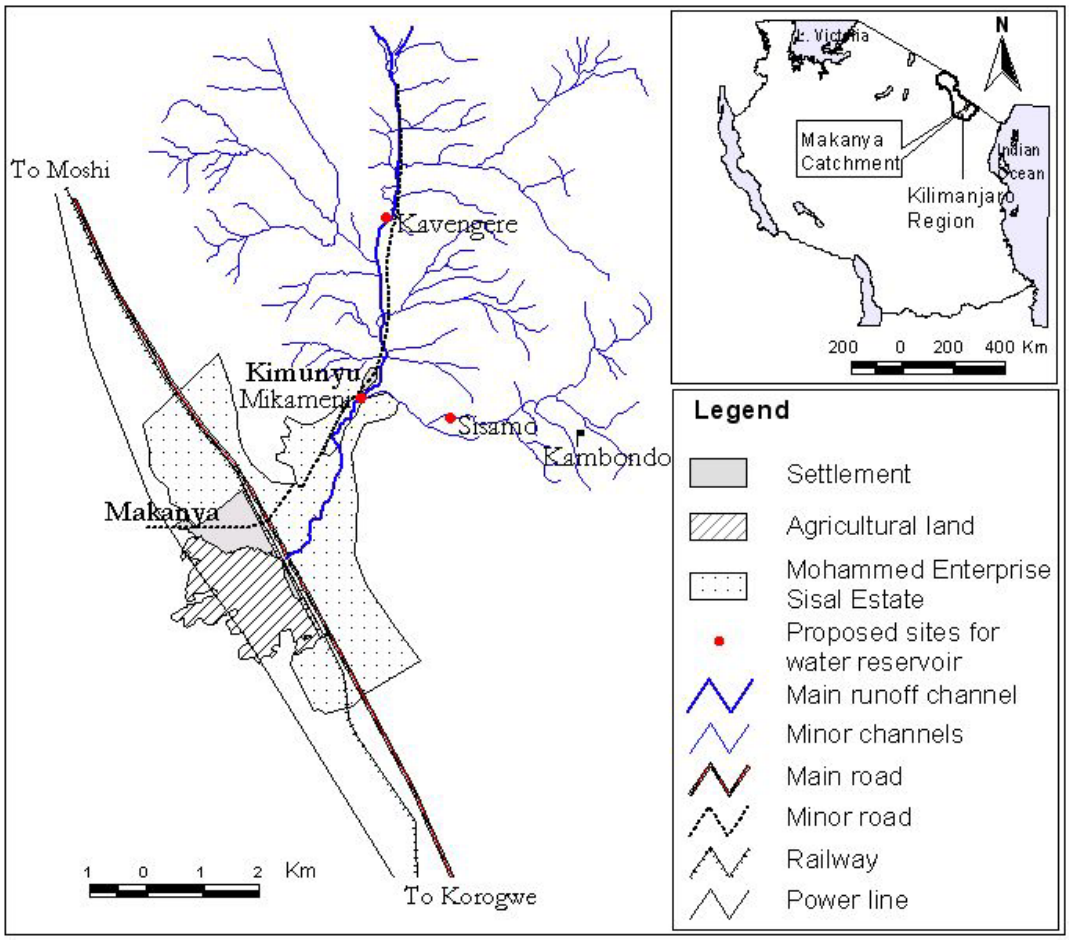

Figure 1: Part of the Makanya catchment: Land uses, water resources (ephemeral streams) and proposed reservoir sites

2.2. Past and Current Institutional Arrangements for CPR Management in the Makanya Catchment

2.2.1 Institutional Arrangements before Independence

Before and during colonial era, local chiefs were the managers of natural resources including runoff water. To ensure better management of resources common to both upstream and downstream users, chiefdom was occupying a geographical area running from the upper zone of the catchment to the lower zone. There were also verbal agreements between the users from the two zones. For example, upstream users would abstract runoff water during daytime and leave it to flow downstream during the night. Such agreements were highly respected and adhered to. Breaches to the agreements would lead to high and humiliating punishments. In Makanya catchment, implementation of such agreements was easy because the Chief ("*Mfumwa*") had his headquarters in the lower zone. Excessive abstraction of runoff water by upstream users would result to denying the *Mfumwa* access to water. This would not be socially acceptable.

2.2.2 Institutional Arrangements after Independence

After independence in 1961 the local chiefdom system was abandoned and the local government administrative system was introduced based around the structure of sub villages, villages, wards, divisions, districts and regions. Consequently catchments were divided up into administrative units cutting across the catchment. Since then, runoff water has been managed at village rather than catchment level. Committees and small water user groups are the organs used to manage the resource.

There is a notion that in Tanzania the village structure provides for a unique and viable institutional basis for locally based natural resource management. However, inability to easily handle issues related to management of cross boundary resources at local level is a set back that often lead to misunderstandings between downstream and upstream dwellers, particularly when the catchment comprises of several villages.

2.3. Past Attempts to Construct a Water Reservoir in the Makanya Catchment

Attempts to construct a water reservoir for supplementary irrigation in the Makanya area dates back to 1925. The main attempts are summarized in the following paragraphs:

In 1925 Mr. Monari, the then manager of Makanya sisal estate, attempted to construct a canal from Kambondo (Figure 1) to the estate, currently known as Mohamed Enterprise Sisal Estate (MESE). The water would have been dammed at Mikameni, near the estate, to irrigate his own farm and part of Makanya cropland. According to informants, Mr. Monari's plan failed because of some technical and social problems. Technically, a canal had to be very deep to command water up the slope. This required very high investment in terms of cash and labour. Socially, there were superstitious beliefs regarding the proposed dam site. According to the villagers, there were sounds of cock crowing in the site during night time. This was believed to be a sign of a bad omen. As a result the project was abandoned. However, it is believed that the project could have been completed if Mr. Monari had involved the community in the project process.

In 1950s a proposal to construct a dam at Mikameni area to supply irrigation water to Makanya village was put forward (**by who? to who?**). However, the proposal was rejected because there was already a similar plan to construct the *Nyumba ya Mungu* dam about 100 Km from Makanya village. Instead, it was proposed to construct a canal from *Nyumba ya Mungu* to Hedaru town, located 20 Km from Makanya village. The canal was to supply irrigation water to all the places where it was supposed to pass including Makanya village. Unfortunately the canal was not constructed because the costs were found to be too high.

In 1987 there was an attempt by Kilimanjaro Zonal Irrigation Office, to identify areas suitable for irrigation including sites for water reservoirs in Same District. Personal discussion with irrigation officers in the Kilimanjaro zone indicated that Makanya was among the areas and was included in the government budget. Unfortunately, due to change in government priority in funding, the project was abandoned.

In 1988 World Vision Tanzania agreed to support Makanya village to construct a dam to store runoff water for supplementary irrigation. Unfortunately the project could not take off because the people from Mgwasi village, where the dam site (Kavengere) was located, were not involved in the project design. As a result, 600 bags of cement, worth about 4,200,000 Tsh, that could have been used in the project were damaged.

The following lessons can be drawn from the historical background to the attempts to construct water reservoirs for supplementary irrigation in the Makanya area:

i) The need to construct water reservoirs to increase agricultural production in the area is not a new idea. It was realised and thought viable by the communities and some potential donors more than seven decades ago. Implementation of re-emerging similar ideas should learn a lesson to what happened in the past.
ii) Insufficient participation of project beneficiaries has been observed to be one of the main snags in the implementation of the past projects. Future attempts should therefore critically consider involvement of project stakeholders from the identification stage. The participation of a great number of people will help to achieve the full utilisation of the project capacities.

3. Participatory Planning Process for the Makanya Water Reservoir

3.1. The Makanya Village Government Approach

In May 2003 the Minister for Agriculture and Food Security Hon. Charles Keenja visited Makanya village and held a public meeting with farmers. The visit was part of his mission to assess food requirements in Same District following poor rains in the last season. Makanya was visited mainly because it was considered to have high potential to produce a substantial crop harvest as a result of macro RWH. During the meeting farmers requested the Minister to assist them in the construction of RWH storage facility so as to improve and stabilize crop yields. The Minister promised to assist in soliciting funds for the project as long as it is proved viable. He asked Zonal and District irrigation offices and Soil Water Management Research Group (SWRMG) to prepare the project write up for the project.

Following a positive reaction from the Minister, Makanya village leadership convened a meeting in May 2003 to discuss possible sites for locating the water storage structure and the way forward. The challenge was to identify suitable site(s) from which the stored runoff water could run downstream through gravitational force to the main cropland. Considering the location of the main cropland and the Mohamed Enterprise Sisal Estate, and topography of the area, all suitable sites were found to situated in another village called Mgwasi. Most of the area in Makanya village is very flat and the area upstream to the cropland is already occupied with sisal plantations. Having noted that, the meeting selected a team of three people to go to Mgwasi village and discuss with the leadership to support the idea of constructing a dam in Mgwasi village, close to the boundary between the two villages. Their Justification was based on the fact that Makanya has a vast agricultural land which could be made more useful by improving water availability. As a result, many people, including those from Mgwasi village, would manage to cultivate the land and hence improve food security. Mgwasi leadership was completely against the idea, not because the project would not be beneficial, but because of skewed project benefits. They argued that Mgwasi would become suppliers of land and water to Makanya people and while themselves benefiting nothing from the project. They also argued that the proposed location is very close to the Kimunyu settlement and would submerge a portion of their farmland. The chairman of Mgwasi village said "*We cannot sell our land and waste our settlement, farmland and water to benefit Makanya people. I am going to tell my people that this is not possible, they should disagree completely*". The meeting ended without a compromise.

To save the situation from collapsing, Makanya village requested the SWMRG to act as a mediator in a dialogue between the two villages and lead the process of defining an effective strategy for development of the project. SWMRG was approached because of the already existing partnership between the Group and local community in research and development projects. The Group is conducting three research projects in the area, all employing participatory approaches since 2001, and was involved in charco dam projects.

3.2. The SWMRG Approach

Rather than focusing on planning at community level, SWMRG chose to focus on catchment level. The main reason was because of the interdependence among catchment villages on the use of runoff as a Common Pool Resource (CPR). Supplementary irrigation water used in Makanya village comes from the highlands of the catchment, thus increased water abstraction in the highlands will reduce the flows downstream. A draft planning guide (Box 1), extracted from a planning matrix shown in Appendix 1, was therefore devised to guide the process of defining an effective strategy for implementation of the project. The core issue in the guide is participation of stakeholders.

Box 1: A summary of planning guide for development of a small scale RWH project at catchment level (for details refer to Appendix 1)

1) Project identification
2) Participatory project planning
3) Initial feasibility study of the project
4) Preparation of a comprehensive plan
5) Implementation
6) Project monitoring and evaluation

3.2.1 Village Governments Joint Meeting

The first step of the planning process involved SWMRG meeting with representatives from Makanya and Mgwasi village governments, including village chairmen and opinion leaders. In addition, ward councillors and officials from District Council and Zonal Irrigation offices from Moshi Region were invited. The primary objectives of the meeting were:

i) to introduce to the participants the planning matrix and ascertain if it would be a useful tool in the dialogue process.
ii) to identify stakeholders
iii) to introduce to the participants and discuss possible options of runoff water storage structures appropriate in their area,
iv) to propose possible sites for storage structure(s) that will be discussed later in sub village meetings

a) The Planning Matrix

The proposed matrix was found to be a useful dialogue tool to guide the process of defining an effective strategy for the development of the project. It was observed that, at the moment, there is no institution empowered to manage runoff water and other common pool resources at catchment level. Therefore, it was agreed by the village governments joint meeting that

formation of inter-village committee at later stages of the planning process, as proposed in SWMRG planning guide, is very relevant.

The participants agreed that the project could be very beneficial to people from both villages. However, to guarantee benefits to both down stream and upstream users, the project focus should be shifted from Makanya village to Makanya ward which include Mgwasi villages.

The participants recommended that opinions from the village governments joint meeting should be communicated to the whole community and get opinions through sub village meetings, general village assemblies and Ward Development Council (WDC) meetings. It was also recommended that reactions from Tanzania Railway Cooperation (TRC) and Mohamed Enterprise Sisal Estate, as key stakeholders in the dialogue, should be gathered. In addition, the participants recommended that previous attempts to construct dams in the area be documented so that people could learn from past experiences.

A joint village committee, comprising of village chairmen, councilors and six key persons (three from each village), was elected to take the opinions from the village government joint meeting to the villagers and guide subsequent dialogues and report the outcomes. The key persons where nominated based on their respect and hence ability to influence people. SWMRG was asked to take a facilitating role in the entire process.

b) Stakeholder analysis

The SWMRG explain to the participants the meaning of stakeholder analysis as the identification of a project's key stakeholders, an assessment of their interests, and the ways in which those interests affect project riskiness and viability. It contributes to project design by identifying the goals and roles of different groups, and by helping to formulate appropriate forms of engagement with these groups.

Thereafter, the participants identified three categories of stakeholders;

i) Those who will benefit from the project. The category includes Makanya and Mgwasi village.
ii) Those who may be affected by the project. The group includes Tanzania Electricity Supply Company (TANESCO), Tanzania Roads Agency (TANROAD), Tanzania Railway Cooperation (TRC), Mohammed Enterprise Sisal Estate (MESE),
iii) Those who should participate. The category includes Pangani River Basin Water Office, Ministry of Agriculture and Food Security (MAFS)-Irrigation Department, Same District Council and upstream villages (Mwembe, Chome, Tae, Vudee and Mwasi)

c) Options for water storage structures

SWMRG presented three options for storage of runoff water. The options were; small ponds, seasonal open dam (bathtub) and big dam.

- Small ponds would retain runoff from a single rainfall event. A structure to store such volumes is normally constructed upstream. The structure can increase duration of runoff availability for short period of time, control erosion, reduce water speed, and ease water distribution. This is the cheapest option.
- A seasonal open dam (bathtub) can store more runoff water compared to small ponds. It reduces water speed and also increases water availability to plants. The structure is designed to store excess runoff water for one season. It is more costly than the first option but gives better water command.
- A big dam can store large amount of runoff water, but needs large catchment area. Such structures are very expensive.

After the presentation, participants discussed among themselves and opted for seasonal open dam. The participants emphasized that the main problem facing crop production in the area is lack of water at critical crop growth stages such as tussling stage. This is despite the fact that excess runoff water is left unused during the beginning of the rainy season but not available during the middle crop development stages. Therefore, the excess runoff water if stored can be utilized during critical times. A big dam was found to be not appropriate because of the cost implication and unavailability of enough water to fill it. Given the dam size, most of the participants were convinced that the runoff water received in each season is not enough to fill the dam.

d) Possible sites for water storage structure(s)

Selecting appropriate sites for the storage structure was challenging. The ideal site should be able to store large amount of runoff water and be able to supply water to both villages. A number of sites were proposed and assessed based on the above challenges. In the end two sites were proposed to be further discussed in sub village meetings. The sites are Sisamo and Kavengere (Figure 1). Kavengere is located along the Mwembe stream and Sisamo located along the Tae stream. Both sites are located up stream of Mgwasi and Makanya village. It was concluded that the proposed sites were tentative, as community opinions, through meetings, had to be taken on board.

Plate 1: Kavengere site

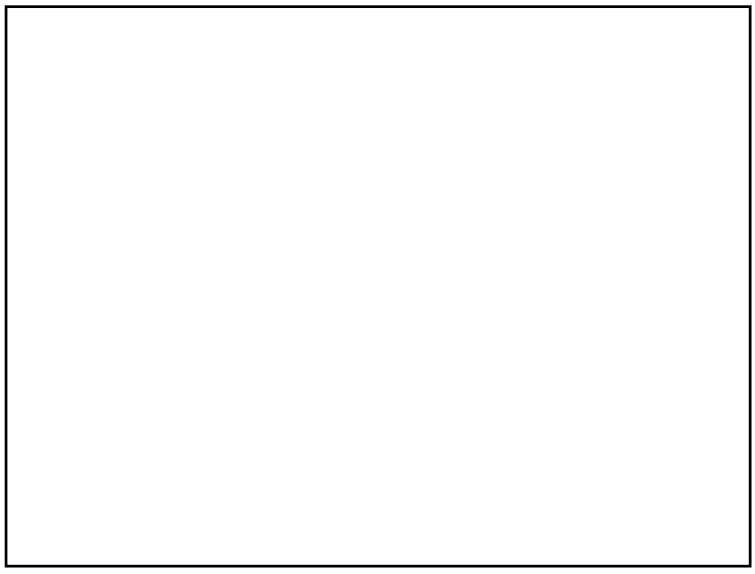

Plate 2: Sisamo site

3.2.2 Sub-village Meetings and General Village Assembly

General village assembly is the supreme body at village level, and normally meets once every three months. Each adult village resident is a member. Sub-village meetings are held once every month to discuss developmental activities at sub village level. Sub-village meetings give a much wider opportunity to gather variability of opinions in the same village. The resolutions from sub-village meetings contribute agenda for general village assembly.

Sixteen sub-village meetings (7 in Mgwasi and 9 in Makanya) were conducted. The main objective of the meetings was to discuss the proposed locations for storage structure(s). In Mgwasi village five out of seven sub villages accepted the proposed sites and two sub villages, Maji ya Chome and Vudee Msanga, disagreed. These sub villages are not likely to benefit from any of the proposed sites because they are located upstream of Kavengere site and far from Sisamo site. The sub villages had the opinion that it would be better to construct a dam around Mikameni area and a plan be established to reallocate people from Mgwasi to Makanya. However the overall resolution by the village assembly was to accept proposed sites by the Mgwasi village governments joint meeting.

In Makanya village, five out of nine sub villages disagreed with the proposed project sites. Those who opposed the proposal argued that Kavengere and Sisamo sites are too small to pond enough water to supply two villages. They commented that by so doing the project will be guaranteeing water to Mgwasi while denying Makanya people the same resource. They proposed Mikameni site located in the boundary of the two villages. The site can collect water from both Kavengere and Sisamo sub-catchments. Kwesasu sub village, which is dominated by pastoralists, expressed fear of not getting water for livestock. They argued that, as a result of the project, all runoff water will be harvested and used for crop production only. They proposed that, in addition to the dam, a communal charcodam for livestock water at Mbalani area should be constructed. The charcodam will collect water from Nkwini stream. The Makanya village assembly summarized the sub village views and proposed Mikameni site and not Kavengere and Sisamo.

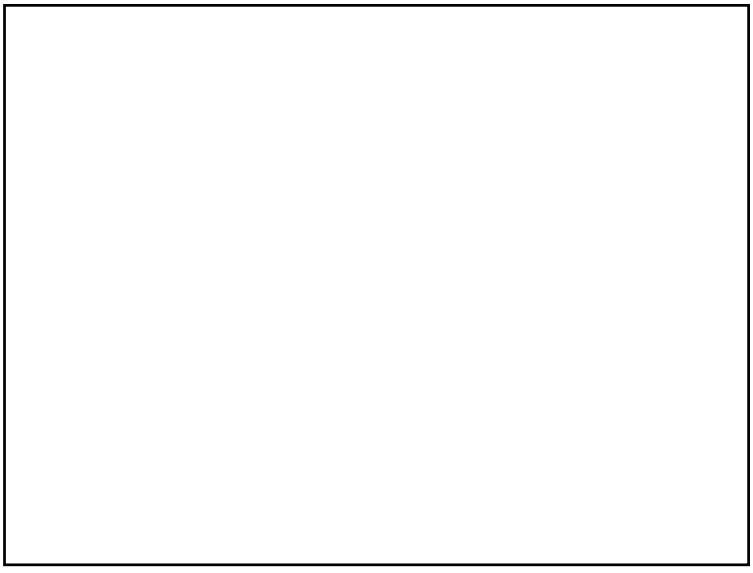

Plate 3: Mikameni site

3.2.3 Meeting with Representatives from Mohammed Enterprise Sisal Estate and Tanzania Railway Cooperation

Tanzania Railway Cooperation (TRC) and Mohamed Enterprise Sisal Estate (MESE) (Figure 1) are big stakeholders in the dialogue as they can all be affected by the project. MESE owns a sisal estate and decorticating factory close to the Makanya stream while TRC owns a bridge across the stream. They are both located downstream of the proposed project sites. TRC supported the idea as it believes that the project will be well designed and all precautions taken for any obvious risk.

MESE agreed that Makanya receives very little rainfall thus the project is very vital to the area. However, on the proposed sites, MESE was very negative for Mikameni site and supported the Kavengere and Sisamo sites. MESE argued that Mikameni is close to their farm and factory and Kimunyu settlement (Figure 1). Furthermore, they argued that the site is not appropriate for a dam because of very unstable soils.

3.2.4 Ward Development Committee Meeting

The Ward Development Committee is the overall board coordinating all development activities including management of common pool resources at ward level. It approves the ward development plans, which are developed through a combination of village development plans. The committee is composed of councillors, village chairmen, any member of the District Council living in the ward, other persons who may be invited who shall include people from NGOs and other civic groups involved in the promotion of development in the ward but shall have no right to vote. The committee meets once in three months.

The committee observed a clear disagreement between the two villages on the proposed reservoir locations. Makanya opted for Mikameni while Mgwasi opted for Kavengere and Sisamo. The WDC proposed that since villagers have vast knowledge on their areas, all proposed sites should be technically assessed and the outcome be incorporated in the final decision-making.

3.2.5 Joint Village Committee Meeting

A joint village committee meeting was held to synthesise the collected minutes from all the village governments, sub villages and ward meetings and to propose the way forward. A report on stakeholders' views (potential benefits and risks) regarding the proposed sites was discussed for further steps. The committee had to meet for the second time after failing to endorse the minutes in the first meeting. In the first meeting it was observed that some important conclusions were either omitted or misinterpreted by the two recorders. It was decided to crosscheck, recompile, type and resubmit the minutes from the recorders. This was the meeting in which the minutes were resubmitted for endorsement. All representatives from the two villages acknowledged that the recommendations made in the previous meeting had been accommodated. However, throughout the meeting a distinct tension and

mistrust existed between the two villages. Each side was trying to defend its interest. Participants from Makanya were adamant on their choice of Mikameni as the best site to locate the water reservoir, while those from Mgwasi stuck to Kavengere and Sisamo. Makanya village representatives were arguing that Mikameni is the appropriate location to harvest sufficient water for their requirements. The other locations will collect too little water to reach their fields. In addition, they would be ready to allocate some farms to residents from Mgwasi. The idea was, however, not welcome by Mgwasi representatives. They argued that despite the fact that there is a vast fertile land in Makanya, they are not ready to move to Makanya just like some of Makanya residents did not like to go up to Mgwasi in the years when their area was flooded and homes washed away. Mgwasi favoured a location upstream urging that it is the only place where at least some fields in their village will benefit from the project. The site will also cause less damage to fields, roads and residential areas compared to the choice made by Makanya village.

It was observed that representatives from both villages perceived that the decision to locate the reservoir would be based on votes i.e. the village with more counts wins. That is why Makanya representatives assumed to have won the “battle” while their counterparts struggled to refute resolutions favouring Makanya wherever was possible because most of the sub village resolutions favoured Makanya’s choice. One typical case of disputes was the minutes from the sub villages of Maji ya Chome and Vudee Msanga from Mgwasi village. Resolutions from the sub villages favoured Makanya village. Mgwasi representatives challenged the resolution claiming that Makanya committee members arrived earlier in the meeting in order to influence the two sub villages by threatening them that if the reservoir is constructed in their sub village, all residents will have to be moved. Another case was the minutes from Makanya A and B sub villages. The minutes from these sub-villages were disputed by Mgwasi representatives claiming that the attendance list was deliberately increased (from 30 to 64) in order to enhance Makanya winning chances. The allegations were refuted by Makanya representatives.

The SWMRG informed the participants that the decision to locate the reservoir will depend on both technical considerations and critical recommendations from the two villages and assured them that the project goal is to bring about the desired changes while avoiding undesirable situations. Finally, all committee members realised that the two villages alone cannot resolve the issue of deciding on the site for the location of the reservoir. They agreed that the committee compile and summarize all recommendations from all previous meetings showing potential benefits and risks for each proposed location (Table 1). The information would then be presented to experts for technical assessment of each proposed site. Experts should however ensure that all identified risks related to the selected location are sufficiently addressed and each village should realise the desired benefits. The meeting agreed that SWMRG should lead the assessment/feasibility study of the three proposed sites. To facilitate the assessment, each village was asked to define the following:

i) The desired changes (benefits) they would like the project to bring
ii) The undesirable changes (threats/risks) they would not like the project to bring

The results are as presented in table 1.

Table 1: Desire and undesired changes as a result of water reservoir project based on Makanya and Mgwasi joint committee village meeting

Village	Desired changes	Undesired changes
Makanya	(i) Enough water to suffice requirements of the current fields (ii) Expansion of the cultivated areas	(i) A need to make consultation to another village for water allocation
Mgwasi	(i) Enough water at least up to maturity stage to the fields potential for RWH	(i) Loss of cultivated land (ii) Destruction of settlements and a need for people to be shifted

The meeting also agreed on the following:

i) All minutes of the previous meetings relating to this exercise be organised in a form of book/file and distributed to the committee members.
ii) Concrete resolutions of the meeting be compiled and presented to joint stakeholders meeting for refinement before being submitted to experts for technical analysis.
iii) SWMRG and ward office to facilitate organisation of a joint stakeholders meeting. Apart from presenting the concrete resolutions of this meeting, the meeting will also assess and define stakeholder's responsibilities and commitments in the project.

Table 2: A summary of potential benefits and risks of the proposed sites based on sub villages meetings

Site	Benefits	Threats/Risks
Kavengere	(i) Both villages will get runoff water (ii) The catchment produces heavy and long lasting storms	(i) Water shortage in Makanya (ii) Presence of superstitions (iii) Inadequate arable land to meet the demand
Sisamo	(i) Both villages will get runoff water (ii) The catchment produces heavy and long lasting storms	(i) Water shortage in Makanya (ii) Presence of superstitions (iii) The catchment area is very small (iv) Inadequate arable land to meet the high people demand
Mikameni	(i) There is high potential for collecting enough water. (ii) The agricultural land at Makanya could be expanded to cater for farmers from Mgwasi village (iii) Will solve the problem of the downstream users while not affecting upstream users.	(i) Mgwasi people will not benefit. (ii) Kimunyu settlement (Mgwasi village) will be affected by losing 20ha. (iii) The roads will be affected. (iv) The sisal estate will be affected. (v) The soil is not suitable (soil is so fragile)

3.2.6 Initial Feasibility Study of the Proposed Water Reservoir Sites

(i) Methodology

The feasibility study was divided into two phases. The first phase involved a qualitative assessment of the site by a team of SWMRG and joint village committee while the second phase involved a technical assessment of the sites by Kilimanjaro zonal irrigation office.

a) Qualitative assessment of the proposed sites

A team of SWMRG and joint village committee visited the proposed sites to:

i) crosscheck the advantage (benefits) and disadvantages (threats/risks) for each site identified during sub village meetings (Table 1)
ii) qualitatively assess the suitability of the sites.

The team discussed the parameters presented by SWMRG to be used during suitability assessment. The following parameters were discussed and agreed:

- Size of the catchment supplying runoff to the site and potential runoff volume received by the site

- Command area for each site
- Stream banks stability at the proposed site location
- Soil characteristics related to water storage
- Possible negative effects upstream the reservoir (e.g. flooding to the fields, settlement)
- Average flow depth and duration of occurrences per season.

In order to obtain adequate data for estimating runoff passing through each site, key informants were asked to estimate depths of high, normal and low flows. However, these measurements do not suffice data requirement for calculation of water volumes in the streams. A more technical approach should therefore be used.

Estimation of water flow was done for all the streams. For Sisamo stream, this was done at a crossing 500m from a proposed location for intake construction. For Kavengere stream the estimation was done at the proposed point for intake construction and for Mikameni estimation was done between the sisal factory and main road bridge.

b) Technical assessment of the proposed sites

(ii) Results

Table 2 and 3 present the results from qualitative and technical assessment of the three proposed water reservoir sites.

Table 3: Qualitative assessment of potential benefits and risks for each site by SWMRG and joint village committee

Criteria	Location and observations by the team			Opinion
	Kavengere	Mikameni	Sisamo	
Benefiting villages	All	Makanya only	All	Technical assessment on benefit–cost ratio should be done
Command Area	Muheza-Mgwasi and all of Makanya	All of Makanya	Mvumweni–Mgwasi and all of Makanya	
Possibility of expansion of irrigated area	Mgwasi - Not possible Makanya - Not known	Mgwasi	Mgwasi - Not possible Makanya - Not known	It depends on the amount of water to be harvested as per technical evaluation
The advantages overweigh disadvantages	True	Not true on bases of the original idea of putting a bank between two hills (span and height would be very large)	True	Agreed to drop the idea and construct the bank in the stream only to avoid negative effects in Mikameni area.
Possibility of Reduced water supply in Makanya	Not known	Not true	Not Known	Needs technical approval
Superstitions	Not True	Not True	Not True	
Catchment Size	Nearly half of the water to Makanya come from this area	All water that reaches Makanya Passes here	Nearly one third of water that reaches Makanya passes here)	Technical assessment on the amount of water to be done
Water storage Capacity	High due to high depth to width ratio and hard soils	Low due to low depth to width ratio and loose soils	High due to high depth to width ratio and hard soils	
Possibility of destruction of	No	High if the original idea of putting a bank	No	Agreed to drop the idea and construct the bank

Criteria	Location and observations by the team			Opinion
	Kavengere	Mikameni	Sisamo	
settlement areas		between two hills is implemented		in the stream only to avoid negative effects in Mikameni area.
Possibility of effecting road communication	There is this possibility also the power line may be affected	High if the original idea of putting a bank between two hills is implemented	No	Agreed to drop the idea and construct the bank in the stream only to avoid negative effects in Mikameni area.
Possibility of affecting the current cropped fields.	There is this possibility however the intensity can be reduced	Mvumweni fields and sisal estate will badly be affected if the original idea of putting a bank between two hills is implemented.	No	Agreed to drop the idea and construct the bank in the stream only to avoid negative effects in Mikameni area.
Stream banks stability	High due to presence of rocks in all parts and in the steam	Very weak due to presence of loose soils	High due to presence of rocks in all parts and in the steam	

Table 4: Technical assessment of the proposed water reservoir sites

4. Lessons from the Catchment Level Participatory Planning Process

Most participatory planning processes are focused at village or community as planning unit. The case study described in this report provides an example of how the approach can be made effective at multi-village level. The approach is necessary for water resources development because water is a CPR to both upstream and downstream communities.

Some of the important lessons which could be drawn from the study are described in the subsequent paragraphs.

The study has ascertained the challenges facing catchment approaches to management of CPR. These challenges stem from the existence of a variety of stakeholders, some looking similar but with diversified interests in water use. The study has also shown that within a village there are different interests in water needs and priorities. Location of village/sub-village in the toposequence of a catchment and type of production enterprise make them to have different water needs. In most cases their needs are competing.

Despite the differences in water needs among various stakeholders, the study has shown that use of non-biased external party, as dialogue mediator, can be essential for ensuring common understanding among the stakeholders. However, the process of establishing the conditions for agreement can be time consuming.

The study has shown that there is a limit to both participatory and technical approaches in water management. Whereas scientific approach will be biased towards top-down approach, participatory methods may only assist in exposing the conflicts of interest without providing concrete answers to the problems. We learnt further that the combination of the two methods is useful in arriving at solutions to water management problems. Whereas the participatory approaches assist in identifying the conflicts along the catchment, the use of scientific approaches can lead to compromise of the different interests.

5. The Way Forward

- Complete the process
- Formulation of apex and coordinating body

Appendix 1: Planning Matrix for Development of Small Scale RWH Project at Catchment Level

Planning Guide for Development of Small Scale RWH Project at Catchment Level				
Steps	**Why**	**How**	**Responsible**	**Output**
1. Project identification		▪ Undertake need or problem assessment ▪ Assess alternative solutions ▪ Identify appropriate solution	Pioneers of the project	Description of the project
2. Participatory project planning	▪ To assure those who may be affected by the project and agree with them on how the risks may be reduced or kept minimum. ▪ To make sure that important institutions, support the project ▪ To reduce chances of resistance to the project ▪ To make sure that all stakeholders (men, women, youths) understand and own	▪ Identify stakeholders through stakeholder analysis ▪ Involve key stakeholders in initial stages of project planning through meetings (sub-village, village assembly, WDC, etc) ▪ Endorse letter of understanding among key stakeholders	Pionners of the project Representatives of stakeholders Stakeholders Leaders (who and how) Govenmental and non governmental organizations, Community based organisations,	Description of the project Commitee of project pionners to facilitate project prepartion List of all stakeholders

Planning Guide for Development of Small Scale RWH Project at Catchment Level				
Steps	**Why**	**How**	**Responsible**	**Output**
	the project and appreciate its benefits		Facilitators	
3. Initial feasibility study	▪ To be sure that the project is demand driven and that it will be beneficial. ▪ To assist stakeholders in detemine the most appropriate location of the project ▪ To assist stakeholders particularly the beneficiaries to answer basic questions related to the project. These include: How will the project help? especially in improving income, What problems will the project solve?, Is there no other means/alternative of solving the existing problems?, Whose needs/interests/views should be prioritised in the plan?, Who are the primary and seconadary beneficiaries, How will gender concerns be addressed	▪ Identify resources (bio-physical, human, etc) available ▪ Identify existing opportunities and constraints ▪ Identify potential threats related to the project ▪ Assess strength and weaknesses of existing institutions for project management ▪ Make agreement on cost sharing among stakeholders sources of funds for the project	Key Informants Experts in zones and districts Researchers Non governmental organizationStakeholder especially beneficiaries and representatives of other stakeholders Facilitators	Project proposal for discussion with government, investors and sponsors. Initial budget estimate for the project. Decision on acquisition of funds for project development
4. Preparation of a comprehensive plan	To guide the imlementation prosses in order to be sure of: Benenefits expected from the project and who will benefit (men, wemen and youth) Actual project costs Environmental effect of the	▪ Conduct technical studies on bio-physical and socio-economic aspects ▪ Develop monitoring and evaluation indicators ▪ Assess institutional requirements for project	Beneficiaries Other stakeholders Planning commitee Reputable xperts	Feasibility studies reports accepted by all stake holders Confrmation of environmental effects of the project. Implementation, management

Planning Guide for Development of Small Scale RWH Project at Catchment Level				
Steps	**Why**	**How**	**Responsible**	**Output**
	project and the way to address them To make sure that financial and other resources (like land,labour) for project implementation are available	management ▪ Assess sustainability of the project ▪ Make agreement on cost sharing among stakeholders ▪ Ensure clearly defined time frame for project completion	Government and council experts Institutions Investors/sponsors Facilitators. Project beneficiaries District council Central government Sponsors Institutions	and follow up plan Contracts of sharing project or investment costs showing who will contribute what. Steps for preparing project plan
5. Implementation of the project		▪ Ensure active participation of each stakeholder ▪ Efficiency	Sponsors Inst Researchers Project beneficiaries Other stakeholders itutions	
6. Project monitoring and evaluation		▪ Collect and analyse data and information related to the developed indicators ▪ Make relevant adjustments to the project management	Researchers Project beneficiaries Other stakeholders	

- Peckoc and NH report
- Circulate to PADEP and PIDP and Zonal irrigation office for testing and comments