30th WEDC International Conference, Vientiane, Lao PDR, 2004

PEOPLE-CENTRED APPROACHES TO WATER AND ENVIRONMENTAL SANITATION

Sustainable rural water with demand responsive and people centered approaches

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Community based rural water supply schemes are the suitable solutions to fulfill the water needs of village population in the developing countries like Sri Lanka. However ensuring the sustainability in operation and maintenance of rural water schemes are the major challenge. This paper describes the sustainability of water supply schemes, implemented in six-selected districts of Sri Lanka, under the ADB-assisted third water supply and sanitation sector project. Monaragala is one of the selected districts under this ADB project, and our analysis based on the examination of piped water supply schemes, which were implemented, within villages in this District. These schemes were implemented based on demand responsive and people centered approaches, and the community is playing the major role from the implementation to operation and maintenance. This paper describes the post-project strategies, the operation and maintenance system adapted to these water schemes and how the sustainability was achieved through community involvement. Setting up the tariff system and the billing process are also important factors for the sustainability, so the paper explains these details too, and provides the cost comparison of operation and maintenance activities, of some selected schemes.

Introduction

There are number of village water supply schemes implemented in the Monaragala District of Sri Lanka under the ADB-assisted third water supply and sanitation sector project. This project has been implemented in two phases. Under the first phase 36 village water supply schemes were successfully completed and in four local administrative areas since June 2003. A further 33 village water supply schemes are being implemented under the second phase and construction activities of these schemes are nearing completion in the remaining six local administrative areas.

As overall project strategies are governed by demand responsive and people centered approaches, the community is involved in the project activities from the beginning to end of the project and as well as the operation and maintenance activities. Community-based organizations (CBO's) were formed at the beginning of the project and the implementation was carried out through community participation. The operation and maintenance activities were also taken over by CBOs, once the construction activities were completed. Already 36 village water supply schemes are being successfully maintained by the CBOs and the basic details of some of them are as follows.

Table 1. Details of some of the village water supply schemes

Name of scheme	Type of scheme	Detail of water source	No of house connections at present	Anticipated no of house connections
Ulugala	Pumping	Borehole well	184	290
Horabokk	Pumping	Borehole well	80	129
Madapitiya	Gravity	Stream	79	193
Kotagama	Gravity	Stream	140	250
Udamallahawa	Gravity	Stream	93	240
Mudiyala	Gravity	Stream	79	258
Ranweligama	Pumping	Borehole well	150	214
Mahagama	Pumping	Borehole well	250	496
Kimbulawela	Gravity	Stream	105	188
Beraliyapola	Gravity	Stream	110	202
Ethimale colony	Pumping	Borehole well	104	272
Egadakotagama	Gravity	Stream	60	198
Badullagammana	Pumping	Borehole well	148	414

The technical support units were set up in each local administrative area during the implementation, to ensure sustainability in long-term operation. These units are functioning continuously to advise and help CBOs in operation and maintenance activities. Financial and technical assistance to establish each support unit is provided by the project. Training and other skill development activities are provided through a capacity-building programme financed by project funds with the assistance of NORAD (Norwegian Aid). Cost of initial mobilization and training is found to be around 950 US $ per village scheme. Figure 1 explains inter-relationship between each group involved in the sustainable operation and maintenance activities.

National Water Supply & Drainage Board (NWS&DB)

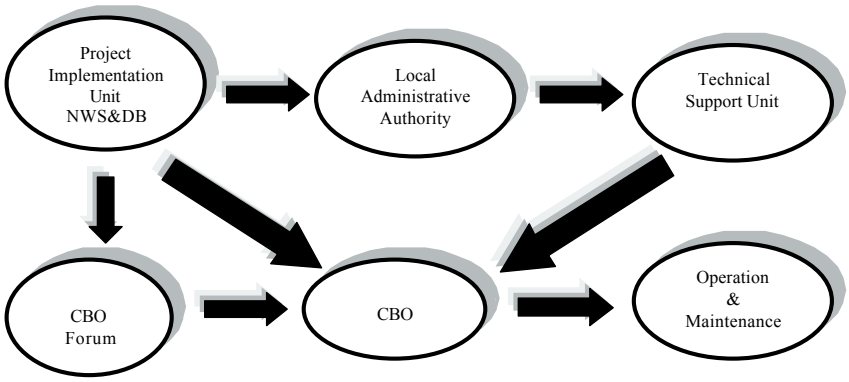

Figure 1. Interrelationship between each group involved in O&M

is the implementing agency and the project is implemented through the Local Administrative Authority in each area. Technical personnel and the Community Development Officer were attached to each unit to monitor and help the community in construction activities. Capacity-building programmes were carried out alongside construction activities. The programmes covered construction techniques, quality monitoring and aspects of operation and maintenance.

Figure 1 also illustrates the role of the CBO forum. This is a common body of all CBOs within the district that is established to look after the well being of CBOs, and to provide additional support and help so that they can overcome any sudden problems. This system is developed to strengthen self-sustainability in operation and maintenance work, as each CBO has to run their scheme independently after the completion of the project in their village. All CBOs were registered with NWS&DB so that they are provided with legal status to function as service-oriented organizations by the Government of Sri Lanka. Each CBO maintains a bank account with access to operate it provided to two committee members.

Operation and maintenance strategy

Though the project provided financial assistance to each community to construct and own a water supply scheme, it is a vital requirement to set up a proper operation and maintenance system for its sustainability. Therefore, from the very beginning of the project, the necessary training was provided to selected personnel from each community water scheme through a capacity building programme. The main activities covered under the capacity building programme are as follows:

- Training in construction activities during implementation of water schemes.
- Selection of suitable staff for operation and maintenance activities.
- Setting up of permanent office space in each scheme for O&M administration and storage.
- Training in operation and maintenance activities.
- Provision of necessary tools and equipments for day to day repair and maintenance.
- Special training in the billing process and record keeping (such as daily water production and consumption, daily power consumption (for pumping schemes only), individual consumer records, recording and attending to consumer complaints.)
- Issuing monthly bills and revenue collection.
- Financial record keeping and maintaining a bank account etc for CBOs.
- Preparing a monthly financial statement ready for CBO members at their meetings.

During the construction stage, selected personnel were involved in the pipe laying techniques, intake, treatment unit and water tank construction etc. Once the construction activities were nearing completion, the same personnel provided training in periodic cleaning of tanks, intakes and treatment units, preventive maintenance of distribution system and pumping unit, operational techniques of pumps, training in billing process, revenue collection and financial management. The external technical support and training were provided through project funds and NORAD assistance. The total cost of this process was found to be around 1600 US $ per Village scheme.

Attending sudden breakdowns and repairs to pumping systems are the crucial problems in operation & maintenance. Standby pumps were installed in all pumping schemes to prevent the interruption in water supply during such occasion. Repairs and damages to pipelines are being attended to by the CBOs and this can be done quite quickly, so the chances of interruption of water supply for long hours are minimal.

Water tariff and revenue collection

An individual water tariff has been introduced in each scheme depending on the type (gravity or pumping), total O&M cost, operational difficulty, requirement of maintenance staff and other relevant factors that can impact on O&M cost, such as average monthly water consumption, frequency of sudden repairs etc. Project staff helped the CBOs to prepare the billing pattern and to decide on a suitable water tariff. At this stage, detailed analysis was carried out by project staff with the involvement of each community for each scheme separately,

Table 2. Monthly expenditure details of selected gravity schemes

Name of scheme	No of House connections	Expenditure in US $ per month						
		Salary of caretaker	Salary of billing person	Stationery	Chemicals/ chlorine	Repair cost	Miscellaneous	Total
Kotagama	149	25	25	2	7	7	1	67
Kimbulawela	105	25	-	1.5	9	8	0.5	44
Beraliyapola	110	30	-	2	10	10	1	53
Udamallahawa	93	25	20	1.5	6	4	0.5	57

Table 3. Tariff system and revenue collection of selected gravity schemes (1unit = 1000 litres)

Name of scheme	No of House connections	Expenditure in US $ per month				Monthly average consumption Per HH	Total revenue per month US $
		Service charge	0 -10 units	10 – 20 units	20 – 30 units		
Kotagama	149	0.3	0.04	0.05	0.075	5	73.3
Kimbulawela	105	0.5	0.02	0.03	0.05	12	67
Beraliyapola	110	0.4	0.03	0.04	0.05	10	69.5
Udamallahawa	93	0.3	0.035	0.04	0.06	7.6	67

to work out the most suitable tariff system, and to ensure a sustainable O&M process. The tariff system produced was discussed with members of the CBO and their acceptance was obtained prior to implementing the billing process. As the entire O&M authority is in the CBO's hands, their decision is final. They have the right to adjust the unit cost, service charge and the O&M staff salaries during the discussions. On several occasions the salaries of the O&M staff, were adjusted to reduce the unit cost to the community. Detailed analysis of expenditure, the tariff system and revenue for some of the gravity schemes are given in Tables 2 &3.

Tables 2 and 3 explain the expenditure details and how the tariff system worked out in each scheme separately. While analyzing the tariff system, careful consideration was given, considering all probable expenses as well as the monthly consumption pattern. There were some occasions where the expected consumption pattern varied in some of the village schemes. This was due to the village community using nearby river or streams for their bathing and washing purposes. They are therefore depending on the safe water mainly for drinking and cooking purposes (this is clearly indicated in Table 3, for Kotagama scheme, where the average monthly consumption is 5 units (one unit is equal to 1000 litres of water). This is the usual life style in most of the villages in Sri Lanka. The village communities use the common bathing places, such as nearby streams or rivers, even when they are not very close to their residences. Also they use these common places to have a chat in the evening while having a bath and washing clothes. Therefore the tariff system has had to be revised for these types of schemes after commissioning. This process has been adopted wherever necessary to ensure the sustainability. In some of the gravity schemes caretakers handle billing work to reduce the expenditure. Detailed analysis of expenditure, the tariff system and revenue for some of the pumping schemes are given in Tables 4 and 5.

While preparing expenditure details, much attention is given to power and repair cost, and the tariff system for pumping schemes. Depending on the pump operation hours, the cost has been worked out according to the electricity tariff and a reasonable amount of additional money must be deposited each month to cover the cost of sudden failure of the motor or the pump. Therefore by considering all these facts, service charge and unit cost are worked out for each scheme separately. Tables 4 and 5 illustrate these details clearly. The tariff system has to be revised when the electricity tariff increases. Efficient training of the pump operator/caretaker is a vital requirement for pumping schemes to assure sustainability, therefore training in operation and maintenance techniques and preventive maintenance of the pumping unit were provided to pump operator/caretakers.

Some of the above schemes are providing water supply to institutions such as schools, rural health centres, religious places and shops etc. A separate tariff system was introduced

Table 4. Monthly expenditure details of selected pumping schemes

Name of scheme	No of House connections	Expenditure in US $ per month							
		Salary of Pump operator/ caretaker	Salary of billing person	Stationery	Chemicals/ chlorine	Repair cost	Power cost	Miscellaneous	Total
Kotagama	291	45	45	3	20	25	95	2	235
Kimbulawela	150	35	35	1.5	9	20	30	1	131.5
Ulugala	184	40	40	2	18	6	50	1.5	157.5
Horabokka	85	35	-	1	6	7	35	0.5	84.5

Table 5. Tariff system and revenue collection of selected pumping schemes (1 unit + 1000 litres

Name of scheme	No of House connections	Expenditure in US $ per month				Monthly average consumption Per HH	Total revenue per month US $
		Service charge	0 -10 units	10 – 20 units	20 – 30 units		
Mahagama	291	0.5	0.05	0.08	0.10	8	270
Ranweligama	105	0.5	0.06	0.12	0.15	6	156
Ulugala	184	0.5	0.045	0.065	0.1	13	213
Horabokka	85	0.6	0.08	0.14	0.2	8	114

for these institutions because their water usage is entirely different from domestic water usage.

All the household and other institutions are metered and on-the-spot bills are being distributed to the consumers once the meter readings are recorded. Billing personnel were trained to work out the monthly bills according to the tariff system. About 70 % of the bill is collected at the time of billing. However 14 days time is allowed for consumers to settle their bills. As all the CBO's are provided with office space to ease operation and maintenance activities, consumers can settle their bills at the CBO office. It has been observed only 5 – 6 % of the consumers fail to pay their bills on time, and this group were given a deadline to settle their bills. Disconnection of water service is the punishment, if they do not pay by the deadline. Eight incidents of disconnections have been reported to us since the commissioning of the schemes. The re-connection of water service provided to consumer's premises results, after payment of the bill, in an additional fine decided by CBO management.

Conclusion

The facts above briefly explain, how a sustainable operation and maintenance system was achieved in rural water systems in Monaragala District using a people-centered, demand responsive approach and the simple strategies adopted to achieve this difficult task. The National Water Agency cannot provide safe and adequate drinking water to all communities in Sri Lanka. So community-based self-sustainable water schemes are the most suitable and appropriate solutions in rural areas. Using such an approach results in the communities having the feeling that the scheme is their property and they understand the importance of the safe water facility. As a result they are maintaining the scheme properly according to the guidance given to them.

Though the National Water Agency is unable to maintain small-scale schemes, they are playing a major role in implementing these water schemes with community involvement. Sustainability of the schemes is assured with the assistance of the Local Administrative Authority of each area and the post project strategy used in operation and maintenance activities. External technical support and the training provided through the capacity building programme to the village community has borne fruit at the end of the project. Those who were actively involved in the capacity building activities were well trained in pipe plumbing techniques, maintaining intake and treatment units, attending sudden repairs, maintaining distribution network and pump operation etc. An added advantage is that a minimum of two people from each village were provided with employment by the community itself.

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