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SUBSURFACE/SAND DAMS FOR DEVELOPMENT

Presentation to American Business Association
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KITUI DISTRICT SYNOPSIS

Arid and semiarid districts (ASALs) have 35-40% of the national population. They have received less than their fair share of development resources because of historic economistic arguments about rates of return. They have more land for food production, 20 ha. per capita, than the high potential areas, 0.25 ha. per capita, compared to 20 ha. The major bottleneck to production is water in the ASALs. Kitui district is such a district. It ranks close to the bottom in social indicators like hospital deliveries, under five-mortality rate, literacy, education, health, HIV/AIDS etc.

Kitui District has a population density of 120 people per sq. km. but as high as three times that ratio in the central slightly better endowed areas. Since the turn of the century the District, populated by the Kamba people, has exported labour, mainly to Mombasa. About 60% of the households are female headed. Kitui District covers a large area for it extends 200 km from south to north and 120 km from east to west. The average altitude is 1,100 above sea level. The soils are derived from basement rock systems, not rich in nutrients and prone to erosion. Farming systems are poor. Soil poverty is exacerbated by slash and burn agriculture, still widely practised. Land husbandry techniques are poor; there is little terracing, little use of manure or commercial fertilisers. Given the geology, water tables are low and boreholes are not successful unless located in shatter zones.

Rainfall is generally lower than 600 mm. per year and is characterised by very high variability. It falls in short highly erosive storms. The rivers therefore flood for short times and but remain dry for most of the year. The District has no perennial rivers. Agro-ecologically the whole District should be a millet and sorghum growing area, for open pan evapotranspiration rates approach a meter a year. However, these crops are not grown extensively because the strong quest for education means that the children needed for bird scaring labour are not available. Under these constraints, farmers try to grow maize. It, at best, succeeds in only one season out of four. Other crops are beans, pigeon peas, cow peas and cotton. Livestock

keeping was an important complement to crop agriculture but with increased population densities together with the droughts of recent years; very few families have livestock. Eking out a living in these lands is not a proposition for the weak.

SASOL FOUNDATION

SASOL is a local NGO created in early 1990s with the objective of participating in the development of Arid and Semi-Arid Lands (ASALs) by the people living in those regions. We emphasise that popular participation in development is foundational, for ultimately it is the communities who develop themselves, a point ignored by many development workers and governments. In the Kitui programme the specific focus is to create a water net, a concept with two meanings: first, there is the task of physically capturing and retaining the water. Second, there is the need prevent people from falling into the clutches of ever greater poverty. Water is the single most important limitation to development in the arid and semi-arid areas. There is need to capture and retain water both for domestic and livestock use initially, but in the long term, the objective is to have water available for the transformation of production in the ASALs.

This is not theory but reality on the ground. For example, farmers in Wamunyu, in Machakos District, an area of very low rainfall (zone 5 in terms of the national classification which has zone 7 as desert) have caught and retained water and are now keeping world class Friesian cattle. They even obtain semen from WorldWide Sires, the premier global semen trader based in the United States. By catching water, these farmers, the majority of them illiterate, have been able to produce surplus milk, to the extent that they now dominate the market in the towns of Machakos, Kitui and Athi River. They have won prizes in national agricultural shows! They keep Friesians in areas where the Ministry of Agriculture policy claims that survival for high-grade cattle is not possible!

EFFORTS TO DATE

SASOL selected a 600-sq. km. area for its project site since it has the highest population density, varied geology and soils as well as rivers with diverse morphologies. Water unit costs as well as social and economic cost benefit ratios of development would therefore be higher than less populated areas. The project is intended to ensure access to reliable water sources within an average distance of less than 2 km. from the typical homestead. This configuration can be compared to conditions prevailing in the past when homesteads were located 10 km. from a reliable water source, i.e., a source that does not dry during the dry season.

The initial steps in the creation of the water net were to build well and catchment tanks for schools. These initiatives were launched to keep children (especially girl children) in school during the endemic droughts. The idea was to ensure access to drinking water even in times of food shortages and water sufficient for cooking famine relief food. Finally, it was an attempt

to ensure that the girl children would not be taken out of school to fetch water during droughts. Additionally, communities adjoining schools would also be able to utilise the school water sources.

About 100 school wells and about 13 school water tanks of 25cu. meters, the latter built where there had been no possibility of a good well, have been completed. One hundred forty subsurface or surface dams and fifty five wells have been constructed in the same communities.

THESE DAMS ARE NO MORE THAN BARRAGES ACROSS DRY RIVERS. By constructing barriers across ephemeral rivers, one is able to catch storm water and store it under the sand; between 30% and 40% of the volume of good river sand is the space available to store water. This water is then available for multiple uses. This is not a new technology. It is argued that it is as old as Hamurabi and was part of the water system in the Hanging Gardens of Babylon. The African Land Development Board between 1946 and 1959 implemented it. A few of these dams were built in Zimbabwe, Namibia and Botswana. What is new in the SASOL program is the density of construction; SASOL is building on average about one barrage every kilometre in the respective rivers.

This density of construction is intended to achieve several goals. It assures access to a water point within 2 km. of the typical homestead, directly benefiting the health of women who are then relieved from carrying water 10 km. It has health implications for the population in general for available water means improved hygiene. It releases labour for other productive activities. It recharges the ground water table. It creates new high moisture farmland by lateral seepage. This land is available to the community for production of high value crops like vegetables, fodder, fruit trees and bee forage trees and shrubs. Such a farming system has direct implications for the productivity of the area as well as a positive nutritional impact on the general population, particularly on children.

What are the dam construction costs? First we should note that SASOL works with communities which provide all the construction labour, including site excavating, collecting and crushing of stones, assisting the fundis and bringing water to sites where there is none. The communities provide approximately 1,000 person hours per dam. They house and feed the skilled workers provided by SASOL. For its part, SASOL provides the skilled masons, the cement, barbed wire and iron rods for reinforcement. Contraction is by use of river sand, and stones. No aggregate is used. On average a dam and the related well costs approximately USD 2000.

KITUI SASOL PARTNERS

Our partners in these efforts are community groups, which can be subsumed under the term "Mwethya". Historically, the Kamba community came together to do work which was beyond the labour power of a household. Such activity could include cultivation or construction of a house. As the men migrated out for purposes of selling their labour, women have

dominated these community rural solidarity groups. Since dams are site specific, SASOL does not organise the groups. When we come to a sub location, the lowest organised administrative area; we call a public meeting to announce that we are willing to work in the area if the community comes up with an organization responsible for the respective potential dam sites.

Characteristically, the community selects committees for each site. Some of them fall into the category of the traditional "mwethya" configuration, for it was based on area settlement. In other situations, traditional mwethya groups are merged to create the site committee. In still other situations, new groups are created de novo. in the rural areas. In rural areas, it is important to note, the capacity to organise and reorganise in ways commensurate with innovative or new tasks, is readily present. This dynamic character of Kenya's rural communities is easily ignored.

Once the groups are formed, they link to the government development committee structure by becoming members of the village, sub location and location development committees. These government development committees have had an uneven track record since District Focus for Rural Development was formulated in 1983. In areas where SASOL is operational, the sub location and locational ones have been active in co-ordinating the communities work. The site committees have become an important source of selection of personnel for the Divisional Development Committees, the lowest level of Government development prioritising of development projects according to the District Focus Policy. In development jargon, these site groups would be seen as Community Based Organizations (CBOs). They are beginning to federate since the management of a whole river catchment is larger than the area they cover. This reconfiguration presents opportunities for engaging in other development work at a larger scale. Such options are not often cited in the literature on CBOs. Instead, it is implied that such CBOs essentially require the mediation of national or international NGOs if any degree of effectiveness or flexibility is to be realised.

PRIVATE SECTOR AND SUBSURFACE/SAND DAMS
We in SASOL believe that the private sector could act to stimulate more widespread use of Subsurface/Sand dams to increase national production. As an initial practical step, perhaps someone in the private sector could offer a web site or provide a digital camera to facilitate the documentation and thus the publicity of this water storage and distribution system.

It is important to understand that this kind of undertaking in fact falls within the general category of "public works". Most communities in Kitui District simply cannot on their own muster the instant cash required to build such water storage structures. Thus the financial component becomes a critical dependent variable for the success of the initiative. On the other hand, SASOL has demonstrated that with relatively small amounts of money from external sources, combined with well-organised community participation, masses of water can be caught for storage and distribution. The construction techniques in density have been proven.

In October, the National Kenya Rainwater Harvesting Association held a conference which provided opportunity to evaluate both the SASOL and another community driven water development undertaking in Machakos District, namely the Utooni Community, which has constructed 104 dams over the past two decades, some of them in existence since 1978. A report by professional engineers, sociologists, economists and other development specialists, makes the argument that this system of water collection and storage is more effective than open dams or other means of providing water in ASAL regions of Kenya. This system protects water from evaporation; it is less expensive than any other construction techniques; it is inherently clean; furthermore, and most importantly, these systems can be undertaken and owned by communities.

The Kenya Government has recently issued a policy document on water. It states that from henceforth communities will be responsible for the provision of their own water sources.

Can you give them a helping hand?