SAHELIAN SOLUTIONS FOUNDATION
The Story of Sand Dams in Kitui District, Kenya

For I will provide water in the wilderness and rivers in the barren desert. Isaiah 43:20 **(The Bible)**

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A: SAHELIAN SOLUTION (SASOL) FOUNDATION

1.0 BACKGROUND INFORMATION

Kenya is among a group of countries faced by 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.

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.

1.2 KITUI DISTRICT IN PERSPECTIVE

Kitui district in Kenya's Eastern Province, is semi-arid and lack of water is perrenial story. Kitui district extends for roughly 200km from north to south and 120km from east to west. SASOL (Sahelian Solutions Foundation) focuses on an area of about 600km square in the central division because it has the highest population density.

In arid lands average distances to sources are high. Distance to source, frequency of water fetching trips and number of persons per trip varies between the wet and dry seasons. The size of the household, economic status and proportions of females in the household positively influence the domestic demand for water in the household. Sixty per cent of the households in Kitui are female headed and this has impact on the household human capital endowment for the majority of Kitui men work outside the district.

- The District covers an area of approximately 20,555.74 including 6369.1 square km occupied by the uninhabited Tsavo National Park.
- The climate of the District can be described as hot and dry for most of the year and is characterised as an arid and semi arid area with very unrealible rainfall. The high rate of evaporation, combined with unreliable rains, limit intensive and meaningful land use and other related development activities.
- Population: District Development Plan 1999 estimates-574, 215 people
- 213 persons per square kilometer square

1.2.1 Water resources

Water being a major development input, 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. Sources of water are usually rare during the dry. In some places, women walk as far 25-30kms to fetch water. The water available is of good quality partially due to minimal use of agricultural chemicals and little industrial discharge. Athi River the main perennial river in the District is however polluted due to industrial discharge and agro-chemical use upstream.

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 households draw 77% of their incomes from agriculture while the better off households draw 22% 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 Livestok 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 beef or for milk production.

1.2.3 Food availability

The District normally experiences food deficit due to recurring drought episodes. The little harvest they get is supplemented by relief food from the government and other donor agencies. Since the short rains of 1992 when crop production increased to 700,000 bags of maize, productivity has been low. Food security in the District has been bad as consumers depend on outside support, which sometimes is expensive. 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.

3.0 DEVELOPMENT APPROACH

SASOL adopted a joint venture of construction of sand dams as a potential solution to water problem in the arid and semi arid areas of Kitui central based on Participatory Development Approach (PDA). The starting point in the development process is the community. Based on this principal, the community must define its problems, set priorities and make decisions on how to solve them. 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.

In arid lands reliable and accessible water sources are scarce. Kitui district has these problems. This made SASOL to initiate water development projects in Kitui District. In this area, water is used for drinking; cooking; washing utentials, clothes, and body; building; cleaning sisal for baskets; weaving; watering tree nurseries; making compost manure; growing vegetables; spraying pesticides; watering livestock; making bricks; making concrete and making beer from sugar cane and honey.

Initially SASOL intended to facilitate the development of water through construction of shallow wells; water tanks to harness roof water; rock catchments; 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.

3.1 COMMUNITY MOBILIZATION

This is the back borne of Sasol's programmes. Sasol takes advantage of the existing administrative structures. This approach conforms to the Government's District Focus for Rural Development- Decentralization of planning process.

TABLE 1: ADMINISTRATIVE STRUCTURE

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

3.1.1 PARTICIPATORY RURAL APPRAISAL (PRA) TRAINING

Traning is done first at sub-locational 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. Training lasts for 5 – 8 days

Activities

The trainees:

- appoint individuals to take care of time keeping, recording, control of the group, organising meals, and so on;
- prepare maps showing: social setting; resources of the area; other important aspects;
- collect baseline information eg rain patterns; population trands; soil fertility; trees/forests, etc.;
- prepare time line- indicating major events eg. droughts, famines, floods, etc. and give explanations for these occurrences;

  NB: This baseline information provides a point of reference for future comparison after the new developments have taken place- to prepare community for a change and to enable them to monitor the change.

- record seasonal calendar- Activities such as- *Land preparation, planting, weeding, harvesting*- through out the year. This is to determine how time is divided between these activities and the division of labour between men, women, girls and boys;

  (This is a kind of SWOT analysis. Experience: PRA sessions reveal that men have the least burden of work; lack of planning for food security always has been seen as a weakness among other issues)

- identify the problem facing the community and analysing the reasons for the problems;
- use Venn Diagrams to study institutional links- showing the relative size, proximity and connections with instituitions the community is involved in.
- use Matrix Ranking- to evaluate the importance of the trees in the area- eg medicinal value; firewood; shade; fruits; poles; woodcarving- assigning scores and ranking them;
- undertake impact analysis to determine development activities with greatest impact. This is setting priorities and development action plan.

  (Experience: Shortage of water has always been pinned down as a cause of underdevelopment in this area- not only quantity BUT quality)

A plan is prepared, of which the community is FULLY responsible to IMPLEMENT.

3.2 THE PROJECT

The Community elects a Chairperson (Always a woman) and a store-keeper. The Chairlady and the Headman assign duties.

Responsibilities of the community:

- Arrange for delivery and storage of cement, reinforcement bars (which SASOL purchases), maintenance of the artisan (SASOL assigns to them);
- Show where water storage is useful;
- Show where river is naturally confined between bank even during flooding;
- Identify a site with a rock bar running across the riverbed- possibility without a fracture

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

To establish understanding and to foster closer co-operation, the artisan attend the PRA sessions too.

3.3 AT THE SITE

Able bodied are split into two or more groups that rotate so that sand dams work continues without compromising other duties! Records are kept, later comers/absentees are fined! Traditionally water is the responsibility of women. PRA reveal that men are not fully occupied, so SASOL gives them a chance to play a leading role

TABLE II: DIVISION OF DUTIES

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

The work is hard, sometimes the community can relax especially when the sand dam is partially completed- before the completion of the wings. To maintain the participation, the SASOL approach is to start with the wings, the community work with alot of interest as the gap close at the centre!

It is the responsibility of the community to keep the water clean and safe by (for example):

- Boiling;
- Digging pit latrines;
- Digging terraces to check run-off; and
- Separating animal watering area and domestic water areas

3.4 ASSESSING THE IMPACT

This is from observation and comments of the community

3.4.1 COMMUNITY

- Increased water availability- before, the community used to dig deeper on river beds during the dry spell. Risk of collapse were too high
- Dam impedes downward stream flow and recharges the riverbanks, from which water returns as the dry season proceeds
- Without sand dams, water infiltration rates were low forcing women to queue, sometimes overnight- men had to protect them
- Diversion of attention from other activities due to water scarcity
- In dry seasons, girls could be withdrawn from schools- negative impact on girls school enrolment and population growth (*However, the causality between water availability and population growth in Kitui is not yet empirically tested)*
- Health- washing dishes, body, clothes etc
- PRA helped the community to look into itself like never before- understand their problems and look for possible solutions (SWOt itself!!)

3.4.2 AGRICULTURE

- Tree nurseries established- useful trees identified during PRA are planted
- Saved time available for agricultural and other economic activity
- Production of vegetables
- Incomes- GDP contribution of the area has gone up
- Improvement in nutrition
- Livestock trek short distance in search of water- now have time to feed and fatten!

3.4.3 ENVIRONMENT

- Tree planting- due to more water
- Terracing- due to more time
- Grown fodder grass- increased animal feed and reduced the speed of water
- Reduced erosion of the river banks
- Increased water retention- vegetation has increased, meaning increased evapotransipiration will improve micro climate- increased rainfall in future?
- Planting of nappier grass is confining river to the centre- reduced erosion of the banks

4.0 LEADING ISSUES

- Water will always be at the top of the development agenda.
- The current SASOL programme is planned to cover an area of 200km, to test technologies in different soils, gradients and in different social

setting. However, funds are available for only 10% of this experimental area.
- There is need to finance the other 90%. Where will funding come from?
- Yet the district covers 12,000km square. What are the possibilities of extending the programme to other needy areas?

B: SOCIAL AND ECONOMIC STUDY OF ` THE SASOL DAMS

I INTRODUCTION

The establishment of sand/subsurface dams has changed the living patterns of the inhabitants in the catchment areas in form of the new opportunities; challenges and some anunswered questions. These include:

- Increased availability/supply of water for domestic use;
- Increased farm production through watering livestock from shorter distances, irrigation of vegetable and fruits;

- Social re-organization for dam management committees had to be consituted to oversee the dams;
- Management of extra time created by shorter distances moved in search of water;
- Introduction of some new crops and cash crop farming in bid to expolit opportunities created;
- Improved sanitation;
- Management of negative attributes of stagnant waters and water waste loads.

Emerging Questions

? Who has the right to grow fodder grass along the river banks
? Who can have access to land to grow vegetables
? Whose responsibility is it when the dam wall leaks
? Whose responsibility to control sand harvesting

II OBJECTIVES OF THE STUDY

The Study will be more complex than an ordinary impact assessment for it will seek to analyse data being collected by communities, collect historical data on the area and then deal with specific impact data to generate policy options for similar areas which form 83% of the country. The need to be systematically established.

- Identify whether the project has had an socio-economic impact in terms of:

1. Increased land output through sustainable agriculture based on optimal use of local resources and natural processes and safe efficient of external inputs;

2. Empowerment of local communities (female and male farmers) who seek to build their future on basis of their own knowledge, skills, value, culture and institutions;
3. How the production is impacting on the standards of living of the local inhabitants;

- Carry out a constant production share analysis to establish whether there exist trade-off between agriculture and livestock production in the period before and after the construction of the dams;
- Establish how the time and effort saved from reduced water distances is utilized;
- Assess how the increased incomes accruing from increased land output impact on the stability of the family unit and the youth and the welfare of the women and children in the project area;
- Establish how the communities consitute and balance (gender and social stratification) the dam committees;
- Establish the attitude of the community members towards the management style and sustainability of the dams;
- Establish the degree of integration among stakeholders (community, government, and development agencies) in the project area;
- Establish whether the created opportunities act as incentives to attract people living outside the project area to either acquire or lease land for farming purposes;
- Evaluate the environmental impacts of the dams in terms of changes in the ecosystem and demography;
- Identify whether there is organizational, production and social scaling up including influencing policy at the micro, meso and macro level;
- Establish the policy implications of all of the above at micro, meso and macro levels.

III JUSTIFICATION OF THE STUDY

Providing water means serving many people through improved water supplies for day to day use and for development purposes. A development strategy without multiplier effects is meaningless and more so irrelevant in this era of poverty eradication in Africa. Provision of water has greater externality (spillover effects) compared to other resources. Most of the production problems faced by inhabitants of the project area stem from water scarcity.

The resources committed by local communities and the funding facilitators (development partners) warrant a systematic study of the social and economic effects of these projects to draw policy lessons. The obtained results will be of central importance especially and will determine the viability and replicability of similar projects elsewhere in a bid to fight poverty in Kenya.

BUDGET	KShs
Salary and Social Benefits **Salaries for Two Researchers:** **2,500/researcher/day x 30days/month x 24months = 3,360,000** **Insuarance for Two Researchers:** **2 x 40,000/researcher/year x 2 = 160,000**	3,520,000
Research Enumerators **4 Enumerators x 100 days x 400/day = 160,000**	160,000
Vehicles **Purchase 4 W Drive 1 x 1,000,000 = 1,000,000** **Purchase 2 Motor cycles 2 x 400,000 = 800,000** **Vehicle running costs 30,000km x 50 = 1,500,000** **Motor cycle running costs 40,000km x 7.50 = 300,000**	3,600,000
Office Expenses **Secretarial and Stationery = 250,000** **Computer = 75,000**	325,000
GRAND TOTAL	7,605,000