

From Rhetoric to Practice: Gender Participation in the Fight for Survival

The Story of Sand Dams in Kitui (Kenya)



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Abstract

Kenya is among a group of countries faced with inadequate renewable resources, a problem acute in arid and semi-arid parts and compounded by weak development institutional arrangements. Only 45% of Kenyans have access to clean water. Studies show that communities living in arid and semi arid lands have limitations in accessing sources of water.

The story of sand dams in Kitui is another example of positive reaction to drought caused misery and distress. Since 1992, women and men in Kitui have taken action for survival. This community has proved less conservative and more adaptive to change. Men are accepting a less dominant role. The community has realized its potentials. There is nothing to hold them back and nothing seems to be too difficult to them.

The success of the sand dam project in Kitui is based on community participation, which is strongly rooted in greater understanding of the differences and overlaps between women and men roles and responsibilities. The fact that almost all women involved are housewives suggests that their new roles are accepted and supported by the male members of their respective households and the community at large.

This paper attempts to explore the gender considerations of relevance in sand dam planning, construction, and maintenance based on the review of the available literature and observation in the field. It explores gender participation and inputs in various stages of sand dam project and the benefits accruing thereof.

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CHAPTER ONE: INTRODUCTION

1.1 Background

Kenya is among a group of countries faced with inadequate renewable resources, a problem acute in arid and semi-arid parts and compounded by weak development institutional arrangements. Only 45% of Kenyans have access to clean water. Generally, households living in the medium and high potential part of the country are considered to have access to safe water if they can get 20 litres of clean drinking water daily from sources within a kilometre away (Kimuyu 1998). Studies show that communities living in arid and semi arid lands have limitations in accessing sources of water. They use open water sources, more prone to contamination, during the dry season. Closeness to a source of water and opportunities for multiple applications of the source are important considerations in choosing technologies for providing water sources.

Most governments in the developing countries are shifting their roles from 'providers' to facilitators'. This has been necessitated by contracting resources, sustainability and the failure of 'top down' (*one size fits all*) approach to development. This shift is placing more emphasis on water resources management at the lowest appropriate level. It calls for the empowerment of the users and interaction between the users, non-governmental organizations, private sector and the local government.

Major weaknesses and gaps preventing communities from benefiting from their water supply systems has been reported (IRC 1995). These include insufficient capacity building; partial coverage of user populations; lack of effective and equitable financing systems; absence of suitable management tools; environmental degradation of water sheds; and absence of proper gender balance in planning for, contributions to and control over the established water service.

Much can be achieved by building on experience with locally developed management patterns for traditional water sources. Water collection and use are often regulated by explicit agreements (IRC 1995). Women, who have for long played a crucial role in the traditional society, make many of these agreements. Management of water resources, and also proven to be capable of taking responsibility for complex technologies, as well as managing basic care of water points. Women and men can play decisive and indispensable roles in ensuring the success of water improvement programmes, when neither party is overburdened or excluded and then when work, authority and training are divided in a well-balanced way.

1.2 Kitui District in Perspective

Kitui district in Kenya's Eastern Province is semi-arid and lack of water is perennial story. This district extends for roughly 200km from north to south and 120km from east to west. It covers an area of approximately 20,555.74km² including 6369.1km²

occupied by the uninhabited Tsavo National Park. The climate is hot and dry for most of the year and is characterized as an arid and semi arid area with very unreliable rainfall. The high rate of evaporation, combined with unreliable rains (1000mm), limit intensive and meaningful land use and other related development activities. Kitui population stands at 574,215 people with a density of 213 persons/km² (Republic of Kenya, 1997). Sixty per cent of the households in Kitui are female headed and this has impact on the household human capital endowment. This is because of various reasons including men working outside the district, single parenthood and widowhood.

Moving southward from Kitui town, the land falls gradually and rainfall decreases. The land is characterized by scattered homesteads and irregular patches of cropland interspersed with areas under grass or bush. Indigenous trees such as *Acacia tortilis* and *Terminalia brownii* are common, and together with the occasional boabom, typify the hot, dry conditions that prevail. *Senna siamea* trees with bright yellow flowers are noticeable around many homesteads, and sisal together with the shrub *Lantana camara* is common along field boundaries (SASOL 1999).

1.2.1 Water resources

Water is a common denominator and a major development input; and thus remains the most essential commodity in the District. The search for water is a significant preoccupation of the people of Kitui District as there are only a few water sources such as rivers and springs to serve them. The major sources of water are perennial rivers. The population residing along the rivers does benefit from subsurface water in the sandy riverbeds. Distance to source frequency of water fetching trips and number of persons per trip varies between the wet and dry seasons. Sources of water are usually rare during the dry seasons. In some places, women walk as far 25-30kms, a round trip of around five hours returning with water of questionable quality. The water available is relatively of good quality partially due to minimal use of agricultural chemicals and little industrial discharge. The size of the household, economic status and proportions of females in the household positively influence the domestic demand for water in the household (Kimuyu 1998).

1.2.2 Agricultural Activities

Dry land farming is practiced. Agricultural activities are mainly subsistence in nature and are highly constrained by weather conditions. However its important to note that the poor and rich households draw 77% and 22% respectively of their incomes from agriculture. Irrigation potential along rivers has been only minimally exploited. With more use of these rivers, a lot of cultivation would be done to increase food production in the District.

1.2.3 Livestock production activities

Due to the arid climate of the District, livestock production is a major economic activity. The majority of the rural households keep cattle either for meat, milk, pulling carts and/or ploughing.

1.2.4 Food availability

The District normally experiences food deficit due to recurrent drought episodes. The little harvest gotten is supplemented by relief food from donor agencies. To avail food to the majority of the population there is need to improve water supply in the district so that food production can be increased. And the need is urgent.

1.3 SASOL and the Sand Dams

SASOL stands for Sahelian Solutions Foundation. It is a non-governmental organization founded in 1990. Its motivation was to address water scarcity in Kitui district. Initially, SASOL intended to facilitate the development of water through construction of shallow wells; water tanks and rock catchments to harness rain water; sand dams and other sources. The main objective was to shorten the distances families had to move in search of water, limiting it to a maximum of two kilometres. Of all these methods, construction of the sand dams brought about unique dimension in the whole water development process in the area. To date over 200 sand dams have been constructed in central and western parts of Kitui district.

Sand dams are not new in the district. The earliest were constructed during the colonial period in 1950's, and most of these are still in existence. At that time, they were referred to as sub-surface dams because the water is stored below the surface. However, the term 'sub-surface dam' is used in some countries to refer to a barrier below the surface. It could also be used to refer to an impervious underground barrier in a low-lying area that prevents the lateral flow of ground water and maintaining or raising the water table. In contrast, a sand dam is made as a concrete or masonry barrier on an ephemeral river. Although the upper side of the wall may be hidden by sand, the lower side is usually exposed, in part due to excavation by water when the river is following.

1.4 Objectives

The main objective of this paper is to assess gender participation and the associated costs and benefits to the community in the sand dam water project in Kitui District (Kenya). It focuses on the participation of women and men in the various stages (consultation, decision making, construction, and maintenance) in this project. Attention is also paid to the costs incurred and benefits accruing from the project.

1.5 Scope

This paper attempts to explore the gender considerations of relevance in sand dam planning, construction, and maintenance based on the review of the available literature and observation in the field. It explores gender relations in terms of inputs in various stages of sand dam project (planning, construction, and maintenance) from community mobilization, training, planning, actual construction, maintenance and use of the benefits accruing thereof. An attempt is made to assess the distribution of benefits emerging from and costs associated with this project.

CHAPTER TWO: LITERATURE REVIEW

2.1 Community Participation

Community participation is a strategy that encompasses beneficiaries sharing project costs, assisting in the design, implementation, operation, maintenance and management of water resources. The capacity of the community to manage their water supplies includes the talents of both men and women. Review of the existing literature show that it is becoming clear that the roles, responsibilities and access to and control over resources for men and women, however traditionally different, are now bearing some strong overlaps.

2.2 Assessing the Gender Concept

The concept of gender is problematic in that different interest groups approach it from different angles. Questions like what is the societal expectation of whom it perceives to be the real man or woman arise. Sex and gender are often confused. The former refers to biological differences between men and women while the latter refers to division of labour between men and women which results from the socialization process. In socialization, children learn about gender differences from when they are very young, for example that boys (men) are tough and do not cry and that girls (women) are modest, selfless and caring (Bolt 1994). This leads to certain attitudes, roles and responsibilities leading to certain forms of behavior, that is reflected in their adult lives.

The concept of gender considers social and cultural differences and similarities between women and men. It emphasizes different needs and interests of women and men, difference in tasks and knowledge, and in access to resources. Gender relation reflects these issues in assessing how men and women behave towards each other and how they can cooperate.

The application of gender issues in development projects has proved to be a tricky one. This has led to different schools of thought coming up to offer their explanations as to the best method of its application. Bolt (1994) argues that issues of gender are sometimes thought to be equivalent to women's issues. Many a time, when analyzing differences/similarities and areas of cooperation between women and men, many are drawn into false illusion to believe that gender is all about women and equality. This misconception is prompted by first, sense of sympathy because majorities of women in developing world are discriminated/excluded in many sectors. Secondly, because of feminism. The concept of gender is different from feminist approach preached by certain parties in some developing countries in the name of 'gender activism'.

Bolt (1994) further asserts that one of the underlying assumptions behind this approach is that the community, that is women and men, is the agent of its own development, with development agencies in a supportive role. She further argues that women in a number of respects are a subordinate group (see also DAC 1988).

Thus the gender approach implies that attitudes, roles and responsibilities of men and women are taken into account: differential access to resources and benefits based on gender. The gender perspective calls for an open mind to community development and is geared towards the fullest possible participation of both men and women.

Bolt says that in line with the gender approach, it is important to focus on women's involvement. This introduces another dimension to the debate, because this calls for programmes to uplift the disadvantaged women and bring them into the mainstream of development. The gender approach becomes an effective tool of development in that it gives more opportunities to women and gives men a chance to share the burden; and recognize and (re)value women as partners. Further, it looks for possible actions to improve the balance in work sharing, control over resources and benefits.

The approach seeks to identify the differences and relationships in order to strengthen development projects. It further seeks to understand areas where discrimination between the two exist and how to narrow and eventually eliminate the gap. It is important to note that gender analysis has uncovered information that the women and development literature has long documented that women have less education, less authority, less access to land, credit and training than men do (FINNIDA 1990). Women should not be sidelined in development for three reasons: as a matter of equity, efficiency and sustainability. It is inequitable that women are sidelined from the benefits of development and it is inefficiency not to include women, as they often are critical to the success of many projects. This leads to unsustainability.

2.3 Partnership

For any development effort to succeed, women and men, and the development agencies (the government/NGOs) have to work together as partners¹. Most communities find it difficult to improve their water supplies without outside support. This could be because of resource scarcity and lack of appropriate technologies. At the same time, governments and development agencies are finding it difficult to introduce, manage and maintain improved water supply systems without considerable inputs from the users. This calls for establishment of a good partnership between men and women; the government; and interested development agencies/agent. Working towards this end, the government/agent must not be tempted to think on behalf of the community concerning their problems and imposing solutions. But all the parties must work together, with the community playing a leading role in various stages in the project cycle.

2.4 Women and Development

Women in many parts of the world have inadequate access to education and training; health and family planning services; information; and other resources. Improving opportunities for women is not only a matter of human justice, but also a sure route to faster and more sustainable development. Many people recognize that women have the right to participate in political and economic decision making and to

¹ IRC 1994, working with Women and Men on Water and Sanitation

enjoy the fruits of social and economic progress (World Bank 1990). But in practice, they do not have the opportunity to do so.

Often, their legal standing is inferior and they are unable to participate in politics and in policy making. As a result, those women are denied choices in their own lives and are also prevented from contributing fully to the family well being and to national progress. Expanding women's opportunities, especially in ways that enhances their productivity and earning potential, will raise their living standards and contribute to better economic performance, the reduction of poverty, and general improvement in family welfare.

Beside their work in the formal and informal labour force, women usually have the primary responsibility for the care of children and elderly; and for many other household chores. Women often spend several hours a day fetching water and fuel-wood. Because much of women's work is done at home or outside the formal economy, it is not fully recognized in the official statistics. Studies in Nepal and Philippines suggest that women production valued contribute to about half of the family income (World Bank 1990). To add on to this, many families are female headed- thus women's earning make a particular contribution to the alleviation of poverty, moreover, women perform such tasks as feeding the family, which directly relieve misery.

Women make a crucial contribution to the health and learning of children thus improving future economic performance. In early stages of development, women tend to bear many children and work in or near the home, whereas men are allowed greater choice of occupational mobility.

2.5 Women Initiatives in Africa

From the foregoing, it is important to look at the role of women under traditional rural conditions in Africa. Women in Africa often are instrumental in shaping both the cultural, economic and physical environment of all the inhabitants (Habitat 1990).

Generally, women create the economic base of rural settlements by providing farm labour; transport and marketing of farm produce by organizing mutual assistance groups. By providing household goods, clothing, and food for their families, often, by developing those into trade goods to be sold during the market days to generate income. Women influence and make their physical environment by collecting, adapting and/or manufacturing the required building materials, by actually building their families' dwellings, by assisting in choice of sites for communal facilities and taking part in their erection, by decorating their homes, by planting shade trees and ornamental gardens.

Women have always contributed to the social life of their communities in their traditional roles of midwives, herbalists and traditional doctors, dancers, singers, storytellers, basic level teachers and perpetuators of traditions. Towards this end, women contribute quite a lot to employment and income, which is not registered in the gross domestic product of their respective countries. It is assumed that their labour doesn't bear opportunity cost.

2.6 Gender and Participation

It is important to note that woman and men are affected differently by physical and economic conditions. In the same vein, they respond differently to the challenges they face. For example, in arid and semi arid areas, during famines and droughts, men are tempted (most of them give in) to take refuge in towns, never to come back or to re-appear after harvests. Due to their natural responsibilities, women are forced to remain behind fending for the children in ways commensurate with their abilities. The following boxes highlight different results of balanced/imbalanced gender participation.

Box 1: Men- Total exclusion

The Women of Kibwezi (Kenya)²

This is a successful story of women reacting to natural calamity (Habitat 1990). It is a story of desperate women who under the guidance of the government and some non-governmental organization organized themselves to realize their life dreams namely: increased food; better health and shelter; and increased cash incomes. This approach allowed them, at a time of great despair and helplessness in the face of a natural calamity beyond their control (the sahelian drought) to become mentally and physically self-reliant and aware of their potential through their own hard work, honesty, perseverance, and willingness to accept new ideas.

Box 1 is about a case in which men were excluded. Box 2 contains two cases. In the first case men played a role, but women deliberately failed to acknowledge them. In the second case, men were included late.

Box 2: Men- unacknowledged (case 1) and afterthought inclusion (case 2)

Women Experience in Machakos (Kenya)³

a) Water Tanks Project

Women's groups together with local NGO, discussed possibilities for an improved water supply. Rainwater harvesting was seen as the best solution. The women were trained in technical skills for making tanks. Within three years about 2000 tanks were constructed. When the funding ended the communities were still motivated to continue, with women taking the lead. Since then another 1000 tanks have been built, *exclusively with funds from the women and the communities⁴* (section in italics quoted from page 14).

b) Training for Women and Men

Women in Machakos felt that their participation in development was low due to poor levels of education and skills. They requested the Diocese Development Programme (Catholic) to offer them PRA training in 1979. After about ten years of separate training and activities, the women felt that their men had to be equally involved. "What about our husbands?" they asked. "If we had been getting the training together with our men, we could have been sharing ideas, plans, and development activities in our villages. The results would have been *even more wonderful!*" The idea was accepted and implemented.

² Read more about this in Habitat (1990): The Story of Women of Kibwezi

³ IRC 1994, Working with Women and Men on Water and Sanitation

⁴ Why use the word 'exclusively' when we have 'community' at the end of the sentence. One may be tempted to think that 'community' does not include men, so women succeeded with the help of community, without men!

Box 3: Women- afterthought recognition

Mtwara Lindi Water Supply Project (Tanzania)⁵

Mtwara Lindi water supply project started in 1972. In 1984, influenced by the UN decade for women, a study was conducted on the effects of the projects on the lives of women. The results pointed out that women's participation in planning and implementation of the projects had been very low and that the proportion of women in the project training had been minimal. This led to women to be involved in the fourth phase of the project. The evaluation of 1987 equated the success of the project with the participation of the rural women.

In Mtwara Lindi case, women were involved at later stage when village water committees had already received training on the project, rendering women committee members disadvantaged. Women as main users of water, will be a special recipient group and the success of project will greatly depend on their attitude and participation. FINNIDA (1990) notes the following concerning the inclusion of women and the success of the project:

"Efforts to improve water use practices in the villages should have the support of the women in order to be successful... to encourage the participation of women, at all stages of water supply development from planning through implementation to operation and maintenance, is to be endorsed... If the project fails to inform and involve this level adequately little actual benefits can be derived from the water supply facilities development however high their technical quality."

However, this does not justify the exclusion of men. FINNIDA (1990) reports that although water is considered a woman's responsibility, men reiterated that they would give money to women to purchase water if paying for it would guarantee an easy access to a reliable source.

Box 4: Men- making their presence felt!

Jealous and threatened men (Zambia)⁶

In rural water project in Zambia the staff decided to give special training courses for women in maintenance and management of the new wells. It was felt that water being a woman affair women would feel more responsible to look after the wells than men. It was also a requirement that at least half of the members of each village water committee were to be women. However, it became apparent that many men were quite jealous of this special attention accorded to women. They boycotted the election of able women in the water committees, and tried to prevent as much as possible women's participation in training.

⁵ FINNIDA (1994), *Looking at Gender: Water and Sanitation*

⁶ Reported by IRC's occasional paper No. 25 on Working with Women and Men on Water and Sanitation.

Box 5: Women and maintenance

Women doing it (Sri-Lanka)

In Sri-Lanka, repairing hand-pumps until recently was a job for men. In the old setting when hand-pumps installed in villages broke down (as much as ten times in two years), the community had to wait for the 'specialist' (men) for repairs. Through the support of Sarvodaya (NGO), women have been trained and they do repairs.

Box 4 provides a clear example of the fruits of open discrimination. The men could not accommodate it, and had to make sure that their presence was felt! It has to be pointed out that the decision to train the women alone was based on a very weak and gender insensitive assumption. One wonders as to whether a needs assessment study had been carried out to justify the exclusion of men from the training. Box 5 presents evidence of women penetrating to what was once considered a male domain in Sri-Lanka. Similarly, women in India (IRC 1994) took up the challenge to change the traditional role of women as helpers in the construction work to actual masons, thus being able to earn wages as men.

2.7 Assessing Costs and Benefits

While billions of dollars are invested every year in water projects in developing countries, only rarely are these investments subjected to serious social and economic analysis. A review of the existing literature on the economic aspect of water supply improvements suggests that surprisingly little empirical work has been done on the subject (Whittington 1992, Kamminga 1991). The introduction of improved water supply not only generates benefits for the community members but costs too. The costs are incurred over a long period of time from the planning, implementation, and maintenance.

Some of these costs include the provision of labour and materials for construction; time invested in community management activities, training and construction; the reduction of employment opportunities in water vending, water carrying and well digging; increased inequality and conflicts among users. The benefits are realized after the completion of the project. These may include reduced distance in search of water; increased time availability for other activities; increased water availability; improved health; and reduced risks resulting from some water sources, for example deep sand wells.

However, no attempt has been made to quantify these costs and benefits (IRC 1991). Given that investment resources are becoming limited, more attention should be focussed on cost/benefit analysis of water projects in a bid to make intelligent choices on technology; to assess the level of service; and to consider avenues of pricing and setting user charges. This will ensure maximum utilization of the limited resources available for the water supply systems development.

2.8 Summary

Water is seen as a female domain, but the emerging physical and economic realities call for cooperation of men and women in search of improved water supply systems. Differences in capacity, ability, time and resources demand the contribution of both parties. From the foregoing literature it is evident that women should not be addressed in isolation. Men should also be incorporated and their opinion sought in relation to water projects. Addressing women in isolation will lead establishment of 'small women empires' which men can not be penetrated thus creating another problem of gender inequality. In Africa, such 'empires' are not popular with men and they (men) do not hesitate to fight or sabotage their activities. For any project to succeed, it is crucial that all members of the community, men and women, are involved and share the work and responsibilities. It is, therefore, important for projects to include some specific for supporting women, and overcoming possible "weaknesses" or disadvantages (IRC 1994).

In Mtwara Lindi's case, when women were left out the project almost collapsed. The first beneficiaries of improved water system are women. So sometimes men might lack the drive. In the Kibwezi, it was noted that rural societies seemed to collapse when the capacity of women to carry out their manifold duties and responsibilities were diminished or challenged by drought. The project was a success. Men accepted lesser domineering positions. If men were involved in this project, probably the success could have been enhanced. In selecting technology, attention must be accorded to the technologies allowing community participation and gender balance to ensure sustainability of projects.

It is clear that projects where no attention is given to gender differences are less successful. Gender awareness would help the project staff and field workers to distinguish between needs and interests of women and awareness in a project. It also brings into focus the importance of including women as well as men in the project staff at all levels from the top management down to the field workers. Involvement of both women and men as in the staff ensures that different gender interests are catered for. This approach also incorporates single men (widowers or men opting to remain single) whose interests are not represented in women projects. This is because in some cases, husbands' interests influence wives' interests in projects. In the present situation, economic development in rural areas will be enhanced through improved water supply systems and by pursuing a more balanced gender approach. This will release women's energy and time from long distance water fetching to more productive activities.

It is interesting to note that in most of the gender related literature, most of the cases encountered pointed to successful women projects or failing projects because of excluded women. Does it really mean that there are no cases of successful men projects, or women project failing because of failure to incorporate men? IRC (1994, pp18) says that If women are excluded from projects, they will not be interested in the project, and consequently may abandon or neglect any improvements that the project is supposed to provide. So do the men! It is therefore crucial that both women and men should be included in all aspects and stages of a project to ensure that both contribute in its implementation and sustainability, and that the accruing benefits are shared by all.

CHAPTER THREE: GENDER PARTICIPATION IN SAND DAMS PROJECT

3.1 Development Approach

In the sand dam project, the starting point is the community. Based on this principal, the community must define its problems, set priorities and make decisions on how to solve them (bottom-up strategy). The community in question provides solutions to problems through use of local knowledge and talents. The community members provide labour and local materials. The basic idea behind the approach is to ensure ownership and sustainability (SASOL 1999). Consultations are done in collaboration with the stakeholders in water supply and uses such as the men, women, schools, and the government.

This concept of bottom-up strategy is adopted due to the failure of the conventional top-down approach in which decisions about what is needed and how it should be done, with little consultation with the affected people. This approach represents a fundamental change in attitude accorded to formal education, which in most cases ignore or belittle the knowledge, wisdom and experience of those who are in touch with the natural world but have had little or no schooling. It gives women, who generally carry the greater burden of feeding the family, rearing children and maintaining the home, the chance to participate on an equal basis with men.

3.2 Community Mobilization

Community mobilization is done in line with the existing administrative structures. This approach conforms to the Government's District Focus for Rural Development-Decentralization of planning process introduced in 1982 in Kenya. This is a bottom-up development strategy. The following table illustrates the existing administrative structure.

TABLE I: ADMINISTRATIVE STRUCTURE

LEVEL	ADMINISTRATOR	GOVERNMENT DEVELOPMENT AGENCY
District	District Commissioner	District Development Committee (DDC)
Division	District Officer	Sub-District Development Committee (Sub-DDC)
Location	Chief	Development Committee
Sub-location	Assistant Chief	Development Committee
Village(<i>Utui</i>)	Headman (<i>Mutui</i>)	Village Committee (<i>Nzama ya Utui</i>)

3.2.1 Participatory Rural Appraisal (PRA) Training

These are brainstorming sessions whereby the participants consult and discuss the community problems; available resources including abilities and based on these come up with the best solutions to the same. Through these sessions the community learns about the purpose and the expected benefits; costs; importance of

participation; and commitment concerning the survival and sustainability of the project they are about to embark on.

Training is done first at sub-location level- areas small enough for matters of common interest. The training is PRA- Participatory Rural Appraisal (commonly used by other NGOs and CBOs). The community selects 25–50 trainees, both men and women. To establish understanding and to foster close co-operation, the artisan (allocated to the group by SASOL) attends these sessions too. Training lasts for 5–8 days.

The main activities undertaken during the training sessions are discussed below. At the onset, the trainees appoint individuals to take care of time keeping; recording; control of the group; organising meals; and so on. They prepare maps showing social setting; resources of the area; and other important aspects. Further, collection of baseline information is done, for example rain patterns; population trends; soil fertility; and trees/forests. An example of trend analysis is found in box 5 below.

Box 5: Baseline Information

Trend Analysis: An example from Ngangani Sub-location

Rain: “From the year 1960-70 the rains were plenty and quite reliable. By 1980-90s the rains started reducing and skipping, hence making the land yield little. By the year 2000 due to the expected change in tree planting and conservation, being enforced by man, there will be adequate rains”.

Population: “From 1960s to 1970s the population growth was very low and people had enough. By 1980s-90s the population growth doubled. By the year 2000 the population growth is expected to be controlled if family planning is followed”.

Harvest: “From 1960s to 70s the harvest was plenty and enough through the year. By the year 2000 there will be good harvest since people are being encouraged to practice soil and water conservation”.

Soil Fertility: “By 1960-70 the fertility of the soils was very high and many crops did well. By the year 1980-90s changes in soil fertility were noticed. At present most soils are poor and produce nothing. By the year 2000 there will be some change since a lot of effort is being done on soil conservation”.

Trees/Forests: “From 1960-70s there were many trees and thick bushes. From 1980-90s people continued cutting down trees and left very few. At present there are few trees. By the year 2000 there will be trees since people are being encouraged to practice afforestation”.

Farms: “From 1960-70s the farms were small with good yields. From 1980-90 farms were enlarged and yield decreased. Today, there are big farms that yield nothing. By the year 2000 the farms will be small, as the population rate will be too high.

Adapted from SASOL (1999)

The trainees prepare time line (indicating major events, for example droughts, famines and floods and give explanations for these occurrences) and record seasonal calendar (activities such as- land preparation, planting, weeding, harvesting-through out the year are listed). Seasonal calendars show how time is divided between these activities and the division of labour between men, women, girls and boys. The trainees also identify the problems facing the community and analyse the reasons for the same. Using Venn Diagrams institutional links are studied to establish their relative size, proximity and connections with other institutions the community is involved in.

To evaluate the importance of the trees in the area, Matrix Ranking is employed. This is to establish various uses of trees such as their medicinal value; firewood; shade; fruits; woodcarving uses among others. Scores are assigned in order to rank them. Impact analysis is carried out to determine development activities with greatest impact. This is done to set priorities and to chart out a development action plan.

Box 6: Seasonal Calendar

Example from Wikililye Sub-location

“In the month of January, there is plenty of food in the *shambas*, i.e. beans, green vegetables, fruits such as mangoes, guavas and pawpaw. In February the beans are ready and they start harvesting up to March. During this period, there is malaria breakout due to a lot of mosquitoes, which come from the rotten fruits. In the month of April is when they do celebrate for Easter holiday and have wedding ceremonies. In the month of May they start harvesting of maize up to July. (Maize grown in March-April). In August they have a dry season where they do a lot of work like cultivation, brick making and cutting of firewood to be used during the rainy seasons. During the month of September they start harvesting pigeon peas while preparing their *shambas* ready for the rains. In October they start early planting and in mid October they receive the long rains. In November to December people are very busy in their *shambas* and at the same time they do have many wedding ceremonies, parties and celebrating of Christmas holiday while waiting for the new year to begin and the cycle revolves again as they come to the new year.”

Adapted from SASOL (1999)

Box 7: Typical Daily Schedule

Example from Wikililye Sub-location

The Woman: “The woman always wakes up at 5.30am to start her daily chores. After waking up, she brushes her teeth and washes her face. After that, she sweeps the kitchen, takes milking utensils to go and milk the cows at 6.00am. Since she had left the kitchen clean, she lights some fire and starts preparing breakfast. At 7.00am, she serves tea to her family. When breakfast is over she cleans the utensils, prepares food for young kids, rushes to the river to fetch some water and this goes up to 9.00am. From there, she goes to the *shamba* where she works for three hours and comes back at noon. She rests for a few minutes and starts to prepare lunch. When it is ready, she serves it to the family members. After lunch she rests while making her *kiondo* (sisal basket) up to 2.00pm. From 3.00pm, she joins the third session of her programme. She starts supper preparation and goes to collect some firewood while her small girl puts fire on to keep the pot boiling. After half an hour, the woman comes back from the forest. At 5.00pm, she cleans the utensils that had been used during lunchtime, bathes her young children, washes their clothes and goes to bring home the goats and cattle. During all that time the woman has not bathed. She goes to the bathroom to bathe. When she finishes, she rushes to the kitchen to prepare supper early enough for her small children. They start taking their supper at around 7.00pm. At 8.00pm, the young ones goes to bed. The woman is left behind cleaning utensils. Since it is too early for her to go to bed, she picks her *kiondo* and continues weaving till 1.00pm and goes to sleep till the following morning.”

The Man: “The man wakes up at 8.00am washes his face, brushes teeth and takes breakfast up to 9.00am. From there, he goes to the *shamba* where he works for three hours and comes home. He rests while waiting for lunch to be ready. After taking lunch from 1.00pm to 2.00pm he rests while sleeping. From 2.30pm the man goes to bath at the river up to 3.00pm. He comes back, dresses properly and goes out for the evening walk. Some men go to visit their friends, others to the nearby canteens to share stories with colleagues, and other go to take beer”

Adapted from SASOL (1999)

After these activities the community comes up with a plan, whose responsibility of implementation lies on it (community). The baseline information provides a point of reference for the future comparisons after the new developments have taken place-

that is to prepare the community for a change and to enable them monitor the change. These PRA sessions reveal that men have the least burden of work (see box 7) and lack of planning for food security always has been identified as a weakness among others. Shortage of water has always been pinned down as a cause of underdevelopment in this area- not only quantity but quality as well.

3.3 Sand Dam Construction

The community elects a chairperson and a storekeeper. The chairperson and the headman assign duties during the construction of a sand dam.

3.3.1 Responsibilities of the community:

The community arrange for delivery and storage of construction materials provided by SASOL (cement and reinforcement bars) and organises for the accommodation and feeding of the artisan (SASOL assigns to them).

Both women and men are involved in site selection. In this respect the following factors are considered:

- where water storage is convenient;
- where the river is naturally confined between banks, even during flooding;
- where a rock bar runs across the riverbed- possibly without a fracture.

Sometimes water may be needed in a site where these conditions do not obtain- in such cases, risk of failure is high!

3.4 At the Site

The able bodied both women and men are split into two or more groups that rotate so that the sand dam work continues without compromising other household and communal duties. Records are kept and late comers/absentees are fined.

Traditionally, water is the responsibility of women. PRA reveal that men are not engaged in water matters as much as women are. In this regard, the applied approach is giving men a chance to contribute towards this end. Table 2 illustrates how duties are shared between women and men.

TABLE II: DIVISION OF DUTIES

MEN	WOMEN
• <i>Dig foundation</i>	• <i>Carry water</i>
• <i>Break rocks</i>	• <i>Carry sand</i>
• <i>Haul large stones</i>	• <i>Mix sand and cement</i>
	• <i>Cook on the site</i>

3.5 Maintenance

Once the project is complete, it is the responsibility of the community members to maintain the dams and to safeguard quality of the water through boiling, digging pit latrines and terraces to check run-off, and separating livestock watering areas and domestic water points.

3.6 Costs

Table III shows the costs of constructing a typical sand dam.

TABLE III: COST OF CONSTRUCTION⁷

Materials	Quantity	Unit Price (KSh)	Cost (KSh)
Cement	200 bags	530	106,600
Barbed wire 25 kg 16 g	2 rolls	2,250	4,500
Round bars 12.5mm	6 pieces	450	2,700
Round bars 6.25mm	6 pieces	290	1,740
Cypress timber 2"x2"	30 metres	23	690
Nails 4"	1 kg	70	70
Artisan 2 month	2 month	KSh. 5,000	10,000
Supervision and monitoring			30,000
Community mobilization and training			40,000
Community contribution			
Labour	900 days	KSh. 100	90,000
Maintenance			6,000
TOTAL			291,700

Adapted From SASOL (1999)

The community members are not paid. They provide sand, stones and water, which are difficult to value. The figure for labour is simply shown for the purpose of indicating the proportion of cost borne by the community. The time invested by the community in the organisation and training which is essential for the sustainability of the project and future development has not been valued in monetary units. Box 8 show the calculation of the cost per cubic metre of sand dam water.

Box 8: Calculating Cost of Sand Dam Water

⁷ Typical sand dam of 26 metres

Cost Per Cubic Metre

To calculate the cost per cubic metre of water, the following assumptions are made: - the reservoirs extends upstream for 250 metres from the dam wall, the gradient of the river bed is 1 %; and that the volume of water stored is 35% of the volume of sand.

The maximum volume of water stored would be: $26 \times 2.5 \times 250 \times 0.5 \times 0.35 = 2,844 \text{m}^3$

The construction cost in this instance is equivalent to: $291,700 / 2,844 \approx \text{KShs}102.57 \text{m}^3$

The exchange rate is KShs78/USD.

3.7 The Benefits⁸

3.7.1 Social Benefits

The increase in water availability has reduced the risks posed by collapsing of deep sand wells the community used to dig on the riverbeds during the dry spell. Before the construction of sand dams, women under the protection of men, used to queue for water overnight. This was due to low infiltration rates during the dry season.

The time saved from walking long distances in search of water gives an opportunity for leisure. Thus, attention has been diverted to other social activities. In dry seasons, girls could be withdrawn from schools. This impacted negatively on girls' school enrolment and population growth. However, the causality between availability of water and population growth in Kitui is not yet empirically tested.

Health wise, there is increased hygiene practice because the community has enough water for washing utensils, body and clothes. PRA sessions helped the community to reflect on itself from within, understand its problems and look for possible solutions. The community has acquired organisational and leadership skills which can be applied in other spheres of developmental and political life.

Box 9: Comments from Community Members

Comments after the completion of Kiindu River sand dams

Mama Mboovi Malonza (a woman): "By now Kiindu river is good (better) than before. It is good because the water is high, people are growing the vegetables around. Before, water stayed (in the Kiindu river) January, February, March, April and May. In June it got dry and then we went to Nzeeu river. From here to the Nzeeu it took one hour to go and one hour to come back. We went many people; we waited in line, next to next, for 30 minutes (waiting our turn to scoop the water). Children around 12 years helped me. They went to school at 7.00am and after school in the evening they went to fetch water from Nzeeu on their backs, reaching home at 7.00pm at night when it was already dark. I am happy because of this new mud brick house which we made since the water is near".

Juma Muthami (15 year old boy): "The water is coming up more than before. Before no-one was growing vegetables but after the construction people are growing vegetables and fishing. Before, the sand was down (in the riverbed) and

⁸ This is from observations and comments by the beneficiaries and visitors. No attempt has been done to quantify these benefits

the banks were high but now the banks are near (when you stand in the river. It was our mother and father who constructed it and they did well”.

Mzee Malonza Ndunga (an elderly man): “Before, we went to Nzeeu river in the dry season for water. The women, children and donkeys went to Nzeeu from May to November. They left in the morning each day, one hour to go and one hour to come back. Before, this river (the Kiindu) was dry but now the water is on standby full-time”

Adapted from SASOL (1999)

3.7.2 Economic Benefits

Increased water supply has prompted increased economic activities. These include horticultural and fruit farming; improved livestock farming; brick making and beer brewing among others. Livestock trek short distances to watering points hence has more time to feed and fatten. These economic activities have improved incomes thus raising the national gross domestic product (GDP) contribution of the region.

3.7.3 Environmental Benefits

The dams impede downward stream flow and recharge the riverbanks, from which water returns as the dry season progresses. Slowed speed of the river flow has reduced erosion of the riverbanks. Fodder grass grown along the riverbanks is confining the river to the centre thus reducing soil erosion. Due to increased water retention, vegetation cover has increased. Consequently, the increased evapotranspiration may lead to improved microclimate for the region. This may lead to increased rainfall in future. Tree nurseries have been set up. Highly ranked trees during the PRA sessions are now being planted. The time saved from water searching activities is also being directed towards soil conservation in some farms, for example terracing.

CHAPTER FOUR: CONCLUSION

The story of sand dams is also a story of another example of positive reaction to drought caused misery and distress. Since 1992, women and men have taken action for survival. This community has proved less conservative and more adaptive to change. Men are accepting a less dominant role. The community has realized its potentials. There is nothing to hold them back and nothing seems to be too difficult to them.

The success of the sand dam project in Kitui is based on community participation, which is strongly rooted in greater understanding of the differences and overlaps between women and men roles and responsibilities. The fact that almost all women involved are housewives suggests that their new roles were accepted and supported by the male members of their respective households and the community at large.

It is worthy to note that times are changing, it is impossible to underestimate or disregard women in rural development. Women are becoming increasingly vocal concerning their rights and expectations in life; their needs; and wishes. This is prompted by the new challenges placed before them by changing physical and economic conditions. In face of the increasing scarcity and hardships in securing family survival, the norms that dictate the behaviour of women and men appear to change. Norms that make women remain invisible and bar them from engaging in productive activities and those which discourage men from participating in kitchen duties are getting relaxed.

However, this is not to be misconstrued to mean that women in Kitui are becoming dominating or uncooperative in their families. Rather, this has given them a chance to reason out together for the survival of the family unit in front of these new challenges.

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