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KITUI SAND DAMS

(NTHONGONI)

A PROJECT PROPOSAL FOR

MENNONITE CENTRAL COMMITTEE

FOR ATTENTION OF WILLIE REIMER.

PREPARED BY: S.M.MUTISO **19TH APRIL,2002.**

CONTENTS

1. SUMMARY.

1. NAME OF PROJECT

Kitui Sand Dams

2. IMPLEMENTING NGO

Sahelian Solutions Foundation – (SASOL).

3. **LOCATION OF PROJECT**

Nthongoni Location (Yatta Division) -Kitui District.

4. **PROJECT OBJECTIVES**

To sustainably increase community water supply in dry areas of Kitui in order to alleviate perpetual water shortages.

(A) PROJECT OUTPUTS

(1) Construction of 16 sand dams with off-take wells.
(2) Community training
   (a) Natural resource management
   (b) Project Management
   (c) Hygiene & Sanitation

(B) PROJECT ACTIVITIES

1. Sand dam construction
2. Community training

5. DURATION OF PROJECT

Six months - 6 months

6. TOTAL PROJECT BUDGET

Ksh. 7,172,000 US$ 89,650

7. COMMUNITY CONTRIBUTION

Ksh. 2,372,000 US$ 29,650

8. REQUESTED FROM MCC

Ksh. 4,800,000 US$ 60,000

2. INTRODUCTION

SASOL, founded in 1990, assists Kitui communities to address household and production water scarcity through the sand dam technology. The planning objective was to shorten the distances to water sources to below 2 km. whilst making water available for alternative production systems. Typically, women walk 10-15 km to water sources in the district.

Construction of sand dams is economically and socially effective since the technology is simple and lends itself to participatory development. Communities contribute labor, sand and stones, artisan housing and food for the people working on dams as well as the artisan.

Data from an ongoing social and Economic Impact Study indicates that the sand dams have immediate impacts on cost of water. For example at Mbitini Market, the price of water was reduced by 75%, from Ksh. 20 to Ksh.5, as a result of the construction of sand dams. But perhaps most significant is the transformation of household production. With increased quantity of water, the local people grow kale's (sukuma wiki), tomatoes, onions, improved varieties of mangoes, bananas, sugarcane, bees, fruit tree seedlings and other tree seedling. Fishing, which was uncommon in the area, is a new economic activity. Brick making is on the rise.

District wide interview data from the study shows that households owning land adjacent to the generated rivers are now earning over Ksh 100,000 in the dry three months of August, September and October from bucket irrigated vegetables. Income from horticultural trees is on the rise, though yet to be aggregated and documented. There are 1,969 households in Maluma/Ithumula sub-location. 38.5% of the interviewed households reported that they were engaged in vegetable planting the first year after completion of the dams. Conservatively assuming that only 2% of the household did serious planting, the first year, and further averaging down the household earned income to Ksh. 90,000, with an average household having 8 people, the dry months per capita income is Ksh. 3,750. This compares to the mean income from food sales of Ksh. 125 as reported in the 1999 Welfare Study by CBS. The vegetable household incomes translate to Ksh. 3.1m. during the first year of adoption for the entire Maluma/Ithumula region. This figure is collaborated by the local councilor who estimated that Ksh. 4m was earned in the sub location. For the whole district, keeping the same assumptions, the dams could generate Ksh.118 m. during the dry three months whilst using the land for other production during the rest of the year. We should note that there was minimal extension effort on this new production. With these incomes, the whole district can move into a higher economic plane dramatically. Further, from a health point of view, consumption of vegetables and horticultural produce has impacted positively on health, especially of women and children. This is the way to fight poverty.

The impact of the dams is not just in terms of incomes and health. Sociologically organizing for the dam construction has led communities to improve leadership, more systematic community organization of development, including identification of interrelationship between sectors. Communities are more conscious of the fact that they can bring positive development with their own skills and resources. More systematic organizing has led to dealing with community issues like shortage of wood for cooking and construction etc. Households are able to plan their consumption of farm products. Sanitation has also

improved. Key in this is the construction of toilets. **These issues are part of the training for dam construction.**

3.BACKGROUND

3.1 CATCHMENT APPROACH

SASOL uses the catchment approach for sand dam construction. The approach depends on the cooperation of the community in the development of sequential sand dams on dry river- beds, coupled with terracing and re-vegetation on individual plots. There is a dual participation of the community and the individual.

3.2 POLICY CONFORMITY

The districts Focus for Rural Development is the official policy of GoK. The policy empowers the district Development Committee to design and prioritise agenda for development in the District spelled out in District plans.

The Kitui District plan has amongst in priorities two areas addressed in this project.

1. Increase of accessible water resources in the District
2. Improvement of women group management skills for effective economic development.

3.3 PROJECT APPROACH

In the ASALs there is an acute shortage of water in the dry season. The few sources are far apart and in- adequate. People and animals travel long distances to the water sources. Since seepage is slow, there is long waiting periods at the water source to draw enough water.

There are two rainy seasons in Kitui. The first rains occur in April to June and the second rains November to December. The rains are unreliable and erratic. One in three rainy seasons is a total failure. In the long dry periods the communities experience an acute water shortage.

Many technologies have been tried to supply water to the communities in these dry periods. Boreholes are expensive to install, they are extraction and not sustainable. Shallow wells also offer an extractive technology, which is not sustainable water tanks, are expensive and limited by size. Earth dams suffer from extensive losses due to evaporation; they also have a huge potential for contamination and risks to health. Sand dams facilitate ground water recharge, water is stored below the sand reducing evaporative losses and sand filtration reduces contamination.

The Project uses the Catchment Development Approach for implementation. Construction of sand dams is the base on which other activities are built on by the community. Sand dams retain water, which flows down the sandy riverbeds. After construction of the dams for continuous supply throughout the season, runoff and deep percolation should be facilitated on the land. Land terracing is the first step in slowing floodwaters and allowing percolation. In doing this growing season is extended by increasing the effective moisture on the land.

After the sand dams are charged and water availability assured, tree seedlings can be raised and reafforestation started.

The Project is community driven and managed. The community picks out the sites in accordance to user suitability and their knowledge of the area. Then together with SASOL staff the technical suitability of a site is assessed and reviewed as necessary. Each agreed site then elects a site committee, which will supervise the implementation, operation and maintenance of the site. The community mobilizes for the provision of local material, labor, storage of external material and maintenance of artisan at site.
Using participatory methodologies, the SASOL helps communities to organize their knowledge, establish records fill in any gaps in knowledge that the community might have and input new ideas, knowledge and information. Major areas of concern are in record maintenance, leadership, and community organization and resource management.

4. PROJECT DESCRIPTION

The goal of the project – is to sustainability increase community water supply in dry areas of Kitui. This could be achieved by increasing the number of available water supply points in the dry season.

Purpose of the project- is to increase the retention of water in the dry river bed sands for use by the community. The technology exists to retain the water, which passes through these seasonal rivers for use in the time of adversity. With support of external resources the community can effectively utilize local resources to supplement their existing water resources.

OUTPUTS OF THE PROJECT

1. Sand dams as a sustainable water harvesting technology in ASALs constructed used and adapted in Kitui. It is anticipated the current project will be centered on the western end of the defined area SASOL has been working on. The project seeks to construct 16 sand dams with off-take wells for use by the community in the area.
2. Improved environmental management of the project area in Kitui- The management of the environment is critical to the catchment development approach. Construction of sand dams in the river channels is the first step towards retention of water in the catchment. The second step is to control runoff on the land using terracing. The third step is to increase ground vegetative cover. This can go in two stages, one being the protection and maintenance of existing vegetation, which would be followed by additional new trees when the water base stabilizes.
3. Key lessons from the project documented and disseminated to partners in ASAL water Development – The use of river sands to harvest and store water for communal use has been neglected, as it is poorly understood. Yet this is the source of bulk survival water in the ASALs during droughts. To bring it to the fore and wider usage the project has a duty to circulate it as widely as possible.

ACTIVITIES OF THE PROJECT.

The main activities of the project are:

1. Community organization
2. Training to empower the community to

    (a) Improve local leadership
    (b) Manage their environment.
    (c) Establish and maintain meaningful records.
    (d) Institute effective hygiene and sanitation measures in the community
    (e) Plan effectively

3. Construction

    (a) Establish suitable dam sites to serve the community effectively.
    (b) Formation of site committees to supervise work at site
    (c) Construction of sand dams/wells

5. PROJECT APPRAISSALS

5.1 SOCIAL APPRAISSAL

The economic activity in the area is dominated by subsistence agriculture and livestock production. Sale of agricultural produce and livestock generate the bulk of incomes. Additional family income is generated through labour export. This factor results in many female-headed households. 50% of the working males are wage earners outside the area. 65% of the household are female headed.

Population density in Nthongoni Location of Yatta Division is given as 61 per sq. Km.

The project area is a rainfall deficit region receiving between 500 - 800mm per year. Furthermore this rainfall is irregularly distributed and there is generally a total failure in 1 out of 3 rainy seasons. The land is that prone to droughts and frequent crop failures. This land is semi-arid and is classified as Agro-Ecological zone 4/5 according to the Jaetzold classification. The rainfall is bimodal, the first rains occur in April to June and a highly unreliable. The second rains regarded as the major rains start in October and tail off indeterminately in late December/early January.

The project area is in the heart of Kamba country. The population is nearly wholly Kamba with a sprinkling of other immigrants working as teachers or traders. The basic cultural organisation is thus based on the Kamba tradition which has a strong Mwethia organisation tenet (an informal voluntary organisation which includes all members of the community irrespective of gender and/or age for communal work).

THE ROLE OF WOMEN IN THE PROJECT.

Women play a major role as the water managers in the household. As the project is mainly on water, they have a large role to play in it. They decide which areas are most convenient to obtain water and the distribution of these points for maximum coverage. In the community meetings, the women voice is heard loud and clear. In fact in the project on the Kiindu, more than half of the sites developed were overseen by chair-ladies, who organised the sum total of work at the site as well as organising for increased male involvement to support their work.

GOVERNANCE

The project is designed to give the community maximum responsibility in its running of its own water projects. The artisans working on the project are in the hands of the community who take responsibility of their welfare.

All material, which is delivered to site, is received and stored by the community who is responsible for its security. Normally stores are established at the homestead of one of the community homesteads near the site. The chairperson or member of the site committee together with the owner of the store is responsible for all store issues. Records of the store issues are kept both by the community and the artisans. It is important to note that material orders are delivered by delivery notes from the suppliers to specific sites who are the recipients. Payments are made on the strength of material receipt by the community in good order. The community certifies the receipt of material in the presence of SASOL staff. This method ensures that the community right from start creates a sense of ownership and creates an interest in protection of the received assets, which they identify with. Under the circumstances it is difficult to tamper with the supplies, as there is collective responsibility for the material. It is also an incentive to collect local material, which is needed, to complete work at the site.

Since material delivered to a community is for a specific purpose, it cannot be diverted into any other use. If for an unseen reason the material cannot be used at the site,

SASOL has an option to transfer it to a different site in agreement with the community. Fortunately this has not happened in the past. Also, any residual material is transferred to the next site. To do this the community releases such material with proper documentation and is advised where it will be used. This material is received at the new site using the same procedure as if it came from the supplier.

The system is designed to educate the communities to take responsibility of public goods. This should eliminate the highly destructive notion that it is not theirs and can therefore be plundered. Rather as a public asset it is for the good of the community and everyone should ensure its well-being.

5.2 INSTITUTIONAL APPRAISSAL

The beneficiaries of the project will be the following communities, having a population of

Nthongoni	11,500

Out of these we estimate that 50% will be constantly using the facilities throughout the year, while in drought periods more than 100% will make use of the water, as people from outside these areas will be coming to fetch water. Amongst these, the women who together with children bear the brunt of the water chores will gain maximum benefits.

Time for fetching water would be shortened from about 6 - 12 hours in dry season to a maximum of 2 hours for those furthest for the river. In the short run also the women and children gain from the better nutrition stemming from vegetable growing on river valleys which follows immediately after there is enough water for bucket irrigation as observed in the previous project on the Kiindu. In the long run the whole community gains as the land productivity improves from the sale of vegetables and farm products coupled with water related economic activities such as brick making thus improving income.

The beneficiaries have right from the beginning been involved in the project. A meeting with community leaders through the Chiefs Office which contacted SASOL have explained to the people the need for water management in the community. The community as a whole has given a commitment to undertake the project.

Together with community representatives the sites for development are rivers identified. These are the sites where the community has agreed to develop sand dams and offtake wells. Their commitment mobilize resources is demonstrated by collecting stone at the specific sites.
The administration plays a major role in legitimizing the rules the community makes and the water department is consulted for advise.

5.3 FINANCIAL & ECONOMIC APPRAISSAL

Sand dams first ad forest brings water nearest to the household of ASAL communities.
Their greatest impact is therefore in the cost of transport in water both in time animals and equipment. This is so important that a donkey in Kitui is considered as an indicator of properly losing a donkey is a serious blow to the household.

The cost of water from vendors can have quite a dramatic effect as a result of sand dam institution. At Mbitini town water drawn from Mwiwe 8km away used to retail at Ksh. 20 for 20 during the normal dry months and rising to Ksh. 40 in the droughts which occur at least every three years.. Institution of sand dams on the adjacent Kisiio river brought the price down to Ksh. 5 for 20 litre.

In addition riverline agriculture with bucket irrigation is possible with the sand dams. This improves the price of vegetables in the market. It also introduces new crops, which can be grown including arrowroot and sugarcane.

Building industry has greatly benefited with local brick making cutting out long distance transport costs.

Communities are able to raise tree seedlings from water harvested in sand dams making the base for revegetation.

Sand dam technology is retentive rather than extractive. It increases the supply of water retained in an area, which would otherwise be lost. Maintenance cost of sand dams is quite low, for example to-date the Uvati dam built in 1957 has so far only consumed 5 bags of cement for its maintenance. This additional water has a profound impact on hygiene according to World Health Organization.

Water tanks are also retentive technology. However they are limited in size. A 45 cum. tank in Kitui would cost Ksh. 90,000 to construct. As opposed to a medium sized dam, which would cost Ksh 105,000 and retain water estimated at above 4000 cum.

Shallow wells and boreholes are both extractive technologies. In the ASALs with reducing precipitation these are not sustainable if not coupled with retentive measures like preservation of water catchment areas. Depletion of the aquifers shortens the lifetime of boreholes and wells. Furthermore the cost of sinking a 100m deep borehole in Kitui is approximately Ksh. 700,000 and there is a tendency to become saline with time. Add to this the necessary pumps and the cost becomes prohibitive.

A 15 – 20 m deep shallow well in Kitui would cost Ksh. 60,000 to construct. There is little maintenance required for the improved design shallow well when properly utilized. One has however to ensure that conservation on the upstream is maintained to keep the well recharged.

5.4 TECHNICAL APPRAISSAL

Kenya is among the rainfall deficit countries in the world according to the report " sustaining water" by population Action international 1993. The situation is especially acute in the arid regions of the country.

Kitui district is semi-arid and lack of water is a perennial problem. It would be sensible therefore to employ technologies, which enhance the retention of water in the catchment, rather than those which deplete the limited water existent in the aquifers.

5.5 ENVIRONMENTAL APPRAISSAL

The main thrust of the project is the retention of precipitation on the catchment where it is received. The direct consequence of this is increased water content in the catchment, which would lead to raise water table levels both on the riverbeds and the adjacent land.

Raised water table levels would mean that shallow wells have water nearer to the surface and scoop holes on sandy riverbeds are shallower. Loss of life as a result of being buried by collapsing deep scoop holes will thus be eliminated. Thus safety at these scoop holes is improved.

Increased amount of water available throughout the year will encourage vegetable growing in river channels using bucket irrigation. Napier grass and associated plants can survive throughout the year to protect riverbanks during a storm at the same time providing fodder for animals during the dry season.

A raised water table will also facilitate new colonising plants, which could not grow before. On the other hand some plants will die due to water logging. Overall however ground cover improves.

Through terracing, water is held on higher grounds of the catchment for longer periods. This will result in the soil remaining moist for longer periods, facilitating a longer period conducive to crop production. Some of the water held in the higher grounds eventually flows through the ground into the river channels recharging them. This phenomenon ensures adequate supplies of water even in extended droughts.

The availability of water will mean that tree seedlings can be grown. The non-availability of seedlings in the locality has been one of the biggest hurdles to tree planting in the past. Additionally when tree nurseries are developed in the community only trees people desire to plant are grown. Tree planting exercise then continues smoothly as all the community stands to gain by planting trees, the impetus once initiated is self-sustaining.

Seedlings planted in the fields soon grow up into trees. These affect the microclimates due to shade lowering the temperatures in the effective area.

With a raised water table and higher ground cover, evapotranspiration is increased. Further more increased ground cover reduces runoff, facilitating percolation and higher soil storage space recharge rates. Theoretically once the improvement cycle is started it should go on perpetually.

There is a possibility that the raised water level can result in waterlogging, salinity and sodality. Although this is a remote chance it is a situation, which we are watching closely and a major study in this area is already in progress, which would alert us to the possibility of this occurring.

Part of project proposal is a small monitoring system to observe changes in water levels and observe vegetative and water quality changes.

6.0 **PROGRAMME MANAGEMENT**

6.1 Inputs

SASOL is managed by a Board of Governors who supervise the workings of the organization. The Executive Board chairman is the Co Signatory of all the cheques for payments made by SASOL.

The Program is run by a

- Field Manager
- Construction Supervisor
- Construction Assistant
- Administration Assistant
- Community Organizer
- Security Guard
- 21 Artisans

6.2 The Budget for this project is split up as follows:

MCC contribution	4,800,000
Community Contribution	2,372,000
Total Project Cost.	**7,172,000**

7. MONITORING AND EVALUATION

This project is run on fully participatory basis. The sites for development are picked by the community. The community then picks the store where the external inputs are going to be delivered. It also elects a committee which would policy the material at site and plan for works.

The committee establishes by laws which have to be followed for the work at site. The committee is trained on site management.

Further to the committee a general gathering in the village is conducted to establish baseline data on the village situation at the beginning of the project.

Follow-up of the work is made together with the village elderman and the community, who sort out any problem at any particular site. At the end of the project the village committee sits to do a Participatory Project Appraisal with SASOL.

8. BUDGET

Item	(Kshs).
Construction cost material and Artisanal labour. - Tools - Materials & Artisanal labour for sand dams. - Materials for wells	 80,000 1,760,000 675,000
Training - Community	610,000
Participatory Monitoring & Evaluation Environmental Monitoring	110,000
Institutional support	105,000
Audit fee	75,000
Nairobi office expenses	96,000
Personnel	600,000
Office running costs	229,000
Vehicle running costs	460,000
Sub-total	**4,800,000**
Community Contribution	2,372,000
Total Projects Costs	**7,172,000**