

Factors affecting integrated water management practices in Mwanja and Kalii watersheds in Machakos and Makindu Counties

A.W. Kagunyu, F.M. Matiri¹ and Kwena Kizito²

Kenya Agricultural Research Institute, Marsabit, annfestacy@yahoo.com

¹KARI-Embu

²KARI-Katumani

Abstract

Agriculture in Kenya continues to be the lifeline for the majority of the rural poor. The sector contributes up to 25 % of the total Gross Domestic Product (GDP) (World Bank, 2011). 80 % of the agricultural land in Kenya is under rain-fed agriculture, with generally low yield levels and high on-farm water losses. This problem led the KARI Katumani scientists to come up with this project which aimed at promoting Integrated Water Management (IWM) technologies, an effort geared towards increased food security in Mwanja and Kalii watersheds. This pilot project was based in Machakos and Makindu Counties. To warrant up scaling of the technologies it was important to conduct this study which aimed at trying to establish whether there are constraints which affected the implementation of the technologies. Ethnographic research methods were applied in data collection which included: Focus group discussions, direct observation and documentary information. The result showed that there were many challenges that faced implementation of IWM practices. They included poverty, delay in delivering subsidized fertilizers and seeds to farmers, myths surrounding success stories, inadequate labor, lack credit facilities, limited information on early warning, limited extension services, poor transportation means, and inadequate information on policies guiding IWM practices. This study recommends that the farmers should be linked to banks and other micro finances which would assist them to get loans. The government to deliver farm inputs on time, farmers to be equipped with weather forecast information on time, and to consider constructing feeder roads.

Key words: IWM, farmers, watershed, Mwanja and Kalii.

Introduction

According to Jaspers (2003), Integrated Water Management (IWM) is the management of surface and sub surface water in qualitative, quantitative and environmental sense from a multidisciplinary and participatory perspective. It focuses on the needs and requirements of the society at large with regard to water use for now and in the future and therefore aims at sustainability in all senses (Ong'or 2005). The concept of integrated watershed conservation and management in Kenya emanates from the relationships between nature, people and culture. Rainwater is the primary source of water in agriculture. Agriculture in Kenya continues to be the lifeline for the majority of the rural poor. Despite its significance as a primary source of livelihoods, the sector is afflicted by several challenges which are especially predominant in the Arid and Semi-Arid Lands (ASALs). The level of crop productivity is below potential and in recent years, yield and value for some agricultural produce have either remained constant or are on the decline (GOK 2010). ASALs in Kenya exhibit erratic rainfall and weather conditions (frequent dry spells with occasional flooding), frequent crop failures and low crop and livestock productivity (GOK 2010).

Watershed management as an entry point acts as the beginning to address the issues of sustainable rainwater management for improving livelihood. KARI Katumani saw the need to come up with IWM technologies to promote food production among the farmers in Machakos and Makindu however these were only pilot projects which upon their success would be up scaled elsewhere. Therefore to warrant up scaling of the technologies it was important to conduct this study which aimed at trying to identify the constraints which affected the implementation of the IWM practices.



Objectives of the study

The main objective of the study was to assess the constraints facing implementation of IWM practices in Mwanja and Kaliu watersheds in Machakos and Makindu counties. The specific objectives were to

- To identify and document the constraints faced by the farmers while trying to implement IWM technologies
- To come up with recommendations for promotion of IWM practices

Materials and methods

Study area

This study took place in Machakos and Makindu counties in Eastern part of Kenya. The sites were chosen purposively because this is where KARI with the support of Association of Strengthening Agricultural Research in East and Central Africa (ASARECA) had established some pilot projects. In Machakos, the study took place in Mwanja Watershed, while in Makindu it took place in Kaliu watershed. In the study sites the population is homogeneous.

Data collection

Documentary data was acquired through literature search of published and non published work in order to give some background information of the project.

Primary data was gathered through focus group discussion. A focus group discussion guide was used to gather information from all the groups. Six focus groups were conducted three from each watershed.

Table 1: Groups that participated

Mwanja watershed Focus groups	Venue	Kaliu watershed Focus groups	Venue
Love & Kaathi	AIC Church Love	Kaliu	Kaliu catholic church
Mwanja and Kilungu	Katamani - Resource Centre	Mtendeu	Kavete church
Kyamulu	AIC church Kyamulu	Nduluni	Nduluni catholic Church

Results and discussions

In total 134 people participated in focus group discussions. Kaliu focus group had the highest (20.2%) number of participants, Kaathi and love 19.4%, Kyamulu 18.6%, Mtendeu 17.1%, Mwanja and Kilungu 16.4%. Finally, Nduluni had the lowest (8.2%) number of participants. The explanation given for low participation was that there was another meeting which was being held by the Lutheran church, where relief food was being given.

More than half (56%) of the focus group discussants were females, while 44% of the participants were males. The reason given for this was that most men the study sites usually move to urban towns to look for jobs. On the other hands, women are left in villages and they are the major providers of the much needed labour in the farms.

Some of the IWM Technologies introduced

This study indicated that these groups were working with KARI apart from Mtendeu. It came out clearly that these groups were implementing IWM technologies which they were introduced by KARI Katamani. Some of the technologies mentioned included use of composite manure, agro-forestry, *tumbukisha*, *Fanya juu*, tied ridges, early planting, spacing, digging benches among others. It also came out clearly that the groups had embraced the introduced technologies by KARI. This study reveals that they had formed Water Resource Users Associations (WRUAs) so as to protect the watersheds.

Organizations involved in assisting the communities in implementing IWM practices

Findings of this study indicated that there were few organizations and institutions which were involved in assisting the farmers in Mwanja and Kalii watershed to implement IWM practices. Kenya Agricultural Research Institute (KARI) was ranked highly by all the groups in the two watersheds. KARI worked in collaboration with other government line ministries such as the Ministry of Agriculture (MoA), Kenya Forest Services (KFS), and Water Resources Management Authority (WRMA). The role of the church in promoting IWM practices was also highlighted although its contribution was not in a big scale, for instance groups in Mwanja watershed mentioned Katoloni mission for having provided them with tree seedlings to plant in their farms. NGOs such as Child Community Fund (CCF), Catholic Relief Service, Lutheran Church Foundation were also mentioned to have promoted IWM practices.

Major constraints facing implementation of IWM practices

Poverty. The first problem mentioned by focus group discussants from Mwanja and Kalii watershed that hindered the implementation use some IWM technologies. They indicated that some of the practices such as drip irrigation, green house, sand dams, tied ridges, *tumbukisha*, required a lot of money which they did not have. They said some of those technologies could not be implemented by people who had no sufficient resources. Therefore they indicated that since majority of them were poor they had to engage in those practices which were simple and affordable.

Delay in delivering subsidized fertilizers and seeds to farmers. Policies leading to liberalization and the removal of subsidies on farm inputs in the 1990s resulted in a rapid escalation of prices. As prices rose, farmers used less fertilizer or none at all, resulting in lower demand for the input. The government decided to promote agricultural production by subsidizing prices of fertilizers to farmers. These positive effects of government subsidies are felt by farmers in the country but in the study site they felt that the prices were still very high for them to buy. They also reported that the subsidized fertilizers and seeds were delayed and this affected planting which consequently affected production. The farmers also stated that sometimes the subsidized fertilizer was usually in small quantities and that sometimes it got out of stock before most of the farmers had acquired the inputs.

Inadequate labor. In the two study sites focus group discussions mentioned labour as a big problem which was affecting the implementation of IWM Practices. The reasons they gave for this was that their children were in schools and colleges. While those who had completed their collage education moved to urban areas in search of formal employment. Limited labour in Kenya is attributed to the education system which prepares young people for white collar jobs; a fact that contributes to the development of negative attitudes to agriculture and increased numbers of rural-urban migrants leaving behind the old, too young and women who are already over-burdened. Gender division of labor also impacted negatively on adoption and sustenance of watershed management measures since some of the duties such as land preparation, tillage and weeding are normally assigned to female while men provide their labor in activities which are income generating, such as in attending cash crops.

Lack of credit facilities. It was important to know whether the groups were having access to credit facilities as there was an assumption that they would get credits to implement some of the IWM practices. However, it came out clearly that the farmers had no access to credit facilities from the banking institutions. The most common source of credit was *Merry-go-round* in which members make monthly contribution to one another on rotational grounds. Limited access to credit can be explained by two factors. To smallholder farmers of semi-arid Mwanja and Kalii watershed, borrowing money for farming does not make economic sense as the chances of crop failure are much higher than those of success. Secondly majority of them are poor and therefore lack collateral, including lack of land title deeds

Salty water. According to the findings of this study slightly less than half (45%) of the discussants reported that they depended on water from Kiboko river which they said was salty. This problem was

highlighted by all focus group discussants from Kalii watershed. According to them salination affected the growth of some plants. They gave a case of tree nurseries which they had established but they all dried up. This argument is in agreement with Rhodes and Loveday (1990) which indicates that salination reduced rates of plant growth, reduced yields, and in severe cases, total crop failure. The problem mentioned have serious implications on the technologies introduced to enhance soil and water management.

Soil erosion. Soil erosion as a result of quarrying, sand harvesting and charcoal burning activities was also mentioned by all participants from Mwanja and Kalii watershed. They indicated that despite the fact that these activities contributed positively to generating income to the locals they impacted negatively to their environment especially sand harvesting for building houses, road constructions and sand as harvesters dig deeper, they leaving behind a series of gaping holes that make the stream water stagnate affecting the flow of water downstream. The study indicated that sand scooping has led to collapse of river banks.

Limited information on early warning. Focus group from Kalii Watershed indicated that weather forecast information provided was not always reliable. They indicated that sometimes the information provided about the onset and amount of the rains was misleading. They gave a case In point where by, they were informed that the rains would come earlier but it came very late and was poorly distributed as a result their crops were affected. In some cases the meteorological announces that there would be plenty of rains but it ends up being little. According to them the meteorological department is not supposed to give generalized information of a whole county but would be better if weather forecast information would be specified according to regions.

Limited extension services. According to the findings of this study focus group discussants stated that extension officers were rare. Some groups said that they have never seen extension officers, others revealed that they started having interactions with extension officers during the implementation of ASARECA project which was introduced to them through KARI. It was important to understand how they were getting information before KARIs interventions and they indicated that they used to get from exchanging ideas with other farmers. The agricultural sector extension service plays a key role in disseminating knowledge, technologies and agricultural information, and in linking farmers with other actors in the economy. However limited access to extension services hinders most farmers from keeping pace with introduced watershed management technologies.

Poor transportation means. Focus group discussants reported that poor roads made it almost impossible to take the needed inputs such as fertilizers to their farms. They also stated that poor roads led to increased prices of goods from the farms to the markets and vice versa. In addition it also led to spoilage of perishable commodities as they wait for the available transport and during transportation. They also indicated that in some cases they do not get transport at all especially during the rainy season since most of the roads are not tarmacked which makes them impassable during the rainy season hence if there farm inputs to be transported they are delayed until the rain stops. This complicates planting and harvesting of some farm commodities.

Discussions, conclusions and recommendations

The findings of this study indicated that the communities of Mwanja and Kalii watershed had been taught IWM technologies. According to the focus group discussants there were some institutions and organizations which were involved in introduction of IWM practices. They included government departments, NGOs and faith-based organizations. However, the discussants indicated that KARI had contributed significantly to the implementation of IWM technologies as compared to the other stakeholders. The study indicated that there were various constraints which hindered the full implementation of some of the introduced technologies. The constraints included poverty, the focus group discussants indicated that some IWM practices required a lot of capital and since the members were subsistence farmers they did not have capital to fund heavy investments. The other constraint

mentioned was delay in delivering subsidized fertilizers and seeds to farmers by the agriculture departments and as a result farmers planted without fertilizers and also planting seeds which are not certified leading to low yields. Inadequate labour was also highlighted and this was attributed to children having been taken to learning institutions and rural urban migration. Limited access to credit facilities was also mentioned as the discussants indicated that their only source was *Merry-go-round*. Soil salination was mentioned as a big problem by Kalii focus groups. Other problems reported included inadequate weather forecast information, extension services and transportation.

Conclusion

This list of challenges facing IWM implementation in Mwanja and Makindu watershed can be solved if effective extension and advisory services would be accorded to farmers especially. Those relating to poverty, labour and lack of credit facilities would be solved by the farmers being linked to banks who give credit to farmers.

Recommendations

This study recommends that the farmers should be linked to banks and other micro finances which would assist them to get loans. There is also need for the government to make sure that subsidized fertilizers and seeds are delivered to the farmers on time. A study of the degree and necessary remedial measures on saline soils is required. In addition there is also need for the farmers to be well equipped with weather forecast information as this will assist them to plant at the right time and suitable crops depending on the information given. There is also need for the government to consider constructing feeder roads and also to recruit extension officers.

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