

1a) Name of the best practice: Sand dams of Kitui: - providing potable and production water in semi-arid lands of Kitui District in Kenya.

b) Town: Kitui

c) Country: Kenya

d) Region: East Africa.

2) Address: SASOL FOUNDATION

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3) Contact person: Sammy M. Mutiso

4) Type of organization: NGO- (Non-governmental organization)

5) Partners:

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Type of organization

Type of Support

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Donor.

Financial.

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Contact Person: Mr. P. M. Matseshe

Type of organization: Donor

Type of support: Financial.

3) Site Community

Type of organization: 376 Community based organization

Type of Support : Supply of local materials and partnerships in the project.

7) Financial Profile

	1999	2000	2001	2002	2003	TOTALS
DFID	6,525,780	3,715,545	16,894,980	16,422,487	2,051,849	45,610,641
SIDA	4,017,425	7,384,619	1,305,840	10,502,204	4,500,000	27,710,088

8) Categories:**Poverty Reduction:**

- Income generation

Environmental Management:

- Environmentally sound technologies
- Resource Management.

Technology Tools and Methods:

- Training and capacity building.

Disaster and Emergency:

- Reduction of vulnerability
- Mitigation

Technological Cooperation:

- Bilateral cooperation and assistance

9) Level of activity:

- Village

10) Eco System:

- Arid and Semi arid lands

Without water there cannot be development or reduction of poverty for the inhabitants of the Arid and Semi Arid lands. SASOL, a local Kenyan NGO, together with the community in Kitui has embarked on the quest for water to create a platform for development and reduction of poverty in the past nine years.

11) Summary

Water is the top priority need of the populace living in the arid and semi arid lands. It is the prime limiting factor of production and development, hence the main cause of poverty. Provision of water in this land is therefore the platform for any meaning-full production and development activities and the reduction of poverty is based.

The District Development Committee (DDC) in Kitui has identified the provision of water as the priority issue in its development plans. Demand for water provision in the rural community manifests it self in two ways. Long distances to water sources and inadequate amounts at the sources during long dry spells, 4-6 months endured in these areas.

A solution to water problem in Kitui is deemed to revolve largely on the retention of the received precipitation in catchment areas. The retained water can then be used in the dry seasons.

The sand dam technology is simple, very old, about 3000 years but poorly documented. Where done it was on stand-alone basis. It makes use of our largest reservoir, the subsurface storage.

SASOL's innovation is the building of sand dams in a series in a catchment's drainage channels for synergistic effects. This creates multiple water sources and aquifer recharge points, greatly enhancing the water retained in a catchment. Acting as buffers in the dry season. To compliment the water storage in the channel, the community undertakes run off control on individual land holdings in the catchment. As result, water sources are nearer to households and have enough water for minor irrigation and other productive activities.

12) Key dates

1992- Registration of SASOL as an NGO.

1995- District Development Committee authorization of the sand dam project.

1996- Pilot project, 5 sand dams build on the Kiindu river.

1997- Funding from DFID - "*Where there is no water*" Published.

1999 " *Where there is no water* " Prof. Thomas published

13) Narrative

Situation Before The Initiative Began

Kitui is a water deficit district. This is not due to the absolute lack of precipitation, ranging from 200-800 mm per year. It is rather, the lack of retention of the water in the catchment areas. It is estimated that 80% of the received precipitation is lost as surface run-off, water retention in a catchment in Kitui is limited by the short to very short periods of precipitation and the high intensity of the received precipitation.

As a result water resources are few and far a part in the land dry periods. People walk up to twenty kilometres to abstract water from deep scoop holes in the sands of the seasonal rivers. As the district depends on rain fed agriculture it has been a net importer of food and the inhabitants are food insecure.

Establishment Of Priorities

Both the Kitui district development plans and the poverty reduction paper, list inadequate water as the biggest constraint to development in Kitui. To address this issue, the sand dam programme deems to increase available water in Kitui throughout the year.

Using participatory methodologies, the communities have identified the shortage of water as their priority problem. It pertains to long distances between households and water sources and the low yield which necessitate long hours spent at the water sources. The desired situation by the community is to have water near households which is enough for domestic and production use. Women and children are the principle beneficiaries in this development as they usually bear the burden of water chores.

Formulation Of Objectives And Strategies

Water retention in its catchment area is the starting point for development, improving livelihoods and capacity building of the community.

The main objective is to reduce the distance to water sources and avail adequate water for domestic and productive use within two kilometers of every household.

Second objective is to increase the absolute amounts of water in the catchment to diversity the economic activities of the community and impact on the environment.

The strategy used is the catchment development approach. This involves the establishment of structures to hold water on the land and the river channels to allow for infiltration and ground water recharge. Sand dams constructed in a series increase the number of water sources, and water retention structures on the land, controlling run off increase and stabilize crop growing periods.

Mobilisation of Resources

Acceptance of SASOL sand dams programme by the District Development Committee is a mandate by the administration for SASOL to work with local communities towards the alleviation of the persistent water problem.

A District is divided into Divisions, Locations, then Sub locations. The Assistant Chief is the lowest administrative official in Kenya. SASOL recognises the sub location as a base community. To get to the community, the Assistant Chief arranges the community together with SASOL to meet for getting to know each other. It is with auspices of the administration that the modalities of cooperation are established.

The most important resource in a community is itself, the human capital. At any point in time, flexible social structures exist to tackle issues at hand. To mobilize for sand dams construction, the structures put in place is the site community which chooses the construction site. The formation of a site committee follows. It is the site committee, which plans for the activities at site, supervises and monitors the work in progress and maintain site records, mobilizes the required local resources, stores and protects resources obtained externally, maintains technical staff assigned and assures compliance of rules and regulations developed by the site community.

SASOL was registered as an NGO whose objective is to render social, technical and financial assistance for the development of Arid and Semi- Arid regions. Special emphasis is laid on the solutions of the problem of water. In order to achieve this, SASOL solicites projects funds for its activities. For the past 5 years, DFID of UK and SIDA of Sweden have been our principle sources of funding for the sand dam programme.

Process

The entry point of the sand dam project to the community is done through the local administration. When starting buildings dams in a new area, a baseline data about the area is generated by the community. This gives information about the community. It determines the resource availability within the community.

Through the local administration, usually the Assistant Chief, the community members are organized, told about sand dams and their roles in the construction. Through respective village headmen, the community identify sites for sand dam development. A date is fixed with SASOL staff to ascertain the sites selected for technical suitability. Community decides on the total number of sites it is capable of developing and the actual sites. This depends on the criteria for access availability of enough stones, sand and water. Household representation ensures the involvement of the community at large.

Once a site is identified and accepted by both community and SASOL the works start. A SASOL technician marks the trench, and the community is charged with selecting a site committee, digging the trench, collection of local materials like sand, stones and source water. The committee facilitates formulation of by-laws governing their daily site

activities. After this, SASOL brings the external resources, which include cement, reinforcements and the technical staff, “the artisan”. The committee keeps the site records of; attendance, material used and cost. This log kept by the secretary of the committee is very important in ensuring compliance and dealing with problematic participants. The artisan keeps separate record.

Construction of sand dams and catchment developments is labour intensive. All community members should be involved in supplying labour for the dam construction and provision of local materials. However, it is a big challenge to involve all the members. This challenge is met by involving households with each household providing one of its members to represent them in the site works. In this way, all the community participates. This is important, as the household is involved in the catchment activities pertaining to their individual holdings.

Catchment development approach also involves community training. The community’s capacity is built along with the sand dam construction. This is done through training on aspects of natural resource management. This emphasizes the importance of soil and water management on the land. It includes the role of vegetation in improving the productivity of land.

Since rivers have no water, they receive and channel the run off water from the land and farms. The land thus losses water which would have been used for crop and animal production. A complimentary part of the sand dam programme is run-off control on the individually owned lands. This is the individual effort of the collective self-help principles.

Results achieved

Different elements of the catchment developed approach led to the building of a water platform as the basis of advancement in the community.

Distance to water sources in Central Kitui have been reduced by building sand dams within 0.5 – 1 km of each other on the channel. In general river channels are between 2- 4 km apart. Thus the target of a water source distance of 2 km from the household is achieved.

Due to the development of sand dams and water holding structures, terraces and contour bunds on the land, infiltration into the ground water holding spaces has been achieved. This is evidenced by the increase in Wii sub-location where only 2 productive shallow wells existed before the building of 14 sand dams and associated water harvesting structures on the land in 1999 to 39 wells existing today.

In total 376 sand dam sites have been developed in Kitui to date bringing water nearer to households 200,000 inhabitants. The time saving on water chores for these inhabitants has been reduced from 5-10 hrs to ½ - 1 hr in these areas as indicated by the community in Tungutu during their project impact assessment.

Availability of water impacts on biodiversity. This has led to development of more vegetation hence extensive ground cover.

Availability of water enables minor irrigations. This has boosted food security of the local communities.

Economic activities have sprung up like bee keeping, brick making and growing of vegetables and trees. This has improved the people's livelihoods.

Along side the sand dams, off-take wells are constructed for abstraction of portable water, providing easy access to clean water.

Sustainability

The sand dam project is sustainable due to the fact that results are immediate. The community can see water held in the reservoir as the first rains fall following development of the site. Investment by the community on the development of the sand dam ranges from 50-60% of the total cost. Ownership is never in doubt.

The water held in the reservoir of the dam is a community asset enabling the site community to carry out beneficial activities. The site committee oversees the well being of the asset.

Sand dams operation requires minimal maintenance. The only mandatory maintenance activity related to the sand dams is environmental management, which is not directly related to the structure and its functionality. When a sand dam is well protected, soil erosion controlled, all other operational parameters are controlled by nature, which include sedimentation and development of ground cover.

Maturity time for a sand dam is 5-7 years. During this maturation period, the community is able to obtain water from their reservoirs. By maturity of a dam, it means achieving the ground saturation with stored water. This brings along environmental changes and enhanced agricultural use of the land with increase in the value of land in terms of production. With the mature dam, water can be obtained by shallow well extraction at distances more two hundred (200) meters away from the channel.

The dams provide water all year round once they are matured. This makes obtaining water convenient. When serviced with an off take well, the dams provide clean, good quality water for domestic use.

In Kitui there are isolated dams which were built in the 1950's e.g. Mukongwe built in 1957 and is still functioning and in good condition. If these were done in series, they would have effect over a whole catchment.

The user community manages the sand dams. The important issue in managing the sand dams is environmental management, pollution control and prevention of the contamination of potable water from off take wells. This involves soil conservation through terracing, planting Napier grass to protect the banks, sanitary practices to prevent contamination with

water borne diseases and prevention of putting polluting agents in the water. This is really managing the dams.

Lessons learned

Many participants in the community did not really understand the working and potential of the sand dams, until they were completed and were in use. The dams offers more than the community really anticipated .

The site committees formed for the dam construction have terms of reference given by the community for planning and executing the project. These terms of reference should be reviewed at the end of the project and a committee be reconstituted with new terms including those of operation and maintenance of the facility.

Keeping accurate records at the site helps the community to know the value of their investment. This is important for the sustainability of the facility, as the community would not like to see their investment destroyed. This facility then becomes an asset of the community.

The fact that the community record shows that the community contribution is equal to or higher than that from SASOL is at first shocking. However it reveals to the community that they possess resources which when utilized properly can be used to build a wealth. With proper organizational structures the community can plan and execute many projects.

Involvement of all the community members is important. Defaulters must be dealt with carefully but firmly according to the laid down rules. Failure to deal with them will lead to neglect and conflict.

Food security has improved evidenced by the rapid growth of production of vegetables, fruits and increased crop yields. All these has enabled savings in the households and created possibilities for investment.

The new activities, which are as a result of availability of water throughout the year, have raised the need for modification of the existing social structures. This has raised the demand in the community for capacity building to deal with the changes.

Transferability

Although this is an old technology, it has been poorly documented. Its simplicity is deceiving and it is dismissed by many as ineffective. The contrary is true. The simple technology instituted in series is highly effective and has already changed the situation of over 200,000 people of Kitui.

When SASOL started the pilot programme of 5 sand dams, on the Kiindu in 1996, the community was skeptical. As the programme continued, the programme has greatly changed into fully demand driven process. There are more communities demanding site development than SASOL has been able to raise funds for. To date 376 sand dam sites have been developed.

After 50 sand dams were developed, an external audit was carried out by Prof. G B Thomas a member of the International Water harvesting Organization. The aim of the audit was to evaluate the effectiveness of the programme. Results of the audit were published as a booklet “*Where there is no water*” The booklet has enabled the programme to reach many people.

A delegation of community leaders from Marsabit district in Northern Kenya came, saw and immediately decided to send artisans from their community to learn the techniques. SASOL seconded two artisans to Marsabit to institute the sand dam programme there. To date, more than 40 sand dams have been developed in Marsabit, requests to institute the programme in other districts in Kenya such as Machakos, Makueni, Mwingi and Turkana have been received. The programme has also received delegates from Ethiopia, Tanzania, and Uganda.

In order to document the initiative, effectively, the programme has solicited the expertise of the Technical University of Delft, The Netherlands, which specializes in water structures; together we have looked at the designs for identifications of the problems with a view to improving the functioning of the dams. We hope to have a comprehensive documentation of the initiative in near future.

References.

1. Sammy Mutiso, 2002: The significance of Sub surface water storage in Kenya. Paper Presented to International Association of Hydro Geologists. (NNC-IAH)
- SASOL (2003): Natural Resource Management Training of Kitui Sand Dams Communities.
2. SASOL (2003): Community Ground Water Management Based on Sand Dam Development.
3. SASOL and MAJI na UFANISI, (1999): Where There is No Water -A story of community water development and sand dams in Kitui District, Kenya.
4. Sand Dam Water (2002)- A New Life. Ukweli Video Productions.
5. The Sand Dams of Kitui (2000) Where There is No Water. Ukweli Video Productions.
6. SASOL 2002: Environmental Impact Assessment Report of Kiindu and Kyuusi River.
7. Milu and Isika Mutua 2001: Social Economic Impact Assessment on Sand Dams of Kitui.
8. DFID (June 2003) Project Completion Review Report: Kitui Water Retention Sand Dams Project by Matrix Development Consultants.