SASOL Foundation
Creating Food Security with Water and Trees

1.0 Developing Sustainable Water Harvesting Technology

SASOL Foundation is a Kenyan NGO registered in 1992 (Reg No OP 218/051/9369/238). Its mandate is to combat general and absolute poverty in the Republic of Kenya by improving the physical environment as a pre-requisite to sustained rural production.

The mission is to render social, technical and financial assistance for the development of arid and semi arid areas of the Republic of Kenya.

Since 1995 SASOL has constructed 435 sand dams with 230 off-take wells, serving over 200,000 persons. The sand dams bring sustainable water sources closer to the households and have profound effects on the improvement of the physical and social environment. Together with associated water harvesting structures on the land, significant improvement in food security has been realized.

Currently SASOL has a complement of 6 members of staff – 3 college graduates, 1 diploma level, 2 certificate level – who manage and operate the organization. In addition, a complement of 16 artisans is involved in building the actual structures and supervising the operations staff.

2.0 The Constraining Effects of Seasonal Rainfall

2.1 Project Location

The proposed project will be located in Yatta area of Kitui District covering Kanyangi, Kiseuni, Kalivu and Maluma Athi Locations. The proposed area lies to the south and adjoins the currently ongoing MCC/CFGB project A036 at Nthongoni.

Yatta plateau, which forms the Western boundary of Kitui District, has extreme water supply pressure. During the dry season the search for water consumes approximately half of the women's time in addition to consuming a large portion of their energy. This is time and energy that otherwise should be invested in food production activities such as water harvesting and farm preparations to reap maximum benefits from the short rainfall. Currently the bulk of the rainfall water is usually lost through run-off. Thus a source of water near households is a trigger for activities that lead to food security through saving time and energy spent on water chores being invested for productive purposes, especially those geared to food production.

2.2 The Place of Water in the Local Food Economy

Traditionally, until about four decades ago, the Yatta region was a purely grazing area. The population in the area has therefore only settled recently. They have migrated from higher rainfall areas due to the pressure of land as a result of population expansion. This land in the Yatta region is marginal for human settlement.

Annual rainfall in the area is 400-700 mm with open pan evaporation in excess of 2,000 mm. There are no permanent water sources in the area. In the dry season the community fetches water from the Athi and Tiva rivers. The Athi, which is a permanent river, is highly contaminated with industrial waste chemicals from Nairobi and Thika. In addition, the distance from the top of the plateau, where most of the households live, to the river is on average 4 to 6 km through an elevation of 300 metres.

Staple food in the area is maize grown under rain-fed agriculture. Usually one in three rain seasons is a complete failure. Most households keep livestock, which is sold for food in adverse times. When the rain fails the water fetching chores take up much of the household time and energy, especially for women.

2.3 The Need to Capture Water from Limited, Seasonal Rainfall

The construction of a sand dam, once it matures, captures water from seasonal rainfall that normally is lost in the form of flash floods. Availability of sustainable water supplies addresses Yatta's pressing food security problem in two ways: it frees considerable time for other activities and it stabilizes and diversifies the food production capacity in the community.

Once stable water supplies are achieved other organizations, including relevant government ministries, have taken a hand in moving these communities forward. This includes teaching the communities systems to increase food production using the available water plus enhancing water availability through other water harvesting and soil conservation measures.

2.4 The Effect of Limited Water Supply on the Population

When there is water, diversification of base food supply occurs. New, high-demand crops such as vegetables and tree crops are grown by the community. This readily affects their consumption patterns. Especially the availability of vegetables and fruits affect the nutrition of the populace and increases the health status in children and women. Also, time saved on water-collection chores affects school attendance and frees time for women to undertake other beneficial socio-economic activities as a result of the residual energies they now possess. Healthier, more energetic women have large influences on household livelihoods. For example, meals are made earlier and in a more leisurely manner and there is more time and attention devoted to children.

2.5 Water and Food Coping Strategies

When there is no water, there is little food available in the households. To supplement meager food supplies many men seek work away from home. As a result, in many households one finds only women and children. The wages earned by husbands and fathers are usually used for food purchases. Little or none is left for investment. Hence a continuing cycle of poverty. With stable supplies of water, however, work opportunities arise in the community. Some young people will choose to remain because they can make a livelihood in the community, such as making building bricks, growing vegetables, producing tree products, etc. All members in the community benefit as a more diversified range of foods become available at affordable prices without an enormous overhead cost. Taken in totality, a community saves and these proceeds can be used by the community to finance its own development.

3.0 A Sand Dam Community as a Project Locus

3.1 The Members of a Sand Dam Community

The people of Kitui district have defined the need for water as their first priority. (Kitui District Consultative Forum, *Poverty Reduction Strategy Paper 2001-2004*). Everybody benefits from a community water project: first from just getting the water and second from the derived spin-offs.

Selection of communities for project implementation is by a show of willingness to undertake measures to address water problems. Initially, during the introduction of sand dam technology by SASOL, it was necessary to convince a community of its inherent potential. Today communities, from observation and interaction with neighbours who have sand dams, request assistance for the institution of this technology in their areas. Actually there are more requests than SASOL can meet in the near future.

In the proposed area covering Kanyangi, Kiseuni, Maluma, Kalivu and Athi locations a total of 49,500 persons would be involved directly.

3.2 Local Participation in Project Implementation

Water is a concern of every household in the community. Under normal circumstances the burden of water chores is borne by women and children. Women are the managers of water and food resources in the household.

Since women play a major role in managing water and food resources, they have a major role to play in the implementation of a community water project. They are involved in locating a dam site to be developed; they form the majority of the site committee for dam construction; they contribute labour during the site development; they monitor and evaluate dam construction and development; and they operate and maintain the sand dam. From experience garnered by SASOL, involving women in this manner has empowered them to play a more significant role in the community. Also, with more time in their hands, women are freer to choose and pursue more

beneficial ways of involvement in the community, taking on more time-consuming responsibilities than what had been possible previously.

4.0 Intended Project Outputs and Outcomes

4.1 Project Goal

The goal is to advance the capacity of selected rural communities in Kitui District to obtain increased water supply as a means to a more diverse, expanded supply of food and to increased income earning opportunities.

4.2 Project Purpose

The purpose is: 1) to increase water storage within dry river beds and surrounding areas; 2) to create stable sources of community water supply as a basis to drive increased food production and incomes in dry land areas; and 3) to assist communities to organize to operate and maintain a sand dam; and 4) to assist communities to organize to build on the development opportunities presented by this major community asset.

4.3 Expected Outputs and Outcomes

1. *Project outputs* – The project will be located in a set of 250 sand dam communities in rural Kitui District. Each community is defined as the persons living in an area who band together for the purpose of constructing, maintaining and developing a sand dam. Within each of these sand dam communities the immediate, projected outputs are:
   - capacity building and training to enable members of 250 sand dam communities to organize as required to construct, operate and maintain a sand dam plus undertake additional activities as presented by this significant investment in a community asset;
   - the construction of 250 sand dams;
   - at each sand dam site trenching and terracing of community farm land and related water harvesting structures to complement and extend water harvesting and storage within the sand dam; and
   - at each sand dam site planting of trees, shrubs and grasses to maintain the sand dam, terraces and trenches, add to the supply of fodder, food and wood in the community, and to re-claim badlands for pasture and other farm uses.

2. *Project outcomes* – Consistent with the purpose set for the project, the outputs outlined above are expected to generate a set of outcomes in each of the 250 sand dam communities.
   - an increased, sustainable supply of water within a community;
   - one or more organizations within a community that guide community initiatives to build on opportunities presented by an increased supply of water;
   - increased abilities, at the household and community levels, to manage the water supply, including an ability to maintain the quality of water obtained from ground sources;

- re-vegetation of the land controlled by the members of the community as a product of strategic planting of grasses, shrubs and trees as made possible by expanded water harvesting structures;
- an increase in the supply of food available in the community, including an expanded range of foods available and an extension of the growing season after the rains;
- reduced time, especially for women, required to fetch water, freeing community members to farm more intensively, prepare meals on a timely basis, pursue new and additional productive activities, spend more time with family members plus extended time for rest and leisure; and
- livestock that is healthier, more productive and less likely to die during periodic droughts.

3. *Project impacts* – As a sand dam typically takes 2 to 5 years to mature and become fully productive, project impacts will be limited during the course of a five-year time frame of the project. Some community-level impacts, especially from project action early in the life of the project, may include:
   - reduced poverty and an expansion of food entitlements for community members in dry land areas;
   - increased food security at household and community levels as a product of increased crop and livestock production, an expanded ability to select and store quality planting seeds, and an expansion of the range of nutritional options;
   - improvements in the nutritional status and the health of community members;
   - enhanced status for women within a community as a product of their full participation in project activities and an expansion of leadership roles open for women;
   - improved school attendance at the primary school for all children, but especially girls; and
   - greater social stability within communities as new income earning opportunities emerge for young males and females, reducing the need for young males to emigrate from a community in search of employment.

4.4 Evaluation Plan

The measurement of project implementation and indicators of outcomes and impacts will take place at three levels:

- tri-annual financial reports, using MCC/CFGB forms already in place for SASOL Foundation, that will report on delivery of inputs and outline realization of primary outputs;
- annual reports on realization of project outputs and outcomes; and
- an independent, end-of-project socio-economic survey of both sand dam projects, by Excellent Development and SASOL Foundation, to verify the data presented in annual reports and to summarize in some detail the realization of projected outcomes and impacts at the household and community levels as set out in sub-section 4.3 above.

Several different means of measurement will be employed in project reporting. First, some indicators are quantifiable and will be reported on as the relevant outputs, outcomes and impacts are realized:

- the existence of an organization to guide sand dam construction and a continuing or alternate organization to implement, operate and maintain a sand dam;
- the availability of an additional supply of water within a sand dam community;
- the existence of an organization to guide community initiatives to take advantage of new development opportunities presented by the availability of water;
- the gender composition of such organizations and the place of women in leadership roles (primarily holding office and exercising responsibility in executive positions within such organizations);
- changes in enrollment of girls and boys at the primary school(s) that serve a particular sand dam community.

In the spirit of participatory development each sand dam community will be expected to outline the current situation, at the time project implementation is initiated, and then to report annually on changes occurring as a result of project implementation. These data will be more qualitative in nature. SASOL Foundation will be responsible for assembling these data from each sand dam community and summarizing the information into a format that provides indicators on progress in the realization of project outputs, outcomes and impacts as set out in sub-section 4.3 above. Data to be collected annually by each sand dam community include:

- activities undertaken by the organization(s) constructing, operating and maintaining a sand dam;
- existence and activities of groups/organizations within the community who are building on new development opportunities presented by the availability of water;
- status of the sand dam, especially the existence of banks that have requisite plant growth and/or terracing in the vicinity to limit effectively the erosion of silt into the sand dam, plus the accumulation of sand, months of the year that water is available, and suitability of such water for human consumption, household use, livestock watering, watering of tree saplings and vegetables, and other commercial activities;
- participation of community members, both women and men, in training and other programs undertaken as part of this project;
- time taken to collect water during the dry months of the year;
- a qualitative assessment of re-vegetation that has occurred that year, especially focusing on tree nurseries, trees planted within the community, and strategic planting of grass and shrubs to maintain terraces and the banks of the sand dam;
- a qualitative assessment of changes in food availability at the household level, including methods being used to assure adequate food and nutrition between harvests and coping mechanisms employed when the rains fail;

- a qualitative assessment of the range of foods, especially fruits and vegetables, available within the community and changes in the in-take of more diverse sources of nutrition by household members;
- a qualitative assessment of the nutritional and health status of community members, especially the children within the households, drawing on such information as household visits to health clinics and ability of households to maintain a regular number of meals throughout the year;
- a qualitative assessment of changes in the number and quality of houses and other buildings within the community;
- a qualitative assessment of new business opportunities being undertaken within the community with a focus on employment options presented for young people, both women and men, within the community;
- a qualitative assessment of changes in the number of livestock within the community plus changes in the health status and productivity of the animals bees, etc.

The third form of reporting will be the final report of the independent team that conducts an end-of-project socio-economic survey. The methodology employed by the socio-economic survey in July 2005 of SASOL Foundation's sand dam construction can serve as a guide for this survey. Data collected in the July 2005 survey will provide some baseline and progress indicators relevant for assessment of implementation for this project.

5.0 Project Inputs and Activities

5.1 The Contribution of a Sand Dam Community

A primary source of inputs for the construction of a sand dam is the labour and goods-in-kind assembled and prepared by members of a sand dam community. For an average size dam these include:

- 1,500 person-days of labour;
- 80 loads of stone, broken to size;
- 3,200 basins of sand;
- 2,800 jerricans of water;
- 900 kg of maize and 400 kg of beans;
- 10,000 Kshs for tea and other food inputs; and
- planting of requisite grass and shrubs to assure maintenance of sand banks.

5.2 Outline of SASOL Foundation's Inputs and Activities

SASOL Foundation carries primary responsibility for all aspects of project planning, implementation, monitoring and evaluation, and reporting.

1. *Project management:*
   - management of all project inputs and activities;
   - technical expertise to assess the water collection and retention potential of a catchments area;
   - community mobilization for establishing contact with potential sand dam communities via the administrative structures of Chief, sub-Chief and Village Elders;

- organizing of primary project activities such as capacity building, training sessions, sand dam construction, data collection for monitoring and evaluation; and
- assembling relevant data and submitting requisite project reports.

2. *Technical and skilled labour for project activities:*
   - technical skills of a water engineer to assess sand dam potential of catchments, facilitate selection of sites for sand dam and well construction by members of a sand dam community, guide the masons employed for dam and well construction, and assist as required in sand dam maintenance and repair;
   - a set of 16 skilled masons who take responsibility for construction of sand dams and wells;
   - training and capacity building staff to conduct requisite training at the sub-location level, facilitate the members of each sand dam community to understand the nature of a sand dam, the extent of the investment requirement by the community to construct and maintain a sand dam and then finalize a decision on whether or not to undertake such an investment, and follow-up training to provide information and skills required to maintain and operate a sand dam plus facilitate initiating other related water harvesting, farm improvement and food security initiatives; and
   - project staff to undertake data assembly and processing, to maintain records, and to meet project accounting, secretarial and reporting requirements.

3. *Physical inputs (requirements for an average sand dam):*
   - A skilled mason and one assistant;
   - 250 bags of cement;
   - A pump for a well;
   - 4 rolls of barbed wire;
   - 20 re-enforcement bars;
   - 50 feet of 2”X2” wood; and
   - 1 kg of nails.

5.3 Contribution of MCC/CFGB

1. Kshs 114,050,000 to be invested in:
   - SASOL Foundation’s physical input costs for the construction of 250 sand dams; and
   - pre- and post-dam construction training and capacity building for 250 sand dams.
2. Kshs 1,000,000 as SASOL’s portion of an independent, end-of-project socio-economic review of the SASOL and Excellent’s sand dam projects.
3. Staff time for project implementation monitoring, financial accounting and record maintenance to meet project reporting requirements.

5.4 Summary Project Budget

	Inputs	Unit	Number	Cost/dam (Kshs)	Total Expenditure (Kshs)
1.	Materials for dam construction	Dams	250	211,000	52,750,000
2.	Artisan labour	Dams	250	27,200	6,800,000
	Total dam + well construction	**Dams**	**250**	**238,200**	**59,550,000**
3.	Training costs (4 sessions/dam)	Dams	250	60,000	15,000,000
4.	Site Management	Sites	250	110,000	27,500,000
5.	Overhead, administration and office costs		250	48,000	12,000,000
	Sub total				**54,500,000**
	Total Project Cost				**114,050,000**
	Community contribution				
1.	Labour (person days/dam)	Dams	250	150,000	37,500,000
2.	Material inputs	Dams	250	110,600	27,650,000
3.	Food	Dams	250	31,000	7,750,000
4.	Cash	Dams	250	10,000	2,500,000
	Sub-total				**75,400,000**
	Value of Total Investment				**189,450,000**

5.5 Environmental Analysis

Essentially sand dams are small structures on seasonal river channels which result in these channels, usually dry during dry seasons, serving as water storage areas.

Storage of water in these channels is useful for the environment as it retains a proportion of water in catchments which would otherwise have flowed away. By raising the water levels in the channel, it means that there is reduced flow from the surrounding catchments which feed the channel. That means that there is a corresponding uplift of the water table in the surrounding land. Coupled with the reduced flow rate there is an extended time for production in the land.

Raising the water table means that there is an increased diversity of plants whose roots can reach the water table. These plants will be able to survive where they could not survive before. Thus it makes it possible to develop richer ecosystems.

When sand dams are mature the water is held below the sand. This limits surface water contamination. It is important to note that there is no displacement of people by the sand dams as their influence of morphological changes are confined in the existing channel. However their water storage effects extend far and off the channel.

On the negative side it is possible that the sand dam could form a reservoir of chemical and biological contamination if appropriate measures are not taken. However, it might also be able to clean itself. There is some evidence, though inconclusive, that earlier dams which had been sodic before now have sweeter water. One dam when built was so saline an adjacent tree nursery lost all their seedlings. This nursery continues today and has produced many seedlings with no adverse effects.

5.6 Assumptions and Risk Analysis

1. *Political and social factors*

Disruption of project implementation may occur because of political and social factors. The implementation of project inputs to generate project outputs may be affected by national political factors that affect adversely the mobilization of sand dam communities. One form in which this may express itself is others claiming credit for the construction of a particular dam, which can affect adversely future mobilization initiatives in the area.

At a more local level, competition among organizations active in a project area can prove disruptive where they compete for the time and resources of community members, present mixed messages that confuse the people rather than promote development, and poach staff. This will not be an issue initially but may enter when water becomes available.

Project implementation also is affected adversely if conflict develops within some of the sand dam communities, inhibiting or preventing the delivery of project outputs. Attempts will be made to assess the potential for conflict before committing to project implementation with a particular sand dam community.

Social and political instability, at the national, provincial or district levels, is a potential risk for all development projects in Kenya. Such instability is a risk factor for which there is no immediate mitigating action that can be taken.

2. The effect of drought

Periodic droughts are a fact of life in dry land areas of Kitui district. If they are so severe that food supplies in the community are reduced significantly this can impact dam construction adversely. Should this occur, one option may be to implement food-for-work assistance in support of dam construction. Similarly, severe drought will render impossible the operation of tree nurseries and the planting of grasses, shrubs and trees. Unless water can be obtained from alternative sources the implementation of these project activities will be postponed until the rains come.

At the outcome level, drought conditions that reduce water supply will limit implementation of project activities directly dependent on water. The only effective mitigation is to spend time, effort or money to access alternative water supplies. Otherwise, these activities also will be delayed until the drought has passed.

3. *Disruptive behaviour by persons living in the area*

Successful water harvesting is dependent on terracing and trenching as complementary activity to sand dam development. Improper terracing and trenching reduces significantly the overall water harvesting potential for the farms involved. Training sessions will address this issue as well as guide community members in the skill of appropriate terracing.

Similarly, if care is not exercised both the sand and the water within a sand dam can become polluted. Where this occurs the health and livelihoods of the consumers of the water are affected adversely. Again, training sessions will focus on maintaining water quality, both in the ground and while it is being transported, stored and used by household members.

4. Adequate markets to sustain produce prices

Rapid expansion in the supply of fruits, vegetables, and saplings as water becomes available in a number of sand dams in the area may serve to depress market prices for these products. Encouraging farmers to diversify will mitigate against this problem. Should declining prices become an issue assistance will be extended to enable project farmers to gain access to wider markets.

5. *Inappropriate land use planning*

A failure to plan land use or inappropriate plans can affect infrastructure such as roads and streams that are central to successful project implementation. SASOL will network with local government contacts to promote better land use planning and consistent application of policies that flow from improved land use planning.

6. *A lack of ability or willingness to build on opportunities presented by a sand dam*

SASOL does not typically start with a group that is organized already to undertake development activities. Therefore, a willingness to construct a dam, need not mean there will be understanding and initiative to implement appropriate technology that builds on new opportunities presented by the availability of water. In part this lack of initiative may be the product of an absence of a guided or cooperative vision within a community. SASOL will address these issues as part of capacity building, but there are limits to what can be done as SASOL's primary focus is water and soil conservation as means to greater food security.

5.7 Co-ordination with Government Ministries and Other Agencies

Although the Government of Kenya [GoK] is represented throughout Kenya in the relevant ministries of Agriculture and Livestock and Water, they are thin in personnel on the ground. In the water sector, for example, government policy is to play a facilitating role only. As the policy is changing at the moment towards regional Water Boards its not really clear now they will be working. This should be clarified in the near future.

With the Ministry of Agriculture and Livestock cooperation is possible. The limitation of this venue of activity stems from high allowances and per diem that need to be

paid to obtain participation of their staff. There is little anyone can do about this short of paying these per diems as they are policy.

One could however explore ways of using these personnel, especially in the promotion of water harvesting activities during public meetings held under the auspices of the administration and other forums, for example various development committee meetings. Where specific functions are required by SASOL, however, it may be necessary to pay.

In the area of Yatta that the Project targets there are no known organisations such as NGOs working there at present. SASOL however liaises with any local organisations in the community.

5.8 Projected Time Line for Project Implementation

The annual expenditure of time is set out in this time line of annual activities. It assumes the 16 masons will each construct 3 dams during the course of a year. The time line for the project then involves repeating this annual set of activities five time during the course of the project.

Time Line of Annual Activities

	Quarter 1 March-May 2006	Quarter 2 June – August	Quarter 3 September-November	Quarter 4 December –February
Community organization	↔			
Site selection	↔			
Mobilisation	↔	↔	↔	↔
Trenching	↔	↔	↔	
Construction		↔	↔	↔
Training	↔	↔	↔	
Follow up		↔	↔	↔
Monitoring & Evaluation	↔	↔	↔	↔

The entry point into a community is effectively achieved through the current administration structures mainly due to security and overseeing role of the administrators. In order to implement the project, functional groups focusing on a particular stream site need to be formed. Each functional group would then develop one or more site to meet its requirements.

Sequentially the following capacity building activities will be undertaken:

1. *Pre-unit activities*
   - Community mobilisation – Participatory meeting held in a sub-location (the unit of operation for the project) for deliberations on sand dam potential and involvement of the community.
   - Development of baseline data for the location (questionnaire to be done).
   - Discussions by the communities to select preferred sites for sand dams according to suitability, access and availability of local resources required.
   - Confirmation of the preferred sites on technical grounds between the community and SASOL.
   - Once confirmed the larger community to divide into specified site communities for implementation.
   - Each site community to elect a committee responsible for the development of a site to include all age groups, men and women.
   - 10 representatives of each site to be trained on Natural Resource Management before or very early on in the implementation process.

2. *On-going project activities*
   - Follow up of on-farm water harvesting activities-retention ditches and terracing which are associated activities to enhance sand dam function and are highly relevant in achieving food security.
   - Sand dam operation, maintenance and protection from contamination.
   - Revisit of Natural Resource Management Training to address emerging issues which need to be confronted due to a changing situation brought about by availability of water.
   - Examination of the baseline data by the community for update and future planning.

Annex A: Building Sand Dams: Summary Proposal

1. Date of proposal submission: **September, 2005**

2. Project Name: **SASOL: Creating Food Security with Water and Trees**

3. Full Name of Implementing Organization: **SASOL Foundation**

4. Country: **Kenya**

5. Specific Areas: **Eastern Province – Kitui district, Yatta area, Kanyangi, Kiseuni, Kalivu and Maluma Athi Locations.**

6. Project Start Date: **April 1, 2006**

7. Project End Date: **March 31, 2011**

8. Expected Number of Beneficiaries: **In the proposed area covering Kanyangi, Kiseuni, Maluma, Kalivu and Athi Locations a community of 49,500 persons would be involved.**

9. Brief Description of Beneficiaries: **Family members of the 250 sand dam communities in Kanyangi, Kiseuni, Maluma, Kalivu and Athi Locations.**

10. Brief summary of the project: **The purpose is: 1) to increase water storage within dry river beds and surrounding areas; 2) to create stable sources of community water supply as a basis to drive increased food production and incomes in dry land areas; and 3) to assist communities to organize to operate and maintain a sand dam and build on the development opportunities presented by this major community asset. The rationale for an integrated sand dam development project in the Yatta area is its extreme water supply pressure. During the dry season the search for water consumes approximately half of the women's time in addition to consuming a large portion of their energy. This is time and energy that otherwise should be invested in food production activities such as water harvesting and farm preparations to reap maximum benefits from the short rainfall. Primary project outcomes will be: increased, sustainable supply of water; organizations within a community that guide community initiatives to build on opportunities presented by an increased supply of water; increased abilities, at the household and community levels, to manage the water supply; re-vegetation of the land controlled by the members of the community; an increase in the supply of food available in the community; reduced time, especially for women, required to fetch water, freeing community members to farm more intensively, prepare meals on a timely basis, pursue new and additional productive activities, spend more time with family members plus extended rest and leisure; and livestock that is healthier, more productive and less likely to die during periodic droughts.**

Annex C: Detailed Project Budget

	Materials	Unit	Unit Rate	Kshs	Total Kshs
1.	Cement	50 kg bag	250	640	160,000
2.	Reinforcement bars ½ Dia'	Pieces	10	600	6,000
3.	Reinforcement bars ½ Dia	Pieces	10	300	3,000
4.	Barbed wire	Roll	4	3200	12,800
5.	Timber 2"x 2"	Foot	50 ft	18	900
6.	Nails	Meter	1 kg	100	100
7.	Hand pump		1	28,200	28,200
8	Artisan labour				27,200
	Sub total				**238,200**
9.	Training	Training	15,000	4	60,000
10.	Site Management • Mobilisation • Sitting & site Preparation • Construction Supervisor • Transport	 Item Item Item Item			 30,000 25,000 35,000 20,000
11.	Overhead, administration and office costs				**48,000**
	Sub-total				**218,000**
	TOTAL COST/DAM				**456,200**
	Community contribution				
1.	Labour	Man days	1500	100	150,000
2.	Hard core	Tons	285	210	60,000
3.	Sand	Tons	215	105	22,600
4.	Water	Litre	0.50	56,000	28,000
5.	Food	Bags Maize	10	1,350	13,500
6.		Bags Beans	5	3,500	17,500
	Cash				10,000
	Sub-total				**301,600**
	Grand total				**756,800**

Total for 250 dams **Kshs 189,450,000**

Community contribution **Kshs 75,400,000**
Requested from MCC/CFGB **Kshs 114,050,000**