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SUSTAINABILITY OF WATER AND SANITATION SYSTEMS

Spring protection - sustainable water supply

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WATER SUPPLIES ARE a vital element of rural infrastructure and are an important area for government action, most Ugandans live in rural areas and are confronted with high mobility and mortality rate due to disease caused by unsafe water, and improper sanitation and immunisable disease.

Rukungiri in South Western Uganda is one of the most density populated districts in the country with 200 people per square kilometre. Like most rural areas in Uganda the people earn a living through subsistence agriculture. The main water sources are rivers, springs and rainwater. There is a minimum average annual rainfall of 1500mm distributed throughout the year. Drier seasons are not as pronounced and regular as elsewhere in Africa but can last for 3 or 4 months with only light rains. With good climate, food production is successful and consequently in 1991 the per capital income of the local people was Us and 61.19 which was higher ($) than the national average of Us dollar 49.18. Prices in this report are given in Uganda shillings and the exchange rate in April 1994 was Us$ 1.00 to 1000/=.

History of spring project

Since 1985 the church of Uganda North Kigezi Diocese in Rukungiri has run a water programme funded by Water Aid, a U.K. charity.

Initial Projects included rehabilitation of hospitals, spring protection and also rainwater collection systems for clinics, schools and churches. These projects involved the construction of large tanks, and installation of plastic guttering imported from U.K.

Within the first two years, half of the rainwater projects were in a very bad shape. Communities were not keen to maintain them because of their disadvantage of providing a limited amount of water from an intermittent supply. On the other hand the pumped schemes were "off and on" due to the high running costs. The only project which was working as designed was the spring project.

For these reasons pumped schemes and rainwater collection systems were discontinued in order to concentrate on water sources that benefited more people at a lower cost.

The spring programme

Community mobilisation

The use of spring water is not a new idea in the village life in this part of the country. Traditionally people collect spring water which may either be in a pool (collected by dipping in a collection container) or by use of a banana fibre in the form of a gutter (for springs from steep slopes).

Taking advantage of the socio-acceptability of the spring water, the spring project was encouraged. This was done by mobilising people using church leaders who talked to people during Sunday services about the advantages of safe drinking water. The church here is a very strong indigenous organization whose involvement makes the project achieve the intended impacts. Consequently the church leaders are very respectable and their words are taken serious. This implementation strategy has two advantages: One is that it is much cheaper than employing a separate mobilizer (since they do it as part of their work) and two is that the impact is permanent as the church is also permanent.

Community participation

A definition of participation is a necessary point for a strategy on achieving sustainability. Participation is the learning process by which communities control and deal with technology, change and development. It is a very necessary component of every water supply project that has maintenance and long term sustainability as its objective.

The spring project has been implemented in line with the above definition of participation. Initially the communities were always expected to provide the following to have their sources protected.

- Manual labour.
- Stones and sand for constructional work.
- Feed and house the "Fundi" (artisan) during the construction.

The project input was limited to cement and paying of wages for the fundi. As communities got more mobilised, the community contribution was increased to include half of the pay to the fundi. There are undoubtedly some rural areas where cash is simply not available but even in these areas very poor house holds usually have some resources in particular their own time to contribute to constructing and maintaining service improvements.

This contribution can often be important; the community contributions were reduced to half in some areas but well organized self-help labour was used. So far nine hundred and fifty springs have been protected in the district serving about 56,000 people. Thus making 14 percent coverage.

Indigenous water use

Quantity and quality

For such a wet area the quantities of water used in the average rural household are surprisingly low. In a survey during a dry spell it was found that the average daily water consumption in the district was 5.7 litres per person per day. But when sources are protected the consumption increase due to ease of drawing and increased use because of improvement in quality.

There was a marked improvement in quality after protection of sources comparison though contamination was happening in both the collection and storage containers. The socioeconomic status of a household had a direct effect on the quality and quantity of the water at the household concerned.

Below is a sample of the results of socioeconomic, quantity and quality parameters of some of the 100 households surveyed.

On average there were 12 counts of Coliforms in samples taken original from a protected source and 150 counts for samples from unprotected sources.

Financial matters

Affordability

The total cost of materials for the protection of a spring is based on the of cement as the local materials are relatively cheap. On average it needs 12 bags of cement to protect a spring. The other materials needed are a lorry load of stones, a lorry of sand, a metre of 2" GI pipe, a square metre of polythene or terram.

The total cost is therefore:

Cement ush	168,000
Sand ushs	15,000
Stones ushs	20,000
GI pipe ushs	4,000
Polythene ushs	1,000
Skilled labour ushs	50,000
Unskilled labour ushs	120,000
Supervisory work ushs	32,000
Total ushs	410,000

Thus the community input us Ushs 180,000= as they provide sand, stones, half of the pay for skilled labour, and unskilled labour, let alone feeding and housing the fundi. Supervisory work include the time and fuel for the engineer and the supervisor. The project input therefore is Ushs 230,000= On average a single protected spring has 60 beneficiaries, giving a community input per capital of Ushs 3000= and hence a project input per capital of Ushs 3,833=. We have been improving on the design to achieve better ones and reduce the total cost by cutting down the amount of materials used. However, the latest design which include a big spring box to act as reservoir has put the total cost high. The design allows for the storage of night flow (for low yield springs) and the tank is fitted with a tap, a washout and overflow. We have started building this type of spring only where the low yield spring is the only source for a population of at least 60 people. The total cost for this type of spring is about 42 percent more than that of an ordinary spring but it is shared between the communities and the water programme.

Material availability

Cement is available locally in Rukungiri and out buying trading centres. The cement is manufactured and is priced at around 14,000= per 50 kg (April 1995). Good quality sand is found within the district but is located in the Rift Valleys; in some areas the available sand is very poor.

Good stones are also available in most parts of the district but occasionally we provide transport for areas where it is not available.

Maintenance and sustainability

Before constructional work begins for any spring, there must be in place a water and sanitation committee which is charged with mobilising the people before and during construction. They are also charged with maintenance of the spring. The committee is formed from the beneficiaries. Day today maintenance is done by a caretaker.

Every spring has a caretaker. The caretaker is not paid for his work but is exempt from the normal "bulungi bwansi (communal work) which is done every Wednesday. Each caretaker has a manual which guides him during the maintenance. These manuals are given to them after attending a workshop or during the construction of the spring.

As the inputs from the community is being increased gradually, there is hope that one time the communities will be able to meet the full cost. The technology being simple and requiring only an artisan the communities will be able to use their own local people in future.

Conclusion

- For any rural water supply project to be sustainable, governments and external agencies must establish the environment in which communities can construct, operate and manage improved facilities.
- Communities should not be underrated in terms of their contribution for the costs of the chosen services.
- The most appropriate technology should always be given first priority for a given community for ever lasting solution.
- Involvement if indigenous institutions in the implementation of projects should be encouraged for sustainability.

References

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Table 1. Results from protected sources

Number of people in a household	*Daily demand (litres)*	*Capacity of collection containers (litres)*	*F.C/100ml*	*Socio-economic*
7	75	35	250	Below average
7	90	85	150	Average
9	90	80	5	Below average
7	60	60	65	Average
7	100	50	8	Average
9	90	50	3	Average
7	60	30	65	Above average

Table 2. Results from unprotected sources

Number of people in a household	*Daily demand (litres)*	*Capacity of collection containers (litres)*	*F.C/100ml*	*Socio-economic*
12	50	30	350	Below average
10	120	25	380	Average
4	80	50	35	Above average
8	40	5	410	Below average
5	75	50	250	Above average
5	75	55	310	Average
6	70	60	350	Below average