INSTITUTIONAL FACTORS: KITUI SAND DAM PROGRAMME

A. KITUI BACKGROUND

Location

Kitui district is one of the twelve districts in eastern province of Kenya. It covers an area of 20,402 km^2 (CBS, 2001). Its altitude ranges from 400 to 1800masl. The district borders Machakos and Makueni Districts to the west, Mwingi District to the North, Tana River District to the East and Taita Taveta Districts to the South .It is located between latitude 0 degree 37 inches and 3 degree 0 inches south and longitudes 37 degrees 45 inches and 39 degrees 0 inches East.

Population

The district consists of ten divisions whose total area is 20,402km^2. The total population is 515,422. Table 1 below, culled from the 1999 Census, shows the population of each division, number of household (h/h) and the area occupied by each division. In "Kitui Demographic Time Bomb" Leonard Kisovi writes: *"... Kitui District is one of the Arid and Semi-Arid regions of Kenya with a worsening population resource balance. Its rapidly deteriorating population-resource balance is a product of limited resource base and an explosive demographic growth rate*." It is estimated that 60% of the households are female headed. (SASOL Socio and Economic Impacts, 2002). SASOL currently (2005) works in Central, Chuluni, Yatta, Mutomo and Mutha Divisions. The population of the various divisions is shown below.

Table 1: Kitui Population By Division Gender And Households

DIVISION	KM^2	MALE	FEMALE	TOTAL	H/H
1. Central	808.6	59069	64673	123742	24792
2. Yatta	175	20019	21627	41646	7648
3. Mutitu	837.2	11245	12615	23860	4988
4. Chuluni	521.5	34298	38043	72341	12977
5. Mwitika	836	9246	10456	19702	3871
6. Mutonguni	398.1	27361	31537	58898	11043
7. Matinyani	269.7	19173	21665	40838	7552
8. Mutomo	1394	24103	27683	51786	9608
9. Mutha	4454.1	17927	21212	39139	7126
10. Ikutha	7707.8	20604	22866	43470	7591
11. Parks	3000				
TOTAL	20402	243045	272377	515422	97196

Geology

Metamorphic and igneous rocks of the basement complex system characterize the geology of the district. (Kisovi 1989). The southern side of the district is composed of Permian deposits and tertiary volcanics are predominant in the western part. These rocks hold extractable water only in small cells, which generally occurs in low areas near stream channels.

The central part of the district has soil, which is mainly derived from the metamorphic rocks of the basement system although there are some small areas of black cotton soil [vertisols], which are tertiary sediments. These (vertisols) are usually high in fertility but are not intensively used because of lack of water and lack of appropriate land working technology. The eastern parts of the district have red

sandy soils, which are low in natural fertility. These soils are very rich in sodium and are considered to be the best grazing grounds. Towards the western part of the district are black cotton soils.

The vegetation of the district consists of natural grasses and shrubs of lantana camara and other species. The grasses and other species of plants have short life cycles to enable them take advantage of the short and unreliable rainy seasons.

Topography

The topography is undulating and gives way to plains towards the east. The Yatta plateau is towards the west. There are also ranges of hills in the central part of the district. Various gneisses of the basement system are the bedrock and are exposed in the hills east of Kitui town, around Mutomo in the south and in the northeast at Makongo and Endau.

Rainfall

Kitui district is classified as semi-arid with rains being erratic in the better part of the district especially towards the south (Thomas D.B 1999). Rainfall is bimodal in nature with short rains occurring between October and December and long rains between March and May.

The rainfall totals range between 250 mm to 750 mm per year. The hill masses, which constitute only 30 percent of the district, receive more rainfall while on the low lands which constitute 70 percent of the district, rainfall totals range from 250 mm to 500 mm. The rainfall received in Kitui is unreliable both in amount and distribution. Dry spells are common within the rainy seasons. Due to this, crop failure is a common occurrence. There is a prolonged dry period, from June to October, during which most of the vegetation sheds leaves and lies dormant. There are high temperatures that result to very high evaporation rates of water from the few available sources. The pan evaporation is estimated at above 2000 mm per year.

River and ground water resources are scarce. River Athi, which forms the Western boundary of the district, is the only perennial river. The river is highly polluted with sewage and industrial wastes from the city of Nairobi. River Tiva to the east of Yatta Plateau however flows as long as the rain falls. It holds water in the sands for a long time after the rains. This dries out in prolonged drought.

Boreholes and wells have been constructed to lessen the water stress however the problem persists. A lot of homes have shallow wells, which most of them dry up during drought periods. Most boreholes are dry while others have saline water that is unsuitable for human, livestock, and irrigation uses. The salinity problem is very severe in the southern part of the district especially Mutomo and Mutha division.

B. CHOOSING APPROPRIATE TECHNOLOGY: TOWARDS SAND DAMS.

All dry land life and survival is the result of adaptation of the conditions that exist.

The consequence of increasing number and length of droughts as a result of rain failure is hunger for the people, lack of fodder for animals and critical shortage of water. This leads to destocking, thus removing major pillar supporting household well being.

There is abundance of water in the ASALS during the short rainy season when water from the oceans is deposited in the land. Most of this water is usually lost through runoff back to the oceans.

In mitigation against current and future droughts emanating from climate change, it is important to invoke technologies, which increase retention of received rainfall in a catchment. Such technologies would eliminate water shortage for people and animals; increase moisture content in the soils, thus increasing land productivity; and increase vegetative cover over the land, thereby reducing land degradation.

To achieve the potential of water retention technologies, local communities must understand, implement and manage them for the benefit of their physical and social environment. Of necessity the technologies must ride on the survival mechanisms, which have enabled past generations of indigenous people to thrive in these harsh climates. What is needed therefore is for communities to manage their environment in context of the changing global climate.

The community must take certain critical steps to achieve these goals. Firstly, the community must analyze the past in retrospect to understand the survival techniques employed in droughts. After this it is useful to show how that knowledge can be fed into the current situation to offer possible solutions. Secondly, institution of community wide problem solving strategies in view of identified problems and aspirations and visions of a better future must be started. Thirdly, support for community capacity building for development through soliciting outside expertise and technology where appropriate must be instated.

By analyzing and evaluating the water technologies available to the community in Kitui, the community can make a conscious choice of the preferred technology for adoption. A discussion of the merits and demerits of all the known technologies aid the making of this choice.

The following table gives a consolidated findings resulting from analysis of the available technologies in Kitui for accessing water resulting from discussions and deliberations by Kitui communities.

TECHNOLOGY	MERITS	DEMERITS
1. Boreholes	-Produces clean water -Utilizes ground water	-Expensive to install, operate and maintain -Extractive in nature -80% chance of salinity due to geological formation especially in southern Kitui - Dries out when the water table declines
2. Shallow wells	-Brings sources closure to settlements -Simple and cheap to construct -Utilizes ground water -Safe water provision -Conserves water- only needed amounts drawn	-Extractive in nature - Dry out as water table declines - Can only provide small amounts of water due to slow recharge -If not covered poses risk of drowning people
3. Water tanks	-Provide clean water -No distance to source; household based	-Expensive to construct -Limited size due to engineering constraints

		-No water harvested during the 6 month long dry period (June- Nov) -Limited to homesteads with iron roofs - Breaks easily
4. Earth dams	-Large storage -Facilitates recharge	-Need expensive heavy machinery to excavate and compact and maintain (desilting) -Exposed to high evaporation rates (pan evaporation rate estimated to be 2000mm per year in Kitui) -Stagnant water have high risk of contamination and attendant health risk - Site identification limited by high fractured base rock - Poses risk of drowning of human and animal life -Susceptible to silting and reducing reservoir volume -Cost – volume ratio not realistic - Breaches easily
5.Rock catchments	-High surface runoff collection -Suitable technology where large impervious rocks occur	-Limited capacity -Very high evaporation losses -Exposed to high contamination -Cost-volume ratio unrealistic -Limited to protruding bare rocks which are few in Kitui - Breaks easily
6. Sand dams	-Holds water under sand hence reduces biological contamination - Reduces evaporation losses -Facilitates bank recharge -Holds large water volumes -Simple to construct -Cost effective -Needs minimal maintenance -Distributes water points -Provides water for various uses; both domestic and production water -Stabilizes and raises the water table. -Improves surrounding vegetation -Long life in excess of 50 years	- Limited to sandy river/gully channels -Labor intensive -Water extraction needs extra technology -Long- term reservoir for chemical contamination

Water Classification

Water is continuously in a state of flux. The water we use is an integral part of the hydrological cycle. Part of the water is in liquid state held in large reservoirs in the seas, lakes, hollows, rivers and aquifers. This is *blue water*. Some other water is held in the soil and is slowly released into the drainage channels through ground flow. This is *brown water*. Other water is released into the environment by plants and trees through transpiration. This portion, the *green water*, is the source of our food production. It is the very basis of survival. The air always contains a certain amount of water in vapor form. This is *white water*. After the vapor attains a critical mass in the air it coalesces and falls as rain.

Water Scarcity

The scarcity of water is a major problem for the social economic fabric of Kitui. In all the District Development Plans, water has always been the priority. Further, during the development of the PRSP (Poverty Reduction Strategy Paper) for Kitui, all divisions gave water a very high priority.

Usually, many people only think about water as drinking water per se. However this is a miniscule amount, about 2% of the total water demand. Therefore by only looking at drinking water many projects have totally missed the focus for water development projects. Due to concentration on provision of drinking water, large investments in water in the district have shown little impact.

The scarcity of water in Kitui is due to the following factors:

1. Low levels of total precipitation
2. Erratic patterns of the precipitation
3. Distribution of the precipitation over time
4. The high intensity nature of precipitation
5. Loss of received precipitation from catchments.

Given the pattern of high intensity precipitation, over short to very short periods, interspersed with long periods of no precipitation; it is no wonder the scarcity of water in Kitui. To mitigate the situation, the retention of received precipitation in a catchment is paramount. This will initially distribute the available water over time. Eventually this may lead to modification in precipitation distribution patterns.

Success And Failures Of Water Retention Options In Kitui Catchments

Many technologies have been tried in Kitui to ease the plight of Kitui citizens suffering from scarcity of water with varying success. These include: earth dams, earth pans, shallow wells, boreholes, rock catchments, water tanks and sand dams.

For a long time earth dams and pans have been the backbone of the water resources development in Kitui. Most of the earth dams in the district were constructed in the 1950’s and 1960’s. The bulk of earth dams are now silted up and hold little or no water. Desiltation requires heavy machinery, which are expensive and beyond the community’s finances and maintenance expectations. On their part earth pans hold water for only one or two months after the rainfall leaving a desperate situation before the next rainfall. Both earth dams and pans suffer large losses due to evaporation.

In Kitui over 100 boreholes have been constructed. More than 80% are nonfunctional due to various problems. Generally boreholes are expensive to construct and maintain. Furthermore due to the geological formation many are saline and/or low

yielding. In addition this is an extractive technology whose long-term consequence is depletion of existing deep aquifers.

Most shallow wells, which were constructed in the 1980's and early 1990's are dry and stand out as concrete masses in the villages. They have been deepened periodically to follow the falling water table with less or no significant success. However those constructed along sandy riverbanks with natural barriers are viable.

The 1980's and 1990's also saw many water tanks built with varying degrees of volumes and designs. Underground and ground water tanks have been constructed in homes and institutions e.g. schools and health facilities. Water tanks are suitable for drinking water supplies. They are however limited to households which have corrugated iron roofs, estimated to be 20% of Kitui households. Their construction is expensive and they are generally small making the water very expensive. Their holding capacity is limited whilst the cost-volume ratio unrealistic.

Sand dams are a very old technology, which is believed to having been practiced by the Babylonians more than 4,000 years ago. It seems to have been lost in the mists of time. *The engineering scientific community never adopted it.* This is a tragedy as it is an appropriate technology for water management in areas where plenty of sand occurs especially in the drainage channels. Rather than only use pockets of water found in these sandy rivers where a natural barrier holds the water, supplementary man made barriers can be constructed. Some sand dams, which were made more than 50 years ago in Kitui, are functional to date with little or no maintenance. This is the technology of choice by the Kitui community today. It has been arrived at by logical process of evaluation and elimination and collection of all known facts and factors to form an opinion and make choice. However, this has been barred by ignorance on the part of the community and performance underestimation by past and existing development partners.

Sand dam technology was employed during the last two decades of colonialism in Kenya in the then the wider Machakos and Kitui Districts. Stand alone dams were constructed without much emphasis on extension. However, the existing isolated dams in Kitui have really served as the sources of water of last resort. Mukongwe on Mwiwe built in 1957 and Ngali sand dam in Simisi built in 1957 (now annexed to Tsavo National Park but accessible to the community) are classical examples.
A revival of the technology was done in the second half of 1980,s and 1990's. The Catholic Diocese, USAID, DANIDA and Kitui Agricultural Project (KAP) have since included them in their development activities menu.

After critical analysis of possible water technologies, SASOL chose the construction of sand dams as their core business. From 1995 to present (July 2005) SASOL has actively engaged the Kitui community to construct 435 sand dams. SASOL is looking for funds to build another 500 dams. They are built in cascades.

The sand dam is simply a barrier in a drainage channel, which holds sand and water on the upstream reservoir. It facilitates the percolation of water into the surrounding soil recharging the ground storage. The water migrates backwards during the wet season and drains towards the channel during the dry season. Thus the sand dam regulates the water level in the river sands as well as the surrounding area.

Mature Sand Dam: Kwa Kang'esa

A series of sand dams in a cascade in a sandy river channel can create a continuous aquifer, thus, largely distributing the water off take points in the channel. By raising the water level in the channel, it also raises the water level on the adjoining land. This affects the vegetation in the surrounding area, with a modification of the vegetation hence increasing biodiversity in the environment. Water losses from a sand dam are minimal as the water is stored below the sand surface where evaporative forces are greatly reduced.

Communities and SASOL employ the catchment development approach. Sand dam construction is the platform on which all other activities stand.. Sand dams retain runoff water from the catchments flowing down the drainage channels. The dams are made by collective self-help. Individuals on private land carry out conservation on catchment lands. This extends the crop production period by increasing the effective moisture content on the lands.

The process of water conservation is driven and managed collectively by the community. The community picks the sites for sand dam development in accordance to user suitability and their knowledge of the most ideal sites for development. Together with SASOL staff, the technical suitability of the sites are assessed and reviewed as necessary. In each confirmed site, the community then elects a committee to supervise the dam construction, operation and maintenance procedures. The community mobilizes for provision of local materials, labor, storage of external material and subsistence of artisan at site.

C. COMMUNITY PARTICIPATION

Community organization is the process of sensitizing and mobilizing communities to act to improve the quality of their life through collective self-help. Many types of community organizations exist in a community at any particular time depending on the current needs, problems and aspirations.

In the case of construction of sand dams, the community organizes for development of the sand dam structure. The focus is on the sand dam, a collective effort. In addition, there are individual efforts needed for the conservation of the privately owned pieces of land adjacent to dams. Thus an organization with sensitivities to collective as well as individual efforts is required for a sand dam catchment development.

When SASOL started the sand dam programme in Kitui, there was need to introduce the technology. Now 10 years later most communities are aware of the technology. Many communities now request SASOL to help them build dams in their areas. In fact it is sometimes difficult to fulfill the number of sand dams a community needs due to shortage of funds. The programme has gone from being supply driven to being demand driven process as the communities became familiar with the technology.

The usual procedure in organizing a community involves, holding an initial community meeting with the facilitation of the Chief of the Location for administrative and security purposes. This is the avenue for SASOL meeting and entering into the community. This is a get to know each other meeting. In this meeting both the community and SASOL discuss the possibilities and conditionality of the anticipated sand dam project in the area. As stated earlier, currently meetings are on demand by the community and are not about the technology but are about implementation procedures. Second, prior to any further development, the community must develop baseline data for their community. Thirdly the focus is on the project community.

Baseline Data
Most communities do not typically collect data for their area. To effect a meaningful plan for an ideal number of water source points, communities should have data on the numbers of people, households and animals in the area, distance to present water sources and distance and time to their source of last resort. This data enables the community to visualize and know not only the water points they require but also their locations, who will use them, and how far sources will be from the user households.

The baseline data identifies the communities' current developmental status and forms a platform from which they can measure their progress.

Baseline data is collected per village. Generally a " Village consists of 40-120 households and a population of 300-1000 people.

The Project Community
For the SASOL sand dam programme we have found that the ideal project community is the sub-location, a sub unit of the location. The location, headed by a Chief, is too large a planning unit for effective logistics. The sub-locational community is reasonably homogeneous and distances are reasonably short for meetings, messages and planning. An Assistant Chief, the administrative and security officer in

the area, heads the sub location. Village Headmen, in each village aid, him. A sub-location is usually 6-15 villages.

It is within this community that the detailed planning of the project is carried out. The first meeting of the project community is arranged with the aid of and is initially facilitated by the Assistant Chief.

The meeting comprises of the local leaders in the sub location including members of the Sub-locational Development Committee whose Chair is the Assistant Chief. Other members include community leaders and representatives from all the villages in the sub-location. The aim of this meeting is to plan for systematic identification of possible sand dam sites per village. The sites of preference are those, which are, accessible and with construction material found within reasonable distance. Above all they must be sites people require, need and are willing to participate in the construction and later on use the facilities.

The first agenda for this meeting is to deliberate on site selection activities. This must be arrived in a participatory manner and have a consensus of the village people. If sites are picked without the agreement of the people, their development is always problematic. The involvement of people is extremely important for dam construction. The second agenda is to fix a date when the community and SASOL staff can jointly visit the community proposed sites. The third action is for sublocation communities and SASOL to assess the suitability of the site in accordance with the criteria listed.

1. The site must be accessible to the community (preferably close to a surveyed road)
2. There must be enough people to work at the site (not less than 20 households)
3. Adequate construction materials ie sand, stone and water must be available nearby to reduce transport costs.
4. The river morphology must be suitable with firm base for placement of the dam. (Some dams have sunk into oblivion because they are sited on clayed soils).
5. The topography of the river should be amenable to the formation of a large reservoir. A low gradient and wide swathe makes a large area for a reservoir and facilitates infiltration into the soil.
6. There must be information of sub-surface water storage from the community i.e. where scoop holes last a long time, which shows possible positions of below ground barriers. These areas have potential for development into larger reservoirs.

On agreement of the sites according to these criteria, by the wider sublocation community, the work shifts to each individual site for development.

For each site, an implementation committee is formed. Its duty is to mobilize community resources, plan the site works, record progress, supervise and monitor the dam construction process. The sequence of activities is; collect stone and sand, prepare the dam trench as marked by the construction supervisor, receive and store external material ie cement, equipment and reinforcement bars, arrange for artisans accommodation and support before start of construction.

During the dam construction the committee arranges for; the transport of material from store to site, mixing and pouring of mortar, feeding at site, maintaining all relevant records at site e.g. store withdrawals and balances, attendance and daily costs. The committee must, on weekly basis monitor and evaluate the progress to

ascertain whether they are maintaining the schedules, which they have set. This is important otherwise the attendance may fall.

The dam committee monitoring system also ensures compliance to the rules and regulations agreed for the site, a copy of which is forwarded to the Assistant Chief and the Chief respectively. These rules are the ones, which will eventually be used in allowing an individual to use the facility when completed. In the case of non-participants a pre-determined fee is paid to gain access to the facility.

Cost Of Sand Dams

Contrary to the popular belief that the community has minimal contribution in the construction of a sand dam the reverse is true. This belief has been perpetuated on the basis that local materials are free and labor is also free. Ironically development theory practice maintains that nothing local has any value and only what comes into the community from donors has value.

The perpetuation of no value of local material is detrimental to the creation of community assets. It is rather surprising that sand and rough stone used in the construction of a house has a value, but the same used in the construction of a sand dam taken from the same area has no value. The food eaten on site by the community, during the construction has a market value and opportunity cost yet only sugar and tea leaves from the local kiosk is usually considered a cost. This is an important value factor where anything foreign has higher value than the usual things donated by community. Yet it is only the use of the local resources turned into community assets, which will allow development to create wealth and improve the standard of living of the community. This is a lesson the community must learn in order to appreciate the sand dam as a community asset while taking care of what they have already built. A typical dam cost is given below: these are actual values of Mbooni sand dam in Tungutu.

DAM COSTING 2004

S/No	Item Description	Unit	Unit Rate	Quantity	Total Ksh.
	External Contribution				
1.	Cement	50 kg bag	600	350	210,000
2.	Reinforcement bars ½ Diameter	Pieces	13	500	6,500
3.	Reinforcement bars ¼ Diameter	Pieces	13	300	3,900
4.	Barbed wire	Roll	3200	5	16,000
5.	Timber 2”x 2”	Foot	17	100	1,700
6.	Polythene Paper g 1000	Meter	100	200	2,000
7.	Skilled Labor	Man days	450	105	47,250
8.	Training	Training	20,000	4	80,000
9.	Site Management				

	• Mobilization • Sitting • Site Preparation • Construction Supervisor	Item Item Item			35,000 20,000 15,000 45,000
					482,350
	Community Contribution				
1.	Hard core	Ton	400	210	84,000
2.	Sand	Ton	300	105	31,500
3.	Water	Liter	0.50	45,000	22,500
4.	Unskilled Labor	Man days	100	2,100	210,000
5.	Community Feeding	Day	10	2,100	21,000
6.	Support to Artisan	Day	80	105	84,000
					377,400
	Total				**859,750**

External contribution input 56 %
Community contribution input 44%

By keeping records of all costs of the sand dam the community can understand the value of the structure and the community input, which has hitherto been ignored. This lesson in value is a spur to ownership and protection of the developed asset- the sand dam.

D. COMMUNITY CAPACITY BUILDING

Training is an integral part of the SASOL sand dam programme in Kitui. The core business of SASOL is to build sand dams as community assets with a purpose of increasing community productivity and wealth creation. But it would be mistaken to see the SASOL dam project as only building sand dams. Several steps in training are taken concurrently with the construction of sand dams.

Training methodology is participatory using carefully selected guiding questions to facilitate group discussions. It avails a forum for the community to critically examine their situation, identify their problems, and suggest possible solutions. The community then can make a plan of action to tackle their problems by implementing suitable solutions according to a defined order, to achieve their goals and aspirations.

Development Of Village Baseline Data
In order to plan for the future, the community has to know; the number of people they cater for, how many animals, their geographical extent, the facilities and institutions in their areas, their standards of living, hygiene practices, crops grown etc. this information is gathered through development of village baseline data.

As stated earlier many villages do not have any village records. The development of this data gives an image of the state of their village which most people visualize for the first time. It serves as an eye opener of the real existing situation, highlights village needs and possible solutions, and helps the villages plan future actions. From this baseline situation future achievements can be measured.

In order to plan for the future the community has to know: - the number of people they eater for, how many animals, their geographical extent, the facilities and institutions in their resources, their standards of living, hygiene practices, crops grown etc.

The information is collected by the community sitting together trustfully discussing and filling a questionnaire. They are free to add any other information it is deemed fit for their area. The information is collected on village basis.

The procedure is to hold a one-day sub-locational meeting with village leaders to discuss the questionnaire. At the end of the meeting, the questionnaire is distributed to be filled by each village individually. To do this the community holds several meetings over a month for the completion of the data. A reporting meeting is then held again for discussion of the collected data. A village might have to go back and review its own data.

Mainly this exercise gives a village the data to use as a planning base a part from highlighting the need of having and maintaining data for posterity.

Site Committee- Implementation Training

Many pitfalls in project implementation procedures can be avoided through proper planning and institution of a monitoring and evaluation scheme. Training site committees on the essence of planning, development of site implementation by-laws, the maintenance of site records and monitoring/evaluating progress coupled with feedback to the site members has been crucial for the success of the sites developed.

A major part of community organization is to form structures for sand dam construction. Once the community in a village has identified the sites for development, they divide the community into groups for each site. This is the time the community organizer meets with the village to discuss the formation of committees for each site. In this meeting the guidelines for the committee are spelled out. The site committee is the backbone of the organizational structure and is critical for the success of a sand dam site. Its constitution is therefore important if it is to function effectively. Usually the committee members are elected from people known by the community for getting things well done. Basically the community sees them as most important as the implementation of the sand dam construction is concerned.

An effective committee is formed out of the site community representing gender and all age groups. This ensures involvement and distribution of responsibilities. Record keeping and transparency are the other major issues discussed. A proper record would show whom and how each person was involved, the investment involved hence the value of the investment. This ensures ownership.

Transparency and accountability of the committee prevents diversion of sand dam construction material to personal or other uses. For smooth operation of the site each committee member must know and act their role.

Whereas the chairman has overall command, he must not show favoritism or become dictatorial. The secretary must keep all site records truthfully. The site treasurer must keep all money records and give feedback to the community of their contributions and expenditure. All committee members must participate in the planning, monitoring and supervision of the site up and above participating in site works.

Continuous interaction with the SASOL community organizer ensures that the committees are constantly appraised and have a constant reference to their operation. Any issues, which arise, are discussed and resolved with the community organizer who is constantly in touch with the site committees and communities.

Sanitation And Hygiene Training

This training dialogues with the community on the dire need for avoiding contamination of their water source. Water is a medium of dispersal of disease when contaminated. Contamination of one source may result to serious consequences on the community holistically. Maintenance of appropriate sanitation and hygiene measures in the vicinity of the sources and the surrounding areas greatly reduces the contamination.

This training, which takes 5 days, is based on material developed by the Ministry of Health. The materials on PHAST (Participatory Hygiene and Sanitation Transformation) training are designed to enable the community to identify their current hygiene practices and help them to change to a desired state. Hence achieving a transformation.

Each site selects 5 participants for this training. The participants are charged with the responsibility of extension of the training material at their sites. In addition two Community Resource Persons (CRPs) from each sub-location are trained as facilitators in their areas. The Divisional health officers and Locational health technicians support the CRPs.

Natural Resource Management

Effective management of natural resources is the path to wealth and improved standards of living. In their native state these resources might not be seem to amount to much, and are likely to be wantonly exploited and destroyed. With informed management, these resources can be changed into assets, which can sustainably create wealth. For example, water harvesting will improve land in the ASALs from a mere possession into a productive entity, which will increase its value and turn it into an asset.

This trainings aim at facilitating the community to look at their resources and determine ways and means of developing assets from these resources effectively.

Poor superintendence of natural resources is a major course of poverty in the rural areas in the ASALs. The Natural Resource Management (NRM) is designed as a participatory 5-day workshop. The training is held at an easily accessible community site. Each site elects 5 participants for attendance of the training. A site is made up of a community comprising of 20-50 households with a population of 140-350 people. The deliberations of the training workshop are disseminated to the site community by the participants with the help of the SASOL community organizer who is in constant contact with the site community.

Using guiding question the community catalogue the available natural resources available in their village. They then, explore ways and means of utilizing their natural resources to create wealth. Take for example the case of water, which is a limiting factor of ASAL production. It is in abundance during the short wet rainy season. It becomes extremely scarce after the rains stop. It is clear that management of water and its conservation can enhance productivity. This enhanced productivity translates into improved food availability and incomes. However to realize this, the community must practice smart marketing. Failure to do this will be tantamount to giving away the fruits of their sweat for somebody else's benefit.

By the end of the week each village develops a comprehensive list of the natural resources found in their village. Possible ways and means of using these resources to reduce poverty and create wealth are worked out. An option plan spelling out how to use these resources sustainably and their management is prepared to take back to the village for consultation, discussion amendment and opinion by the village community. The village community may have one or more sand dam sites.

SASOL staff and external trainers run this training.

Project Management Training
In any community numerous projects are undertaken either on individual or communal basis. Some of these projects are successfully completed whilst others are failures. Some are well managed and maintained while others are misused and left to disintegrate.

This training is an examination by the community of what creates a successful or failed projects, how to increase the success rate. It examines the role of social structures, community institutions, processes and their interactions with other institutions for mutual benefit. This enables communities to shape new ethical behavior, traditions, beliefs, opinions, values, in order to survive in an ever-changing world. It is aimed as increasing project success rate and reduce failures.

The 5-day workshop is held in a facility within the reach of the participants. Participants are at least 5 representatives from each sand am community. In this workshop issues are deliberated and conclusions drawn on proper project management skills. Village participants from sand dam sites meet at a village facility to deliberate and these issues.

Using guiding questions the village makes a catalogue of the projects undertaken in the village in the past 5 years. For each project an analysis of success or failure is made. Two categories of project therefore emerge: successful and failed projects. Each successful project is then analyzed to elucidate factors, which made it a success. Similarly for each failed project an analysis is made to show factors leading to failure. The community them make a catalogue of factors, which promote the success of a project. A second catalogue is made of factors, which are failure promoters.

Discussion on factors of successful projects leads to a definition of concrete principles of future projects. On the other hand it gives pitfalls, which must be avoided to achieve success. For example, it is important to avoid conflict in projects. The community must be ready to resolve conflict, as it is likely to occur due to natural human interactions.

By the end of this training the village prepares an action plan. This outlines how future projects will be handled in the village to ensure success and minimize failure.

It also highlights what community institutions promote success and how and where to get help from external institutions e.g. administration, security and the line ministries.

E. COMMUNITY ASSET BUILDING

Water is the greatest limiting factor of production in Kitui and other ASALS. The provision of water is therefore the base for improving the productivity of the land. Developing water sources is therefore building natural assets by the community to improve productivity, create wealth and improve their standards of living. This is really critical if the community is to break from the cycle of poverty in the face of increasing population.

Each community is ultimately responsible for its own destiny. Therefore its commitment and desire to break the cycle of poverty is the basis on which any intervention can be built. If the community is unwilling, no amount of coaxing, persuasion or pressure can prevail. And if any actor goes against the community's will the result is a facility, which is never used or destroyed by the community.