SecureWater Through Demand Responsive Approaches
The Sri Lankan Experience

By Rajindra De S. Ariyabandu and M.M.M. Aheeyar

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Acknowledgement

The SecureWater study has been a leaning experience. We learnt about the behavior of rural people, their livelihoods and how they cope in times of water short and water abundant situations.

It is our belief that this study will strengthen the knowledge on Demand Responsive Approaches with respect to Rural Water Supply in Sri Lanka.

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Acronyms and abbreviations

ADB	Asian Development Bank
CBO	Community-based organisations
CF	Community facilitator
COWI	Consultancy within Engineering (Denmark)
CWSSP	Community Water Supply and Sanitation Project
DDS	Death Donation Society
DRA	Demand responsive approaches
DS	Divisional Secretariat
EA	Engineering assistant
EPF	Employment Provident Fund
GN	Grama Niladhari (Lowest Administrative Officer of the government hierarchy)
GND	Grama Niladhari Division
HEA	Household economy approach
IWRM	Integrated water resources management
Lpcd/lpcpd	Litre per capita per day
mcm	Million cubic metres
MIS	Management information system
NGOs	Non-government organisation
NWRA	National Water Resources Authority
NWSDB	National Water Supply and Drainage Board
O&M	Operation & maintenance
PCs	Provincial councils
POs	Partner organisation
PRA	Participatory Rural Appraisal
Pradeshiya Sabha	Local Authorities
PRRA	Participatory Rapid Rural Appraisal
PS	Pradeshiya Sabha
Rs	(Sri Lankan) rupees
RWH	Rainwater harvesting
RWS	Rural water supply
TA	Technical assistant
VPP	Village participatory planning
WSS	Water supply & sanitation

1 US Dollar = 95 Sri Lanka Rupees (June 2004)

Executive Summary

Water supply to rural areas in Sri Lanka is a function and a responsibility of the Pradshiya Sabha (local authorities). Accelerated development in this area began in the early 1980s, although interventions were top-down, with participation of water users often limited to the construction stage. This began to change in 1991 with the first Community Water Supply and Sanitation Project (CWSSP). More user participation was evident in all stages of project implementation. Since then, many projects have been carried out in rural water supply, and demand responsive approaches (DRA) have been tried and tested in most of these, with the result that DRA has been accepted as the guiding principle for future rural water supply.

Sri Lanka is considered a country of abundant water resources, with an annual per capita water supply of 2,400cm. However, there are frequent water scarcities in many parts of the country as a result of spatial and temporal variations in rainfall and of changing weather patterns. Disaggregated statistics indicate that when these are taken into consideration, available water resources per person are much less than 2,400cm. Currently, 84% of water is used for agriculture development; improvements in socio-economic and industrial development over the last two decades, coupled with rapid urbanisation, have increased demand. The government of Sri Lanka is unable to satisfy this owing to a lack of resources; it is thus encouraging the private sector and community-based organisations to take over water supply schemes for the supply of drinking and domestic water. Attempts made to legalise private sector participation in water services have been opposed by certain interested parties and environmental groups.

Sri Lanka expects to reach a target of water for all by 2025. The government hopes to reach this target, with the assistance of the private sector and Community Based Organisations (CBOs), by promoting DRA as a tool to improve efficiency and sustainability while targeting the poor more effectively. Implementation of DRA has improved since the first CWSSP: through the water supply and sanitation projects under ADB III (Asian Development Bank, Rural Water Supply and Sanitation Project III), a process has been developed enabling user participation in water supply scheme management. Social mobilisation, village participatory planning, informed choices, and cost recovery have been some of the key elements introduced, expected to lead to improvements in system sustainability and livelihoods of the poor.

This study attempts to understand the relationship between water and livelihoods in poor communities, and DRA in rural water supply and sanitation projects. It is in part methodological, piloting the household economy approach (HEA) as a practical and an affordable tool for analysing rural livelihoods in relation to DRA in rural water supply projects. The study has adopted a case study approach, based on wealth groups as a way of analysing the impact of DRA on rural livelihoods.

Two villages, Kailapathana and Diyabeduma in the dry zone of Sri Lanka, were selected as case study areas. In both villages, water supply and sanitation has been implemented through DRA by the rural water supply section of the National Water Supply and Drainage Board (NWSDB), the primary water supply authority in Sri Lanka. Rural communities in both villages suffered prior to the projects through lack of access to safe drinking water. Small-scale farming and wage labour were the dominant pattern of livelihoods. Although both villages were agricultural settlements, only a few rich people had small parcels of paddy lands; most owned a small parcel of highland for settlement and upland cultivation. Though water was available, accessibility was a problem, with the poor having to spend two to three hours collecting water in certain cases. In dry seasons, the lack of domestic water was also a problem. Women, women-headed households, widows and children often suffered as the main water carriers. This affected the poor more than the rich in the village community: women had to face embarrassment, humiliation and health problems in fetching water over long periods. Children had to compete for limited water, especially in the dry season.

The implementation of water supply projects has improved accessibility, adequacy and quality of water; also livelihoods, through time saving and benefits to family life. Opportunities for wage labour and small-scale livelihood options (brick-making) have enhanced monthly income for some by about Rs800-1,000. Pipe-borne water in the two villages has improved per capita water consumption about threefold among the poor; the increase has been almost fivefold among the rich. Time saving in the dry season has had a particular effect on wage labour, especially during the harvesting of paddy which coincides with the dry season. Access to domestic water has improved sanitation for all community members, benefiting women and young girls in terms of security and privacy. The threefold appreciation of land value has been another indirect benefit.

The existing village institutional arrangements have been strengthened: community-based organisations have been formed to operate and manage the two water supply projects. The powers and functions of these CBOs, internalised by the organisation itself, have instilled in the communities a sense of ownership of the rural infrastructure. The present CBO structure is that of a voluntary organisation serving the community on a welfare basis; however, owing to increased membership and responsibility, both CBOs are contemplating becoming non-profit oriented 'people-based companies'. This would give them more potential to be involved in other income-generating ventures besides domestic water supply.

However, although the majority have benefited from the project, there have been significant livelihood trade-offs in obtaining access to water. The impacts of trade-offs vary according to wealth category within the community: while minimal for the rich, the poor have often had to

forego consumption, family possessions and permanent assets to raise the initial cash contributions needed in order to have access to domestic water. However, the relative benefits have been greatest for the poor; the rich too benefited in terms of savings on transport costs and access to water for small-scale home gardening.

Research conducted in Sri Lanka indicates that, although it is a good tool for assessing the demand of the majority, DRA fails to realise full coverage of a community. It appears to be biased towards cost recovery, marginalising the poorer section of the community from mainstream access to domestic water. DRA has been ineffective in identifying specific demands of sub-communities and individual households. The approach is also not adequately flexible: it does not reflect the seasonal nature of income and the socio-economic status of the rural poor. Adopted globally as an effective tool for improving system sustainability, DRA is not adequately sensitive to country-specific conditions. In Sri Lanka, domestic pipe-borne water supply has a 'social status'; this creates an artificial demand, nothing to do with willingness to pay. Research suggests that the technology option chosen depends not only on willingness to pay but also to a significant degree on past experience of similar projects and the credibility of the implementing agency. The concept of willingness to pay as a measure of 'demand' may therefore not always be real; there are external socio-economic conditions.

In response to some of the inherent weaknesses of DRA, the NWSDB has devised a system of subsidies that will attempt to include some of the economic 'drop-outs' from mainstream water supply projects. However, this system too often does not include CBO members who have not been able to access the domestic water supply in spite of having made initial labour and cash contributions (cost recovery). The CBOs have internalised the concept of DRA to the extent that they impose a penalty for latecomers to the scheme. Addressing the issue of economic drop-outs within the CBO member community and inclusion of non-beneficiaries in mainstream water supply and sanitation projects will require greater in-depth understanding of water and livelihoods among rural water supply and sanitation communities. One of the issues highlighted as arising from the implementation of DRA is the deterioration of traditional point sources in the community, such as tube wells. The depletion of tube well consumer societies has marginalised the poorest, who are deprived of their sole source of drinking water.

Key findings of the study can be summarised thus:

- Water security for the majority has increased as a result of the approach;
- Projects are financially more sustainable under stable community-based organisations;
- A significant proportion of the community is still deprived of a household water supply despite the adoption of DRA;
- The poor are marginalised at different stages of the process;
- The impacts of trade-offs and subsequent benefits in obtaining access to water supply are greatest for the poor;
- Opportunities exist to implement mixed technologies to improve overall water security;
- At least 20% of the community has to be further subsidised to widen access to DRA;
- Sustainability of traditional point sources has been threatened owing to wider access to pipe water systems.

This report limits its findings on water, livelihoods and poverty issues to two case studies. It is expected that the findings and the follow-up 'decision support tools' will widen the horizon of research within the next two main projects, ADB IV Rural Water Supply and Sanitation Project and the CWSSP II under the auspices of the World Bank. Enhanced knowledge of water, livelihoods and poverty within a larger sample of project sites will improve the effectiveness and sustainability of demand responsive approaches as a measure of poverty alleviation through the sustainable supply of domestic water in rural areas.

I. Introduction

The term 'water security' was almost non-existent a decade ago in Sri Lanka; it has made such an impact that it is now accepted terminology among the sector professionals. The country is blessed with water resources: it has a 2,500 year-old hydraulic civilisation and a vast system of reservoirs. As such, Sri Lankans have historically been immune to water scarcity. However, this is changing fast in the current development scenario. Traditionally, Sri Lankan agriculture is the largest water user in the country. However, competing demands from other sectors and improved livelihoods seem likely to make an impact in the future. Urbanisation and industrialisation in the wet zone have not yet threatened water security, thanks to geographical and climatological factors. However, urbanisation in the dry zone looks likely to lead to further stresses on the delicate supply and demand equilibrium that exists today. Meanwhile, domestic water demand is expected to increase and this will be resolved through the reallocation of agricultural water. As a result, greater productivity from water use in agriculture will be required to provide growth in the other sectors, particularly domestic and sanitation, where the need is expected to rise considerably, again owing to urbanisation and improved livelihoods.

Photo © A. Johnstone

Paddy preparation: agricultural water use

The government objective is to provide safe drinking water to 85% of the population by 2015 and to 100% by 2025. Private sector and community-based organisations, through user financing systems, are expected to play a crucial role in meeting these goals. On the introduction of the National Policy on Water Supply and Sanitation in 2001, demand responsive approaches (DRA) were internalised in rural water supply and sanitation projects. It was intended that DRA would instil a sense of ownership and accountability of water users in supplying infrastructure; new mechanisms and institutions would sustain the process of development and expansion to benefit the poor through household water security. This study attempts to highlight some of the fundamental features of the DRA approach, its benefits and its drawbacks. It will detail the intricate relationship between water and livelihoods, with reference to DRA in two water supply and sanitation projects in the dry zone of Sri Lanka. It will highlight the attempts made by the rural water supply section of the National Water Supply and Drainage Board (NWSDB) in using DRA to address some of the key water supply issues in two case study villages.

Section 2 looks at the national policy environment, highlighting some of the past development policies, discussing the evolution of various water resources and supply policies, and addressing the present debate on water sector reforms. Section 3 looks at actual water resources in Sri Lanka. Section 4 outlines DRA in Sri Lanka and the efforts taken by the government to institutionalise the approach in water supply and sanitation. This section also highlights emerging issues and lessons learnt in implementing DRA, impacts on water users, and measures taken to mitigate some of the detrimental effects on pro-poor groups and to involve the poor in mainstream development. Lastly, the report presents the two case studies illustrating the implementation of DRA and benefits, drawbacks and implications for water users, with findings categorised by three wealth groups.

II. The policy environment

In recent years, owing to the lack of a clear overall policy on water allocation and to growing conflicts among water users, water shortages have arisen in many parts of the country. This is mainly felt by poor communities who depend on natural springs for their water needs and livelihood activities. The National Policy on Water Supply and Sanitation (2000) has recognised water as a basic human need but has also identified that it is one which also has an economic value. It has concluded that users should bear the operational costs of drinking water provision and sewerage and sanitation services.

The government estimates that the investment requirement in the water sector will be to the tune of Rs50 billion over the period from 2001–10. Public investment can afford to contribute half this amount, leaving the rest to be provided by either the private sector or the users. Private sector participation in water supply has as a prerequisite a coherent pricing policy based on the cost of delivering water and other economic criteria. Meanwhile, for users, pricing policies for water supply have changed. Prior to 1975, municipalities provided water free of any direct charge. After 1975, the cost of domestic water was included in annual assessment rates. From 1983, the National Water Supply and Drainage Board charged domestic water consumers on a volumetric basis in order to recover operation and maintenance (O&M) costs and part of the capital cost.

Under the existing arrangements, domestic water consumers are heavily subsidised by non-domestic (commercial) consumers. Since the latter group is small, heavy cross subsidisation is financially unsustainable for the NWSDB. The policy is to phase this out and to rationalise tariffs in order to balance the economic cost of providing clean water. The government will seek to recover full O&M and replacement costs through its tariff policy. This will provide more funds for extending direct connections to the urban poor.

In rural areas, water supply coverage is only at present about 57%. The government aims to enable water provision through capacity building of rural communities (community-based organisations) and local authorities. At the same time, it will continue to expand access to water supply and sanitation facilities through a demand-driven approach. Provision will be through dug wells, tube wells, protected springs and rainwater harvesting. Pipe-borne water will be promoted where feasible. New institutional arrangements will be made, with a rural water supply and sanitation division (RWSS) at the centre and authority delegated to rural water supply and sanitation units at provincial councils; there will be a RWSS cell at the Pradehiya Sabha (PS). Water users will link directly with the PS cell through CBOs.

The government intends to transfer the management of point source water (at present 70% of rural water supply) to community-based organisations and local authorities. The RWSS division under the Ministry of Housing and Plantation Infrastructure will set standards and assist capital development, while local communities (through CBOs) will be fully responsible for O&M of rural water supply and sanitation.

National water resources management policy

Sri Lanka has more than 50 institutions and over 40 legislations dealing with water, but there is no one single act that deals with water resources as a whole. This has created confusion and conflict in water resources allocation among different users and contributed to water scarcity, particularly during times of drought. The current water resources management policy and the draft Water Resources Act attempts to introduce the following basic principles for water resources management in Sri Lanka: integrated water resources management (IWRM) allocation on an equitable and efficient basis; decentralised decision-making; and a new holistic institutional structure (Water Resources Secretariat, 2003).

The creation of new institutions is an attempt to empower water users at river basin level through river basin organisations and to establish regional water resources management agencies at the regional level. The central authority will be with the newly established National Water Resources Authority (NWRA). Priorities are drinking, sanitation, and livelihood water use, followed by water for food security, ecology, hydro power, commerce and recreation. These can be modified spatially and temporally according to regional or basin considerations. The first three will remain priority for water allocation under normal or water short situations.

There will be a water permit system for bulk water users to ensure protection against the overuse of water and to allow all stakeholders in a river basin to have access to adequate water for their legitimate use. Traditional and customary water rights will be protected.

There will be three levels of planning: national, regional and river basin. These together are envisaged as enabling participation of all stakeholders in the decision-making process. The NWRA will give technical assistance in the development of plans. Livelihood water users will be represented by CBO members or members of cluster CBOs. One of the salient features of this approach is that water resources allocation will be conceived on the principles of IWRM, and the empowerment of stakeholders in the decision-making process in water allocation is expected to prioritise their water needs.

National policy on water supply and sanitation

This policy was formulated in 2002 by the Ministry of Housing and Plantation Infrastructure and provides a framework for the supply of safe drinking water and access to sanitation services. It involves a programme for sector reforms, including the establishment of a regulatory commission for water supply and sanitation services, and the contracting of private operators in selected areas to improve operational efficiency and to provide private sector operational finance. A division for rural water supply and sanitation will be set up under the Ministry.

The policy covers provision of drinking water from bulk water supply to consumers through piped networks and other means, such as tankers, tube and dug wells and other community distribution systems (Ministry of Housing and Plantation Infrastructure, 2002). Overall sector goals are:

- Access to sufficient and safe drinking water for 85% of the population by 2010 and 100% by 2025;[1]
- Provision of a piped water supply by 2010 to 100% of the urban population and 75% of the rural population;
- Achievement of national standards in service levels and quality of water in urban and rural areas;
- Access to adequate sanitation facilities for 70% of the population by 2010 and 100% of the population by 2005;
- Piped sewerage systems in the major urban areas and selected growth centres;
- Standard on-site sanitation for those not connected to a sewerage system or other sanitation scheme.

Target areas of the policy are: structural reforms in the sector; the institutional and regulatory structure; tariffs, operational costs and subsidies; investment; source protection and water conservation; quality assurance and capacity building; and research. With regards to the present study, a key area is tariff setting in rural water supply projects. These reflect a minimum cost of sustainable O&M of the system, taking into account any voluntary contributions by users and, where feasible (depending on willingness to pay), including cost sharing of capital investment and expansion. It is expected, though, that the water tariff structure will make appropriate provisions for low-income urban and rural water consumers, including an appropriate lifeline tariff for basic consumption and hygiene. These consumers will be assessed on a case-by-case basis with information provided by CBOs and Grama Niladharis (GN – village-level state officials).

National policy on rural water supply and sanitation

This policy recognises that the demand for water resources is increasing, with competition from users for water for domestic use, agriculture, and industry. As a result, there is the need for an institutional arrangement for the efficient allocation and management of facilities, with stakeholder participation. Basic principles of the policy are the same as that of the National Water Supply and Sanitation Policy, but there are a few additional principles strengthening it

Photo © A. Johnstone

Awaiting water tankers during seasonal water shortages

with respect to community participation. Some of the key principles are that:

- Provision of water supply and sanitation services be people-centered and demand-driven;
- The role of the government, provincial councils and local government authorities be to regulate and facilitate sector activities. CBOs, NGOs and the private sector (small-scale private operators) should be the services providers;
- Women play a central role in the decision-making process.

The policy scope covers any Grama Niladhari (GN) division within a PS area.[2] Minimum requirements to meet basic needs are defined as:

- 40 litres per capita per day for consumption, food preparation and personal hygiene;
- Maximum water haulage distance not exceeding 200 metres. In steep terrain this should be reduced;
- Minimum daily rate of extraction of water should not be less than 10 litres per capita at least for 90% of the time;
- Water security for all members of the community. Total interruption should not exceed more than 10 days per year;
- Quality of water conforming to the currently accepted minimum standard with respect to microbiological and chemical contaminants;
- Basic facilities to be sufficiently flexible to enable upgrading. Consumers will bear the cost of additional facilities.

Methods for providing safe drinking water are:

- a piped water supply;
- deep/shallow wells with hand-pumps;
- protected springs; protected dug wells;
- or protected rainwater catchment systems.

Under epidemic conditions special treatments will be required.

Proposed water supply reforms

The Water Services Reforms Bill, tabled in Parliament in October 2003, intends, in an attempt to attract private sector participation in water supply, to:

- Regulate and monitor the supply of water services;
- Provide for regulation of water tariffs for water services;
- Specify the standards for water quality and regulate water quality;
- Specify levels of water services and standards to be maintained in the provision of water services;
- Ensure compliance with consumer protection requirement in the water services industry;
- Facilitate and promote private sector participation in water service industry.

(Source: *Water Services reform Bill,* 2003)

Pipe-borne water supply in urban and rural areas would be handed over to commercial water service providers, licensed by the Public Utilities Commission. The water service operations of the NWSDB and local authorities would be phased out (Rajapaksa 2003).

There is no provision for public debate or transparency in this process, despite the fact that one party is a public authority. As a result, a situation could arise where unrestricted commercialisation of water services would concern not only domestic consumers but also commercial enterprises and water-intensive industries. There are fears that, in addition to the Public Utility Commission fixing tariffs on cost recovery basis, commercial water providers will be given the right to levy additional charges from consumers, such as a security deposit whereby all consumers have to enter into a new contract with the licensee, under the licensee's conditions. Water providers would be given the privilege of negotiating fresh contracts with consumers. In addition, licensees would be allowed to incur any reasonable cost in water provision, repairs, renovations or additions in the system and to bill the consumer accordingly, irrespective of the latter's status. All this happens in the captive market of a life-sustaining commodity; each water provider is given exclusive rights in a particular geographical area (ibid).

The Water Services Reforms Bill was challenged in the Supreme Court in November 2003 and the judgment given was a landmark in the area of privatisation of natural resources. The contention was that the bill taken as a whole was inconsistent with the constitution. The Supreme Court upheld this, adding that the bill did not provide adequate provision for safeguarding the interests of consumers and that water came within the purview of fundamental rights as referred to in the constitution (Supreme Court, 2003).

As a result substantial changes will be needed before the bill can be resubmitted to Parliament. At the same time, the two-thirds majority necessary for its approval in the parliament is almost an impossibility given the current political situation in the country. Annex 1 outlines all policy issues.

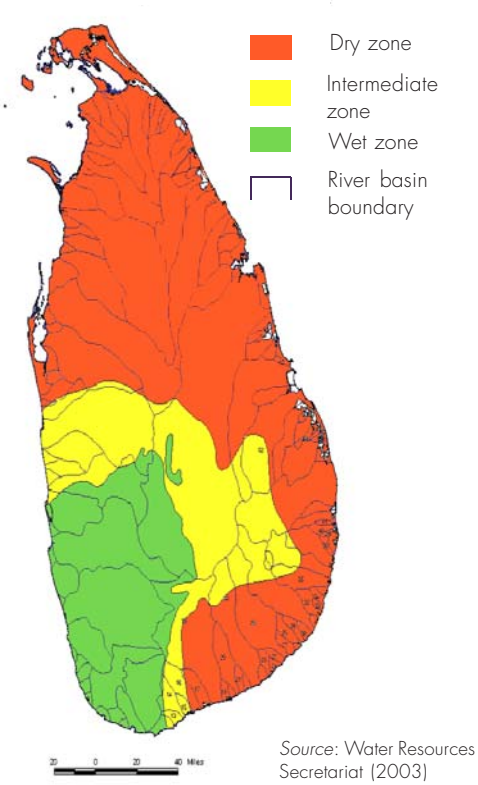
III. Water resources

Surface water resources

In Sri Lanka, precipitation is almost entirely in the form of rainfall. The mean annual rainfall over the island is about 1,800mm (Manchanayake and Madduma Bandara 1999). Parts of Mannar and Hambantota (arid regions) receive about 900mm and parts of the central hills of the country more than 5,000mm. Total rainfall is distributed over two main agricultural seasons. The wet season (Maha), or the northeast monsoon, generally varies from 800mmm to 3,000mm. The dry season (Yala), or the southwest monsoon, varies from 150mm to 3,000mm. Sri Lanka has 103 river basins (Figure 1). These vary in size, with Mahaweli the largest, at 10,448km^{2,} and Thumpakeni the smallest at 9km^{2}. There is no detailed water balance study covering the entire island. However, Table 1 summarises the status of water resources in wet and dry zones and gives an indication as to water resources potential available for development.

A more recently developed (2003) and generalised water balance is given in Figure 2. According to this model, only 10% of total direct rainfall is used for domestic and industrial water supply and irrigation. Nearly 30% goes as run-off to the sea. The highest discharges to the sea are from the wet zone rivers of Kaleni and Kalu, at 64% and 72% respectively. The waters of these rivers are mostly used for domestic and industrial use, with total use relatively low as compared with agricultural water use in the dry zone.

Figure 1: River basin map of Sri Lanka



Source: Water Resources Secretariat (2003)

Groundwater resources

The use of groundwater for drinking, domestic use and small-scale agriculture has been going on since ancient times. Water was extracted from shallow dug wells and deep tube wells, the former popular for domestic use mainly in the wet zone, the latter used extensively for agriculture in the Northern Province districts. Much of the limestone aquifer rich in groundwater was to be found in the Northern districts, in particular in the Jaffna peninsular.

In the dry zone, the weathered overburden is relatively thin, with a maximum thickness of about 25 metres, and underlain by a crystalline bedrock. As a result, the storage capacity for groundwater is limited. Since 1985, though, there has been an increase in agricultural wells in this area for the cultivation of non-paddy crops. It is currently estimated that over 25,000 such large (17 feet diameter and 25 feet depth)(Ariyabandu, 2001) agro-wells are in existence in the two main districts of Anuradhapura and Kurunegala. Exploitation of groundwater using agro-wells in some micro catchments has exceeded the carrying capacity, leading to a net depletion of the water table in these areas.

North Central Province, where the two case studies were conducted, has shallow aquifers in the local valley alluvium. These aquifers are closely connected with the surface water in streams, canals and reservoirs. They can contract and expand in response to wet and dry conditions in the Yala and Maha seasons. When properly located in areas with sufficient groundwater and transmission ability, shallow wells can be a good source for domestic use, small-scale irrigation, and other water use activity. Their shallowness means that they can be susceptible to agricultural and other contamination, including salinity.

Rainwater harvesting

Rainwater harvesting is the latest option for institutionalised water supply adopted by the NWSDB. Though rainwater harvesting has been in practice since the fifth century BC, its institutionalisation for domestic use began only in 1995 with the introduction of the CWSSP. This established that a 5,000 litre tank could store adequate water during the rainy season for a family of five in the dry months (from June to September). The success of this project saw the construction of more than 5,000 tanks in Matara and Badulla districts.

In 1996, Lanka Rainwater Harvesting Forum came into being for the promotion and research of rainwater harvesting. Success of research and subsequent forum activities made RWH a major water supply option for the rural poor, particularly in the dry zone. A number of local and foreign NGOs adopted it as an option. Some NGOs extended the use of RWH from purely domestic to small-scale home gardening, using drip irrigation. Currently, institutionalised RWH (established by the state, NGOs or

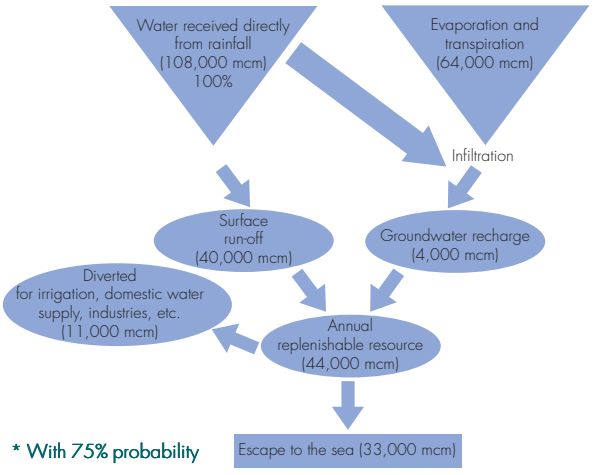
Table 1: Surface water resources (average up to 1972)

	Wet zone	Dry zone	Island total
Rain Fall (annual mm)	2424.00	1468.00	1937.00
Run off (annual million ha metres)	2.58	2.55	5.13
Run-off rainfall (%)	65.10	35.80	40.50
Escape (million ha metres)	2.04	1.30	3.33
Escape (as % of run-off)	79.00	51.00	65.00

Source: adapted from Manchnayake and Madduma Bandara (1999), original source Ranatunga (1985)

special projects) is being practised in 13 districts in Sri Lanka, with an estimated 14,200 domestic tanks, benefiting nearly 71,000 people. RWH is fast becoming a major option, what with increased awareness of the scarcity of domestic water and competition among stakeholders. The rapid increase in its adoption for domestic use in rural water supply is mainly a result of its simple technology, easy maintenance, assured supply on-site, and ownership by the individual. The standard 5,000 litre tank has become common among rural peasants, as it can provide water during the most water-scarce period in the dry zone. RWH has increased household water security for the poor mainly in the dry zone districts of Hambantota, Anuradhapua and Kurunegala. The technology has also been adopted in the central highland districts of Kandy, Badulla and Bandarawela as a water supply option for settlers in hilly areas where other options are not feasible for technical or financial reasons.

Figure 2: A generalised national water balance of Sri Lanka*



Source: Water Resources Secretariat (2003)

IV. Adopting demand responsive approaches in the water supply sector

Past failure to attach a true value to water as an economic good or to implement cost based charging policies for water and sanitation services has been a major factor in downgrading the financial viability of public service providers and discouraging private sector investment. Correcting these failures by robust financial and economic analysis and monitoring at all appropriate stages of WSS improvement programmes can contribute significantly to better progress in extending service coverage (WELL 1998).

The thinking on DRA was born as result of overly supply-led approaches which often failed to reach the poor on a sustainable basis. DRA is premised on the idea that recognising water as an economic good with costs attached to its supply is the key to improving financial sustainability in service delivery. DRA is being promoted globally as a tool to improve efficiency and sustainability while targeting the poor more effectively.

The approach is intrinsically biased towards cost recovery as a basic principle for the sustainable development of a water supply and sanitation system. However, there are important questions around balancing the need for financial sustainability with the wider poverty reduction objective: this is the focus of the SecureWater research programme. Case study research in Sri Lanka examines the linkages among water, poverty and livelihoods and implications for DRA implementation. The aim is to understand how DRA can be enhanced to ensure that it effectively addresses the needs and priorities of poor water users, thereby improving overall scheme sustainability.

Photo © A. Johnstone

Water collection for domestic use: rural Sri Lanka

The NWSDB in Sri Lanka has devised a methodology to include the poorer section of the community in the DRA process through appropriate subsidies. These subsidies are given in two categories, for households who can't afford to give both cash and labour and for households who can't give labour only (see details in box 8). This approach has an intrinsic drawback in that it is not adequately sensitive to socio-economic conditions and seasonality in the incomes of the poor, especially in lean agricultural periods and when costs occur outside initial contributions to the project. This will have to be taken into consideration when implementing rural development projects.

While contributing to overall sustainability, DRA emphasises cost recovery, suitability, and devolution of decision-making authority and responsibility for financial management to the lowest level. The key principles of DRA are summarised as:

- Informed choice made by communities through participatory planning and community involvement in implementing in order to ensure ownership;
- Complete community management of responsibility for O&M;
- Cost recovery-capital cost sharing and 100% O&M;
- Promoting more options for service delivery;
- Integration of water supply sanitation, environment management and hygiene education;
- Targeting the poor;
- Supporting IWRM.

Source: ODI (2003).

Unlike the approach adopted prior to 1996 in rural water supply and sanitation, DRA demands more involvement of water users in planning, making informed choices, implementation, and management of water services. This involves a significant change in the roles and responsibilities of sector stakeholders, including communities, CBOs, NGOs, government and donors.

Monitoring the progress of rural water supply and sanitation projects is not mentioned very explicitly in the DRA methodology adopted in Sri Lanka. However, the rural water supply section of the NWSDB employs a management information system (MIS) to collect data and information periodically to assess progress. Moreover, there is a four-tiered committee system, composed of the National Steering Committee, the Provincial Coordinating Committee, the District Progress Review Committee and the Divisional Coordinating Committee, which monitors the physical and financial progress of the projects. Feedback from these committees is conveyed to CBOs through technical assistants and community facilitators.

'Demand' as expressed in DRA is intrinsically linked to 'willingness to pay' for a particular service. However, evidence from the case studies indicates that it is not always the case that poor households without a good water supply are willing to pay for a better service. A significant percentage of the population has a very high 'demand' but is unable to contribute either in cash or kind. This section of the population is the 'drop-out' section from most development programmes. The meagre daily wage is not sufficient even to make ends meet; the lack of means and

ability to benefit from development programmes makes this group more vulnerable in society. Willingness to pay may therefore not always be a good indicator for assessing demand of the poor. It is for this section of the community that DRA should be flexible, by including cross subsidies to help the poor join in the mainstream of development. The two case studies illustrate this phenomenon with respect to financial management and system sustainability.

Photo © R. Ariyabandu

Pumping station: rural piped water supply scheme

Current water supply programmes

Sri Lanka has gained a great deal of experience in implementing rural water supply projects and programmes through DRA. The first CWSSP, which commenced in 1991, attempted to introduce the concept of DRA into rural water supply. It has been partially successful, with limited participation of water users. CWSSP I (1996–2000) came next, with government funding, attempting to improve on DRA. This was followed by the ADB III (2000–04) rural water supply and sanitation project, which introduced a process of social mobilisation prior to project implementation and followed with a village participatory process (VPP), in which the community was presented with an informed choice of water supply technologies for community consensus. Experience gained through this process encouraged the government of Sri Lanka, through the NWSDB, to formulate a policy for rural water supply and sanitation in 2002.

Some of the key features of DRA as expressed in the Rural Water Supply and Sanitation Policy are:

- The community initiates and makes informed choices about service options, based on willingness to pay for the service, and accepts responsibility for the O&M;
- The community contributes to the investment cost relative to the service and has control over financial management;
- There is improved access to information, which facilitates decision-making in the community;
- The community can choose the method of delivery of goods and services and how water and sanitation programmes are managed;
- The government has a facilitating role, setting policies and strategies and creating an enabling environment for stakeholder participation;
- The community is vested with full ownership of project facilities and assets;
- The community capacity is appropriately strengthened;
- Innovation is promoted and the need for flexibility is recognised.

Source: Sumenesekera (2003).

V. Case study one: Diyabeduma

Though the implementing agency, NWSDB, has conducted many studies on project impacts as part of its obligations under the project, there has not been any systematic in-depth study of the functioning and implications of DRA in rural water supply and sanitation. The objective of this study is to understand the water, poverty and livelihood linkages through DRA. Research location selection was based on: whether projects had been implemented through DRA; the amount of years of operation under DRA; a minimum of 100 beneficiary families; efficient management by CBOs; and prospects for expansion in the future. A number of projects could have satisfied the above criteria; key informant discussions were used in selecting the most suitable locations. Once the locations were identified, an in-depth case study methodology was adopted. Two case study locations, Diyabeduma in Polonnaruwa district and Kailapathana in Anuradhapura district, were selected for the research.

Overview of water and livelihoods in Diyabeduma

Diyabeduma is a small village with a population of around 400 families, located in Polonnaruwa district bordering the Northern Province. As the village is situated on the periphery of the Mahaweli irrigation scheme (the largest multi-purpose river diversion scheme), the livelihoods of most settler families are farming and wage labour. However, the availability of low (paddy) land is mainly distributed among the wealthy (high and middle-income) households, while the land ownership pattern of low-income householders gives a clear indication of poverty (page 19).

The average household income prior to the project was reported as Rs2,200 (Worley International Limited, 2001). Research indicates that this has increased to Rs6,500. 50% of the labour force is employed in seasonal wage labour, 20% in agriculture, 15% in government and private sector employment, 10% in self-employment (e.g. carpentry and masonry) and 5% in business. There are three NGOs one state and a semi-government organisations (Pradeshiya Sabha and 'Samurdhi') active in the area. Samurdhi was selected as the partner organisation in the implementation of the Diyabeduma water supply and sanitation project.

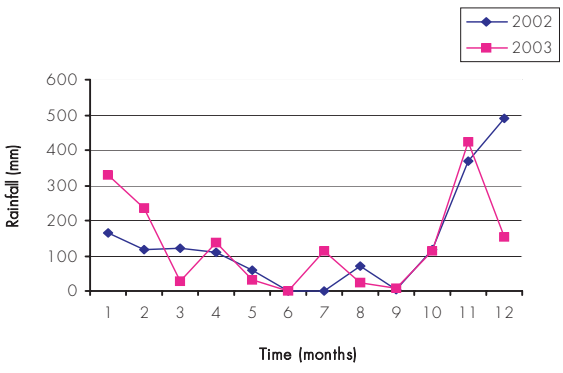
Poor access to safe drinking water has been one of the main reasons for the low quality of livelihoods in Diyabeduma. Settlers close to irrigation canals and dug wells have been more fortunate, but those living far away from water sources have experienced problems. Women and children have suffered as water carriers and there have been health complaints arising from carrying water over long distances. Social problems arising from the use of the same source of water by different families, and the humiliation of women and children, have been some of the important issues that surfaced during the research.

According to poverty studies in Sri Lanka, 25% of the population lives in poverty; abject poverty or destitution exists only in small pockets. Though much work has been done on poverty, there is neither an official definition nor a designated poverty line (JBIC, 2002). To determine the latter, researchers have used household income/expenditure as well as dietary intake data. Poverty levels are particularly high among landless labourers, and among casual labourers employed in agriculture, mining, construction and the informal sector (ibid). A study conducted to assess the impact of irrigation infrastructure development on poverty alleviation indicates that the highest poverty was recorded among householders deriving income from agriculture. Slow per capita growth in the agriculture sector, major droughts, and contraction in the paddy sector have contributed to this. Another factor that contributes to poverty in rural areas is the lack of basic infrastructure, including safe drinking water and electricity (ibid). These features are prevalent in Diyabeduma where most poor households have to depend for livelihoods on rain-fed cultivation of highlands and unpredictable, seasonal wage labour.

Water availability

The area receives an annual average rainfall of 1,000–1,200mm. However, in the last two years, annual average rainfall has been only 135mm (Figure 3). Most of the rains come during the Maha season (from October to January). The driest months are from July to September. However, water availability (mainly groundwater) in the village depends on water issues from the Mahaweli scheme. There are eight tube wells (constructed with DANIDA aid in 1980) and two dug wells constructed by the local authorities. Six tube wells are not functioning owing to lack of maintenance; water in dug wells is saline and cannot be used for drinking.

Figure 3: Rainfall – Diyabeduma 2002/03



Groundwater recharge depends for irrigation largely on water issues from Mahaweli. When water issues are stopped during the off-season, wells suffer.

The irrigation water rotation pattern of Mahaweli for

the area is given below.

Maha season
- 15 November to 15 December – one month continuous flow for land preparation.
- 15 December to 15 March – four-day rotation for crop growth.
- End March to 15 May – close season.

Yala season
- 15 May to 15 June – land preparation.
- 15 June to September – four-day rotation.
- September to 15 November – close season.

The dry season water schedule can function only if there is water in the main Mahaweli system. Usually, the Mahaweli Water management secretariat makes a decision with respect to water releases for agriculture and hydro power. When hydro power is priority, agriculture may have to suffer. In any given dry season, water availability is low. Under these conditions, the water rotations may not work as given, or may work according to a revised schedule which curtails the water issue period. Under these circumstances, farmers usually grow non-paddy crops, which require less water, but the impact on domestic water as a result of the shallow wells becomes significant.

Prior to the project, households used to purchase domestic water from private water vendors, paying as much as Rs30 per 200 litre barrel per day for a household of five. If they had to purchase for the entire month it could be as much as Rs900. Some households paid even more when they had special water demands, such as for social functions or house construction/repair. Although water was available at a price, there was no assurance of its quality. Costs were at least three times more than what is now paid under the project.

Owing to the seasonal nature of surface and shallow groundwater, Diyabeduma rural water supply project constructed a deep borehole to supply water to households. The project borehole has a capacity of 560 litres/minute, although the current demand is only 333 litres/minute, giving adequate water for increased future demand.

Socio-economic status of the community

Polonnaruwa district is predominantly an agricultural area with a number of major irrigation schemes (a command area of more than 1,000 acres). Mahaweli waters augment all major irrigation schemes in the district. As a result of the irrigation infrastructure, most people in the district are engaged in agriculture. Industrial development is insignificant and has no impact on Diyabeduma community livelihoods.

Agriculture is, however, fast becoming a secondary source of household income, as a result of natural and policy changes. Changing weather patterns in the country have changed the cultivation pattern from predominantly paddy to low-water-requirement non-cash crops, such as vegetables. Competing demands for water and macro-economic policy changes with successive governments have made paddy farming a less profitable venture. Lack of a guaranteed price scheme, imperfect competition and conflict among private traders, poor state mechanisms for collection and storage, and the abolition of institutions responsible for purchase have all contributed to the decline in paddy production. While a wholesale paddy market is not expected from the government, the creation of rival organisations for the purchase of paddy is anticipated to create competition among private traders (Kelegama, 2003).

This has resulted in a number of occupations, agricultural and non-agricultural, being identified as the main income-earning opportunities in the village (Table 2). Nature and the distribution of occupations segregate the community into wealth groups. The village community as a whole can be classified into 20% high, 34% middle and 45% low wealth categories. However, these categorisations are used mainly for the purpose of analysis in the current research. For the purpose of the study, 10 households from each category were taken. While there is a clear difference between high and low-income groups, the middle-income category cannot be clearly demarcated.

Land ownership

Most of the highlands (homestead) are of single ownership spread among the three wealth groups. However, ownership of lowlands (paddy lands) indicates a distinct segregation among the categories. The high and middle-income categories show a high degree of single and shared ownership of paddy lands; tenant, mortgaged and encroached ownership of paddy lands are common in the low-income group.

Survey results indicate that less than 10% of population owns more than 2½ acres of land. This amount of lowland is usually given under irrigation settlement schemes for subsistence livelihoods. Even those in the high and middle-

Table 2: Wealth group categorization in the village by occupation and assets

High Income	Middle Income	Low Income
Business	Middle-scale land owners	Agri & non Agri labour
Large scale (>2 1/2 Acs) land owners	Self employment (paddy purchasing, small business)	Self employment (brick making, masonry)
Ownership of capital assets	Foreign employment	Tenant farmers
Government and Private sector employment		

Table 3: Distribution of land size by wealth group and type of land (%)

Extent (acreage)	High Wealth Group		Middle Wealth Group		Low Wealth Group	
	High Land	Low Land	High Land	Low Land	High Land	Low Land
0 < 0.5	60	–	90	–	80	–
0.5 - 1	40	40	10	30	10	40
1 - 2.5	–	10	–	30	10	20
> 2.5	–	10	–	–	–	–

Source: Survey Data (2003)

income categories mostly own less than 2½ acres of lowland, while most in the low-income category own less than one acre. Land being the only permanent asset of the community, distribution of paddy lands among next of kin is the cause of a high degree of land fragmentation. Though all community members own highlands, only 60% of the community, irrespective of wealth categorisation, has ownership of lowlands, while 40% remains landless (Table 3).

Income distribution

Income distribution shows a typical distribution pattern whereby higher wealth groups earn more than lower groups

All members of the lower wealth group earn less than Rs10,000 (US$105) per month. Although there is no official poverty line, as indicated before, the government *Samurdhi* programme uses Rs1500 as its line to work with for the distribution of government aid (in cash and kind). (This is not a good indicator of poverty as it does not have the flexibility to change with inflation.) Sources of income vary among the wealth groups.

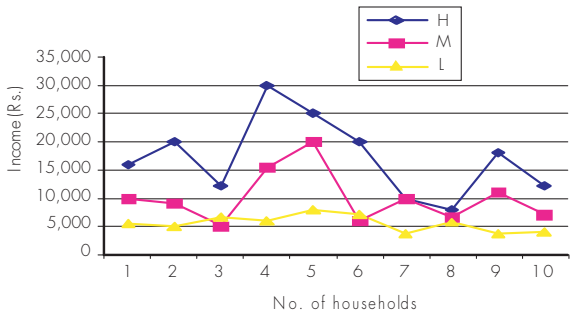
Table 4: Monthly income pattern (Diyabeduma) (%)

Income (Rs)	High %	Middle %	Low %
<1500	–	–	–
1,501–3,000	–	–	–
3,001–5,000	–	20	40
5,001–10,000	20	50	60
10,001-20,000	40	30	–
20,000>	40	–	–

Source: Survey Data (2003)

The upper wealth group income depends mostly on business and permanent employment in the government or the private sector; the lower wealth group depends mostly on daily wage labour or self-employment. There is some income from foreign employment in the middle-income category, althoug this– has not significantly elevated the livelihoods of recipients. However, those who have some sort of support from outside (foreign or urban employment) have found it relatively easier to bear the initial cost contribution for domestic water supply. The poorer group of people has hardly any flexibility within this income pattern to accommodate any new household expenditure. Most of the household income is used for food, clothing

Figure 4: Monthly income by wealth group (Diyabeduma)



and medicine. While members of this group have successfully managed to save adequate funds to meet the monthly tariff, they find it difficult to bear the initial cost contribution along with the connection cost for domestic water supply. At least five families from the lower wealth group have taken out loans from local money lenders to pay for water supply at a rate of 50% interest per season.

Consequently, it is imperative that, prior to planning a strategy for cost recovery, rural interventions understand income and expenditure patterns in households of all categories of people.

Access to water

A basic necessity for livelihoods, drinking water has been the major problem for those communities living in the dry zone of Sri Lanka. Seasonal and temporal variations in rainfall create severe water shortages. While the overall impact of water shortages can be mitigated through water storage in large and small reservoirs, water quality cannot be guaranteed, owing to the pollution of canal water through intensive agricultural activity: Diyabeduma is located in the 'rice bowl' of Sri Lanka, where intensive cultivation takes place because of the availability of irrigation water and the favourable environment for agriculture.

Before the project, Diyabeduma community depended on canal water for bathing and washing; the same water recharged the two existing dug wells and the few tube wells available in the village. Although water was available in the village, it was not suitable for human consumption: the shallow groundwater was highly saline as a result of certain lithological formations. Moreover, most shallow wells run dry during the dry seasons, with extended dry

periods arising from global weather changes. Most of the available tube wells in the village were out of order through poor maintenance. Although these were constructed with DANIDA aid, no maintenance took place after the completion of the project. This is typical of rural infrastructure development in Sri Lanka, where ownership of an asset becomes questionable after interventions are completed. The end result of this mismanagement is that the poor have to suffer. Meanwhile, during the dry season, most people in Diyabeduma had to travel long distances and spend a large amount of money to collect good quality water for domestic use.

Some of the important issues arising from lack of access to good quality water prior to the project are listed below.

- Lack of good quality water for drinking and cooking;
- Large amounts of time spent on collecting water;
- Impacts on the health of women and young girls through carrying water;
- Social problems from fetching water;
- Inability to collect adequate water for all household use;
- Inability to attend to other livelihood needs owing to the need to fetch water;
- High costs and efforts in collecting water;
- Dangers faced by children due to lack of secure access to water.

Meanwhile, competition for water has been increasing as the socio-economic development of Diyabeduma continues. Water was becoming a scarce commodity before the NWSDB decided to select Diyabeduma under its rural water supply programme. Since the introduction of the water supply programme, access to water has improved. Significant changes are:

- Good quality water at all times of the day;
- Improvement in health in women and young girls;
- Significant cost reductions in accessing water;
- Benefits to the old and to invalids in households;
- Opportunities for extra work;
- Physiological strength to face dry spells.

Project planning and design: assessing demand for water

Selection

Diyabeduma was selected among from 12 Grama Niladhari divisions (GNDs) after a socio-economic survey assessing the demand for water. Guidelines given for selection of the village were as follows: the village had to

- have more than 200 families;
- use dug wells and tube wells for domestic use;
- have a suitable CBO to take responsibility for O&M;
- have a community willing and able to contribute to the cost of the project;
- have water and sanitation hardships;
- have different employment groups.

Once the village was selected, project proponents envisaged that the community would contribute 20% of the capital cost of the project,[3] to instil a sense of ownership of the project and to bridge the gap between the basic level of service and the desired (affordable) level of service (Table 5).

The DRA ensures that the selected CBO interacts with the relevant government, NGO and local authority in the project implementation process. This concept accepts the CBO as the implementing organisation; all others are supporting organisations. In practice, though, the NWSDB is the only government organisation that has assisted the CBO in implementation of the project. The NWSDB can legitimately select a local NGO to function as a partner organisation (PO). The selected PO is trained by the NWSDB in community mobilisation and technical aspects through a number of modules at the initial stage of project implementation.

In Diyabeduma, a local bank, the Attenakadawela Smurdhi Bank, acted as the PO. The function of the PO was to extend assistance to the community to develop skills, competence and institutional capabilities so that people would be able to participate actively in project planning, construction and O&M.

Table 5: Contributions of the community and the project during implementation (total membership of 227)

Item	Description	Contribution	
		Project	Community
1	Sampling, training, survey etc. required for community mobilisation	Planning, training and other required activities.	Participation in survey teams.
2	Water supply construction	Technical guidance and training for construction and O&M up to 80% of the cost, amounting to Rs2.8 million.	Labour and supervision and cash contributions amounting to at least 20% of the total capital cost. Collected from 227 families @ Rs2,600/family (assuming 100% membership).
3	Latrine construction	Advice and cash Rs3,500 in three stages for each latrine.	Labour and materials to complete the facilities, with a value in excess of Rs3,500 (50% of the total cost).
4	Health education	Leaflets, training, advice, workshops, education campaigns, school programmes.	Participation as health education volunteers, organisation.

Source: Worley International Ltd (2001)

Technology choice

In December 1999, the PO held its first meeting to inform the community of the water supply project, which was attended by about 100 members of the community. This group was divided into six; a participatory rural appraisal (PRA) was conducted to identify the water supply technology choice of the community. All six groups opted for pipe-borne water supply. Tube wells were rejected because of the bad experience with the former project, where the Pradeshiya Sabha (local authority) failed to maintain the infrastructure without donor support. There were seen to be shortages of water in dug wells during off-seasons, and rainwater was judged to be inadequate, so harvesting was not seen as feasible.

Once this decision was made, the PO, with the assistance of the NWSDB rural water supply section, conducted village participatory planning (VPP) exercises in which the community was made to understand the functions and responsibilities of the CBO and individual community membership. The VPP approach has three distinctive stages: investigation, feasibility and final design. There are a number of steps within each of these stages where the technical assistant (TA) and the community facilitator (CF) of the PO gets actively involved in project implementation. While the entire sequence of events within the VPP is demand-based, there are a few particularly important points where the community is informed of the choice and their responsibilities.

Photo © R. Ariyabandu

Village Participatory Planning (VPP) exercises

Feasibility

Under the feasibility stage, the TA makes a preliminary assessment where capital and O&M cost are calculated for each of the technically feasible options and presented to the community. These assessments are made based on 'Guidelines for preparation of cost estimates for village schemes' prepared by COWI consultants under the ADB III-assisted rural water supply and sanitation project. Then the TA prepares capital and O&M cost estimates for each option, as based on the guidelines. An assessment is made of respective cost contributions from each member household. These cost estimates are presented to the community; agreements are reached and final approvals are sought for the feasibility report.

Final design and implementation: responding to demand

At the planning stage of the project, the total number of families involved was taken as 227 (Worley International Ltd, 2001). However, at project implementation stage, only 180 families expressed their willingness to participate in the project. This is the result of a lack of confidence among the households regarding project implementers. People of the village had been exposed to earlier water supply projects, carried out by various implementing organisations, which failed for a number of reasons, among them a lack of ownership and poor maintenance.

Demand for water (by way of participation) is not then entirely reflected in willingness to pay for cost recovery. Other issues, such as: prior experience of similar projects in the village; confidence in the implementing agency (in this case the NWSDB); the approach adopted; and the individual office bearers of the PO and the CBO do contribute to the amount of participation of households in water supply projects. Currently, there are 285 households connected to the water supply system. The increase in the number of connections is due to new settlements (eight families) and fragmentation of original families through marriage. It is also a result of increased confidence among the households that the project is not another 'hollow promise'.[4] Once people establish this confidence, they can become willing partners in development. One of the key factors in the success of Diyabeduma is this establishment of community confidence.

Community contribution

As per the DRA adopted, the community had to contribute 20% of the total project. The responsibility for this lies with the CBO rather than individual households and the effort is therefore collective. The total value of 20% in this case was Rs440,000 in 2000. Depending on the number of households participating at the time of project initiation, a sum of Rs2,600 was set as the total community contribution (cash and labour), with total cash at Rs1,000 and total labour at Rs1,600. For the labour, each participating household was allocated 40 metres of trench to be dug to a depth of 2½ feet by 9–12 inches wide. Besides the initial contribution, households have to contribute Rs3,250 for water supply connections (cost of the water meter plus pipelines to the house). The total costs associated with connecting a water supply for domestic and commercial

Table 6: Community contribution for domestic and commercial water supply connections

Cost items	Domestic (Rs)	Commercial (Rs)
Membership	10	10
Shares	100	100
Labour	1,600	1,600
Cash	1,000	1,000
Supply connection	3,250	3,500
Total	5,960	6,210

Source: Survey Data (2003)
(US$1 = Rs160)

purposes in Diyabeduma is given in Table 6. These cost estimates are decided at a CBO general meeting, with total agreement from the membership.[5]

Table 7 indicates the cost of new connections in different localities. The difference in cost is due to varying lengths of pipelines necessary. One of the problems faced by the CBO in supply extension is the number of households dropping out after the initial work commences. This means those who remain pay more for their connection than originally estimated.

Table 7: Cost paid for new connections in extension areas (Rs)

Extension area	No. of HH	Total paid (Rs)
Farm	14	12,500
Track 34	3	10,240
Ratnapura Bazaar area	5	9,340
End of the pipeline	2	15,000

Source: Survey Data (2003)

The CBO has adopted various measures to help poor members of the community ease the burden of payments. It offers a loan of Rs2,500 per household, although this is not encouraged: management of the loan scheme is difficult owing to excessive demand from all sections of the community. This scheme therefore targeted only five very needy households, who showed exemplary commitment by paying small instalments towards the initial cash contribution. The households were expected to pay the loan in instalments with the monthly tariff. However, the CBO repayment was irregular and recovery of the loan was difficult. This has prompted the CBO to discontinue the loan system for any future users.

Once the cash contribution (Rs1,000) and the Rs10 membership is given by any household towards the project, the balance payment (labour, shares, connection costs) amounting to Rs4,360 can be given within one year of obtaining membership.

At times, wealthy households do not contribute labour. Instead, they pay the equivalent cost (Rs1,600) in cash to the CBO. The CBO uses this money to offer poor families, unable to raise the cash contribution, the option of doing extra wage labour to make up the equivalent cost. This system of exchanging labour for cash helps both the poor and wealthy households. The CBO has not charged labour contributions to the following institutions: the temple, church, hospital, library, Montessori, schools and irrigation department quarters.

At present there are 365 member households, of which 285 have their water supply connections. The total population of the village is around 410 families (approximately 2,000 people). At the planning stage of the project, it was anticipated that a total membership of 300 would be achieved in 15 years; in fact, membership of 365 has been reached in just three years. This indicates the high level of demand for clean domestic water as expressed by the community.

Tariff structure

Under the VPP process, the community is made to understand that it has to pay a monthly tariff to sustain the system efficiently. Paying a monthly tariff for domestic water is not a problem, as most people understand that if safe water is delivered to the house a cost will have to be paid for the service. This is the same as in urban areas, where householders pay a monthly water bill to the NWSDB. However, the difference between urban and rural consumers is that the urban domestic consumer is subsidised by industrial and commercial water users, whereas rural community-based projects charge the real cost for water without any subsidy. The tariff paid by urban domestic users does not therefore reflect the actual cost of water. In the rural areas, with no provision for cross subsidisation, all water users have to pay the actual cost of water.

The decision on the tariff in Diyabeduma was taken at a general meeting, with the approval of all participating members. It was calculated using the following variables:

- Length of the pipes to be laid;
- Number of persons for O&M (caretakers);
- Salaries for the caretaker(s) between Rs3,500 and 5,000 per month;
- Approximate monthly electricity cost;
- Replacement cost of the pump in 10 years;
- Water demand for the next 10 years in the village (depending on pump capacity and increase in households).

It was revealed that the total cost of production per unit (cubic metre) of water would be Rs7.05. On this basis, it was decided that the CBO would fix a cost of Rs35/ month for domestic and Rs40/ month for commercial water users. However, the first five units of water would be given free of charge. The fixed cost therefore takes care of the basic water requirement of a household.

This structure (Table 8) indicates that though there is no cross subsidisation between domestic and commercial water users, there is cross subsidisation between high and low water users within the individual categories. The structure was formulated at project construction stage, when the total number of beneficiary households was only 180. As the number of households has increased to 285, with the potential to increase further, CBO management costs have increased. As a result, it is proposed to increase the tariff in the future.

Table 8: Tariff structure (Diyabeduma)

Units (m^3)	Domestic/unit (Rs)	Commercial/unit (Rs)
Fixed charge	35	40
1–5	free	free
5–10	8	12
10–15	10	15
15–20	15	20
20–25	20	30

Source: Survey Data (2003)

Although the number of consumers has increased over the past three years, total water usage has remained more or less constant. Therefore, total revenue has remained the same, allowing also for the increase in electricity charges, the salary of caretakers and general overheads.

Community drop-outs and non-recipient households

The VPP process is highly sensitive to cash contributions (cost recovery) coming in on time. According to the process (Annex 3) there are five instances whereby the project can be suspended owing to non-timely financial contributions or agreements to plans. This is explicitly mentioned in the VPP process: 'A maximum time frame has been indicated in the process. Such limitations do in most cases not limit the participation of the people but serve to focus project resources where they are needed. This means that the project has the right to reject communities, which are unable to agree on important principles for the future water supply facility.' The advantage of this is that it is the CBO that is responsible for raising funds and obtaining the agreement for the community. Either a few households having financial difficulties can be helped through the collective action of the rest or, as usually happens, the CBO forwards a loan for the amount and deducts it from the households concerned over period of time.

More important are sections of the community not receiving water supply connections through poverty, even after becoming members of the CBO and contributing partially to the development process. In Diyabeduma, 22% of the total membership that has contributed to the water supply project has not been given the connection, as a result of non-completion of total contributions (Table 9). 12% of the total population are non-members of the CBO through inability to pay through poverty and through having other options.

Of the non-members, 22% cannot become members through poverty and 77% opt out as they depend on other sources of water. Some of the families in the latter group have dug wells which do not dry up, even in the dry season. Others, a greater majority, depend on buying water from those who have pipe water connections for a flat rate (i.e. Rs100 per month). A minority in this group borrows water only for drinking purposes. The CBO is not in favour of this system of water purchase.

Table 9: Status of household water supply in Diyabeduma

Status	
Present membership	365 (88%)
Non members	45 (12%)
Total	410
HH with connection	285 (78%)
HH without connections after initial cash and labour contributions	25 (7%)
HH without water after initial cash contribution	55 (15%)
Total	365

Source: Survey Data (2003)

Impact of changes in water access arrangements

One of the issues highlighted in implementation of DRA in water supply and sanitation in Sri Lanka is heavy dependency on cost recovery to the extent that the poor and the marginalised can get eliminated from the entire process, or suffer in the short or medium term.

Water service provision (according to Table 9) indicates that 22% of member households still lack water three years after project implementation. Disaggregated statistics indicate that 15% of households have paid cash contributions but are unable to provide the labour contribution. This contradicts the assumption that village labour is free. Most of these households depend on daily wage labour and are unable to sacrifice a paid labour day to voluntary labour, even though the long-term result of voluntary labour for the project can be a net gain. The poor are therefore trapped in a vicious cycle of poverty, forced to take paid labour at the cost of household water. Macro-economic policies and the political environment have disallowed this section of the community from foregoing paid labour for future benefits.

Box 1: Access to water and the poor

Leelawathie lost her husband two years ago. She now lives with another man. Both live on wage labour. She has three children. The eldest is a 17 year old boy who works in Colombo as a labourer; he is exploited by the employer. The second son is sick with childhood convulsions. Only the last child, a girl, attends school.

Leelawathie used to work in the village rice mill, where she was paid Rs150/day. Unfortunately, due to a change in government policy on the sale of paddy, small rice mills have had to close and Leelawathie has been without any work for the past months. Her partner cannot work regularly, as he is suffering from acute renal colic as a result of drinking hard water for a long time.

Though they have a great demand for household water supply, this was denied to them as they could not afford to attend meetings and sacrifice labour days for the project. They used to meet their water demand using tube wells. Tube well users collected a monthly fee for maintenance. Since the establishment of the water supply scheme, many who used the tube well have got pipe water and have disassociated themselves from the tube well community. However, some of them still use the tube well to reduce the monthly tariff on supplied water. Nonetheless, as they now identify themselves as part of the CBO, they refuse to contribute to the tube well maintenance.

This has put lot of pressure on Leelawathie and her family as the maintenance of tube well has to be borne by a smaller section of the community. Unable to withstand the pressure, the family has decided to dig their own dug well in their homestead. They are fortunate as the irrigation canal passes close to their house. However, water in the dug well is dependent on irrigation water issues. When there are no water issues, Leelawathie and her only school-going daughter have to walk a long distance to carry water.

The poor, therefore, have to depend on common water sources, like tube wells and dug wells. However, tube wells are also patronised by households who have received water supply connections (Box 1).

VPP

Despite the weaknesses of the process, the VPP has been one of the important innovations of the rural water supply strategy, with confidence building coupled with the capacity building of the beneficiary community. As described earlier, one of the main reasons for non-participation of rural communities in the development project was lack of confidence in rural development initiatives. The VPP process, which is mainly focused on water supply, brings community sanitation, environmental development and hygiene into one package. The project has the provision for a small grant (Rs10,000) for environmental development and hygiene; the PO uses this to distribute a few fruit plant seedlings and a hygiene kit for all water users. Though these inputs are insignificant in content, the impact they make on the community with regards to commitment is immense. Some households have used pipe-borne water for the upkeep of plant seedlings and have been successful in tolerating drought conditions without any crop loss. The PO has also introduced a sanitary programme, with a grant of Rs3,000 per household to construct a water seal type toilet. A fully constructed toilet would cost around Rs6,000: the grant represents a 50% subsidy. Some households have used this subsidy to help obtain a water supply connection and have built toilets by themselves using bricks made at home. The environmental programme implemented at Diyabeduma has facilitated the introduction of the technique of making bricks with sawdust. This technology has been used by one water user in the higher wealth group to make bricks for commercial purposes.

Box 2: Impact of the VPP

K.G. Gunesena is a permanent labourer in the irrigation department. He owns a two-wheel land master tractor and cultivates paddy on leased land. His family used to fetch water from a tube well in the village but this has been out of order for the last five months. Though he has a dug well in the homestead, the water is saline and cannot be used for drinking. He has been involved in brick-making as a part time occupation since the introduction of the sawdust technology.

As they have been unable to fetch water from the tube well, he has been compelled to opt for a water supply. Being in the extension part of the village, he had to pay Rs12,600 to get the supply connection. He has borrowed Rs3,000 from a friend. Because of the household water supply, he now has more time to transport raw bricks and burn them for commercial sale in Colombo. A reliable household water supply means he also maintains five coconut trees, three jak and three lime plants in a kitchen garden.

Ranjith Ganhewa is a self-employed trader who did not have any confidence in the water supply scheme. His wife, being the main water carrier of the household, managed to find Rs1,600 as the initial contribution, without the knowledge of her husband. However, paying Rs3,000 for the water connection was a problem. Fortunately for the family, Ranjith developed confidence in the project and he managed to pay the connection charge.

Within the first six weeks, Ranjith managed to make 3,000 bricks and earn Rs9,000. This was used to buy roof tiles for his house. Another 3,000 bricks were ready for a house extension. Besides this, Ranjith and his family now have 27 coconut trees, 10 jak, five pepper and five fruit plants fed by the water supply system. Prior to the project they only had four coconut and two jak plants.

Photo © R. Ariyabandu

Brick making: small scale commercial water use

Livelihood impact by wealth group

The direct impact of improved access to a safe water supply scheme does not vary significantly among the three wealth groups. What is evident is that the relatively high wealth group in Diyabeduma has managed to use extra time gained in small-scale income-generating activities and improving their home gardens with perennial crops. The low-income group, on the other hand, has benefited through a better supply of water for domestic use. In the absence of the means to get better quality water, the poor always used to have to depend on saline shallow well water or on poorly maintained/broken tube wells. Having good quality domestic water has provided an immense health benefit.

Some of the benefits for the poor are: improvements to the health of women and children; ease of managing households with invalids; adequate availability of water for all household activities; saved time in fetching water; improved security for children. This latter is an immense benefit for the poor: it was reported that once a small child lost her life while trying to wash from an open well. An assurance against such misfortunes has been a significant improvement in the mental and physiological status of the community.

Hence, improved water quantity and quality benefits all, but the greatest benefit is to the poor. Increased convenience (security, dignity, sanitation) is felt by all, but value of time saved varies and is arguably greatest for those who depend heavily on wage labour (the poor). Benefits of increased water consumption are limited to those who have assets (high and middle wealth groups) which can be put into productive use, i.e. land and finances. Nevertheless, the overall improvement in water security enhances the capacity of poor households to cope and enables the middle group and the rich to accumulate.

Improved water security is of greater social benefit to the poor, while the rich and the middle wealth groups enjoy both social and economic benefits. However, women and young females in all wealth groups enjoy greater benefits through improved security and dignity, especially in terms of sanitation and bathing, owing to greater access and availability of water. Those with financial assets and inclined towards small-scale income generation through brick-making have had more time available for productive use. The research found that households that transport raw bricks for burning prior to sale had more time to transport a larger quantity of raw bricks, thus increasing household income. Similarly, there has been more cultivation of home gardens. Although the direct income from these small-scale cultivations can be negligible, it can have an impact on household food security, especially for the poor. Though perennial crops like jak take more than four to five years to bear fruit, it provides a wholesome meal by itself and is often a staple food for the poorer sections of communities in Sri Lanka.

Besides the direct benefits, land prices have increased significantly through water security. Half an acre, Rs20,000 in 1999 prior to the project, is currently valued at Rs100,000–130,000. Improved CBO management and the success of the project have brought in new social contacts and links with the state and private sector. New contacts with local and foreign visitors and academic studies carried out by researchers and scholars have opened up new opportunities for the community.

Some of the direct social benefits are:

- Improved water security and privacy for women and young girls;
- Saved time for women, women-headed households and widows;
- Adequate water for bathing during the dry season and night times;
- Less stress at home;
- Improved livelihoods of children through regular washing of school uniforms;
- Less humiliation of children as water carriers.

Substitution among wealth groups

The following discussion highlights some of the direct and indirect benefits to the community as a result of improved access to water. However, to achieve these benefits, the poor have to forego on average 86% of their monthly income for capital cost recovery. Table 15 will illustrate the proportion each wealth category has to forego. Though the impact is less for the wealthier groups, the high wealth group still contributes 30% of their monthly income. In terms of substitution, it is evident that the impact on the poorer groups of the community is far greater than on the high or the middle-income groups (Table 10). It has been reported that some households have even mortgaged their permanent assets, such as paddy land, to pay for the water supply. This is considered rare, though it signifies the demand in the rural economy for water and status.

Improving household water security

The main purpose of the rural water supply is to improve household water security and sustain this improvement equitably among the village community. In Diyabeduma, at least 80% of those who became members are enjoying this benefit. For the purpose of this study, 'household water security' is defined as the timely availability of adequate water to meet all household water demands. Demand in this instance includes water for livelihood purposes, including small-scale home gardening.

This research analyses the change in per capita water consumption among the three wealth groups categories by assessing the quantity of water fetched before the project and metered reading of water consumption after the project. Water fetched prior to the project was purely for the purposes of drinking, cooking and sanitation (excluding bathing). The impact of the water supply project has increased the per capita water consumption of the higher wealth group eightfold; there has been a three-fourfold increase among middle and lower wealth groups. It is evident that the increase in water consumption has mainly been used for improved sanitation (including bathing) and for small-scale home gardening, mainly among the higher wealth group (Figure 5).

Table 10: Substitution among wealth groups

High Income	Middle Income	Low Income
Postponing house repairs	Using monies set aside for getting electricity	Consumption substitution, using money meant for purchase of fertiliser for crop cultivation
	Consumption substitution, sacrificing monies kept for leasing a paddy land for cultivation	Pawning jewellery
	Social infrastructure substitution, postponing purchase of CLF bulbs	Substituting the grant given for the construction of toilets
	Pawning jewellery	Economic substitution, using monies reserved for trade
	Borrowing money from friends and relations	Mortgaging permanent assets. Obtaining Rs10,000 for ½ acre of paddy land

Source: Survey Data (2003)

Figure 5: Average consumption by wealth groups

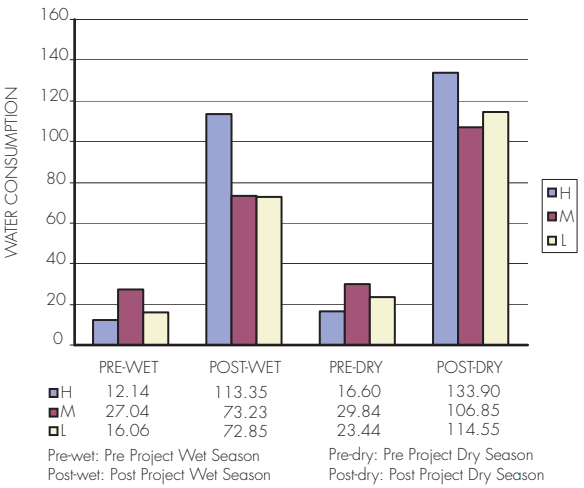


Figure 6a: Average time spent collecting water, for different uses (per day) Wet Season Pre & Post project

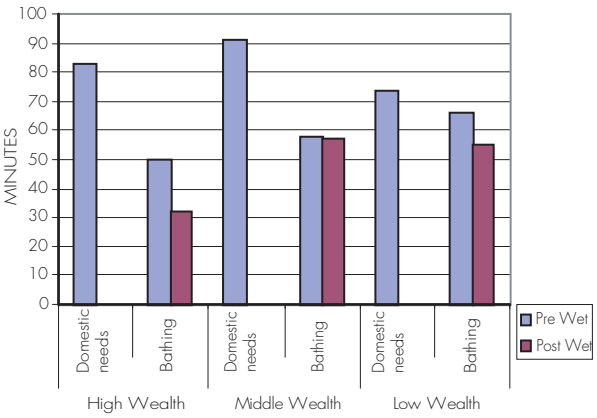
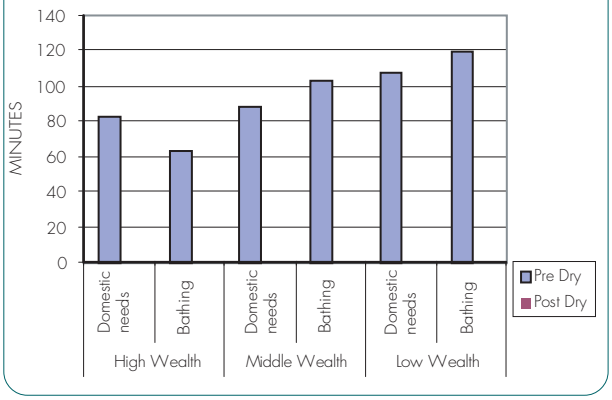


Figure 6b: Average time spent collecting water, for different uses (per day) Dry Season Pre & Post project



The average time spent fetching water has significantly lessened for the poorer section of the community. Results indicate that the poor now save up to three to four hours per day, during the dry season in fetching water for domestic needs and, more importantly, for bathing (Table 11).

The most significant improvement in the livelihoods of the Diyabeduma community is that all water needs, including bathing during the dry season, are satisfied (Figure 6b). However, during the wet season, when water is available in most common sources, such as canals and dug wells, people tend to patronise these. Sri Lankans, lavish users of water, like to maintain the tradition of bathing in canals and wells whenever possible. This situation is evident in Figure 6a: people travel to common water sources for bathing even in the 'post-wet' (post-project wet season). In the dry season, all water needs, including bathing, are fulfilled by the pipe water system. This indicates a rise in total water consumption during the dry season.

What was envisaged in the pre-project situation and under normal circumstances was that the distance from water sources had an impact on the quantity of water used in a household. However, this presumption did not hold good for Diyabeduma village. Results indicate that households travelling up to 800 metres do not have a significantly reduced consumption of water as compared with households that collect water from 200 metres away (Figure 7a). The average per capita water consumption varies from 20–25 litres in the pre-project dry season.

This behaviour can be attributed to three causes: i) the distance travelled to fetch water is not significant enough to reduce consumption; ii) there is a pattern of lavish consumption of water for all household activities; iii) there is an availability of water sources within a reasonable distance.

A similar pattern is indicated in the consumption versus time (return trip) relationship (Figure 7b). This relationship is a result of many poor people (men) using bicycles to

Table 11: Average time to collect water (Diyabeduma)

		Pre Wet		Post Wet		Pre Dry		Post Dry	
		Ave	Range	Ave	Range	Ave	Range	Ave	Range
HWG	Domestic needs	83	0–160	0	–	83	0 - 160	0	–
	Bathing/washing	50	0–90	32	0–90	63	0–90	0	–
MWG	Domestic needs	91	0–150	0	–	88	30–160	0	–
	Bathing/washing	58	20–90	57	0–90	103	20–150	0	–
LWG	Domestic needs	74	10–150	0	–	108	30–215	0	–
	Bathing/washing	66	30–150	55	30–90	119	50–240	0	–

Figure 7a: Domestic water consumption vs distance

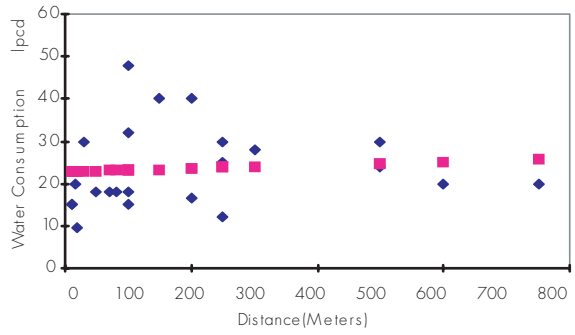


Figure 7b: Domestic water consumption vs time

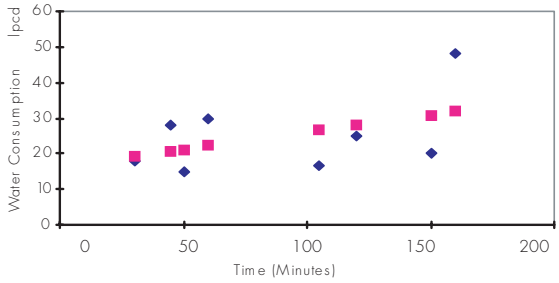
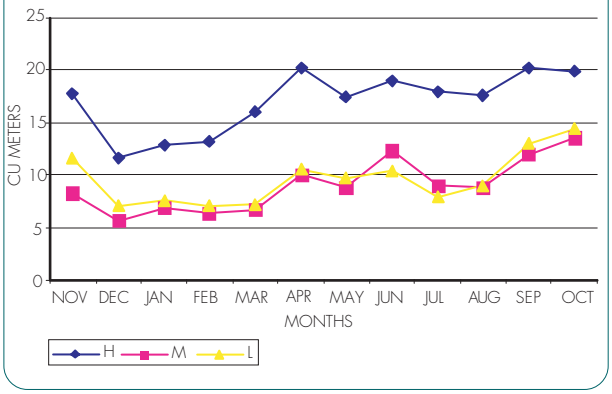


Figure 8: Average monthly water use by wealth groups November 2002–October 2003 (Post project)



collect larger quantities (two 30 litre cans/day) of water from a greater distance, while women of the same poor group walk to collect water from the same source. This accounts for more time and more water collected per household, irrespective of distance. These results differ from an earlier study done by Cairncross and Feachem (1993) in Sri Lanka which showed a significant relationship between household water consumption and time taken for a return trip to collect water. However, the locations in that study are not known. It could be that water use pattern has a distinct relationship with geographical location and availability of water sources.

Research indicates that since obtaining a piped water supply, water use among the three wealth groups has substantially increased (Figure 8). The high wealth group uses about 15–18 cubic metres of water per month while the poorer groups use about 8. Typically, the water use pattern is sensitive to seasonal change. There is low water use though the pipe system till about January (end of the wet season). Water use increases from March with the onset of the dry season and peaks around June/July during the heights of the drought. The peak water use in April is a response to the Sinhala and Hindu New Year. The pattern indicates a similar trend among the three wealth groups, though amounts used vary among the three groups and are sensitive to types of water use and tariffs.

Sustainability of community water supply projects

The sustainability of community water supply projects depends largely upon the credibility of CBOs, which in turn depends on the neutrality they maintain with respect to local politics. This was clearly shown when the Diyabeduma CBO maintained its independence in the tussle with the local authority for ownership of the project. Success of the Diyabeduma community water supply project can be directly attributed to the efficiency and management of the project by the CBO. The VPP process builds mutual trust between the CBO and the community. It takes almost one year to embark on the construction of the project; this facilitates the partnership between the CBO and the community by means of various other supplementary activities, dealing with, for example, environment and hygiene.

CBO financial management has been impeccable in most community water supply projects; in Diyabeduma also the community was satisfied. Currently, the CBO has a Rs600,000 in bank accounts and Rs200,000 worth of assets. It has been instrumental in organising credit for community members from informal lending institutions and has itself developed long-term credit facilities for the payment of cash contributions for the poorer section of the community. However, this system has been limited to the CBO membership, which effectively leaves the poorer non-members out of the mainstream. The reason for this is that the original project target of providing water for 180 families has been achieved; if a loan scheme is devised for the poorer section of the community, money will be difficult to recover. There is no incentive for the CBO to encourage the poorer section of the community to join the mainstream.

Institutional structure

At present, there is no distinct institutional structure for the management of rural water supply projects. The CBO takes all the responsibility of project management once the NWSDB has handed over management ownership. The process is institutionalised through a tripartite agreement concerning the CBO, the NWSDB, and the PS. However, only the NWSDB has a link to the CBO for monitoring, management and auditing. Though the CBO is registered with the Divisional Secretariat (DS) office as a voluntary organisation and the latter is expected to carry out annual audits of financial accounts, this has not ever been done. The main reason for this is a lack of resources.

Figure 9 shows that though there are number of institutions with some links to the CBO, only the NWSDB has a two-way responsibility and a reporting linkage indicating a sustainable relationship for project management. Although the same could be expected from the Divisional Secretariat and local authorities, these are still limited only to a reporting linkage. The NWSDB link in the village is maintained through its Divisional Unit, located in Elahera town. The CBO maintains a close link with rural banks but the relationship could improve further to support better financial management. The CBO, meanwhile, signs an agreement with each water user, which establishes the power and responsibility of both parties towards maintaining the water supply infrastructure.

Legal status and authority

At present there is no legal mechanism allowing CBOs to own and manage rural water supply schemes. The NWSDB has been attempting to encourage CBOs to register under one of the existing acts; none of these attempts has materialised effectively. However, according to the latest amendment to the NWSDB Act, approved by Parliament in December 2003, the NWSDB can enter into a joint scheme with any CBO; provisions are made to transfer any water supply scheme within the area of local authority to such local authority or to any community-based organisation established under the law. This will give legal recognition to the CBO. In order to support the provisions made by law, the 'training and capacity building of institutions' component under the ADB III water supply and sanitation project is formulating bylaws for adoption by Pradeshiya Sabhas to provide more authority to CBOs.

Water user assessment of O&M and financial management

Assessment of project O&M within the past three years indicates that the water users are satisfied with the overall management performance of the CBO. As a result of O&M training received during project implementation, caretakers have been performing satisfactorily and nearly 80% of water users in all categories were content with them. 100% of water users were satisfied with the service provided by the CBO and with water reliability.

Although the CBO has been functioning satisfactorily, with proper accounts and audits carried out by the NWSDB, water users' perceptions of CBO financial management have not been satisfactory. Most water users are not aware of the expenditure and financial transactions of the CBO. The same observations have been made by the Benefit Monitoring and Evaluation report by COWI consultants, assessing the performance of 660 households and 13 CBOs in six districts in the first batch of the ADB III project.

Cost recovery

The policy hitherto practiced in rural water supply is partial capital cost recovery and full O&M cost recovery, including pump replacement costs. The impact of capital cost recovery and the monthly tariff on household income is shown in Table 12 and Table 13. Capital cost recovery, in terms of cash and labour contributions, has a higher impact on the poorer section of the village. For Diyabeduma, Table 12 indicates that the poor can some times pay up to 120% of

Figure 9: Institutional linkages (Diyabeduma CBO)

Table 12: Capital cost recovery as a % of monthly income [6]

Wealth Group	Average %	Range %
High	30.7	15–56.2
Middle	53.3	22.5–90
Low	86.9	56.3–120

Source: Survey Data (2003)

Table 13: Monthly tariffs as % of monthly income

Wealth Group	Average %	Range %
High	1.29	0.2–2.9
Middle	0.9	0.3–2.4
Low	1.59	0.5–3.1

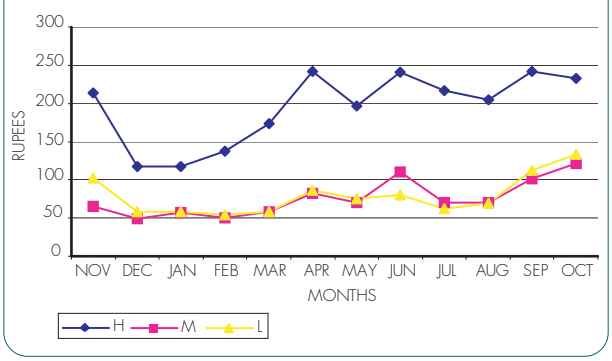
Source: Survey Data (2003)

indicate that poorest group contribute between 0.5% and 3.1% of their monthly income for domestic water. The same group answered in the affirmative when questioned as to whether they could pay more if the policies of the government changed or the CBO decided to raise the tariff. This indicates clearly the demand for domestic water within this group.

Pattern of tariff payments

There is a distinct difference in tariff payments among the wealth groups. While there is hardly any difference between the low and the middle-income category, the rich group pays a higher tariff for increased quantity of water used. Research indicates that the low and the middle-income groups pay a monthly tariff of Rs50–100 while the rich group pays a monthly tariff of Rs150–250 (Figure 10). This indicates a significant difference in water use between the two. Considering the cost of obtaining water prior to the project (approximately Rs700–900 for rich households), this is a substantial reduction in monthly expenses for domestic water. In the event of a major water use activity, such as house construction or repair, the poor would pay up to Rs300 per day only for water. Therefore, while tariff payments reflect one's water consumption pattern, among the poor they also reflect the ability to pay for water on a regular basis. Figure 8 indicated that the poor pay less than Rs50 during the months of December to January as a result of the rainy season. During this period they can use irrigation canal water for high water-use activities, like bathing and washing clothes, which reduces monthly tariff payments. The same trend can be observed with respect to the high-income category but the reason for using other water sources is more a behavioural pattern than an effort to save on tariff payments. The high-income group does not plan particularly for tariff payments, whereas the poor always plan and anticipate the monthly payment in advance. Some poor households save Rs5–10 per day in anticipation of monthly tariff payments.

Figure 10: Average monthly tariff by wealth group November 2002–October 2003 (Post project)



Financial sustainability

Once construction is completed, O&M is the responsibility of the CBO. The policy of the NWSDB is that the CBO should be self-sustaining, generating its own funds through 'affordable' tariffs. The Diyabeduma CBO has been sustaining its project without any financial assistance from the NWSDB or the Pradeshiya Sabha. It depends entirely on the monthly tariff income for revenue. Figure 11 indicates the revenue generated, expenditure incurred and net profit to the CBO during the period of investigation.

All water users pay their monthly tariff but there are lean and peak periods in revenue collection. This coincides with the harvesting of paddy in Diyabeduma. It is not uncommon to find poor households sometimes delaying

Figure 11: Monthly amount collected, expenditure and balance (Diyabeduma) (Post project)

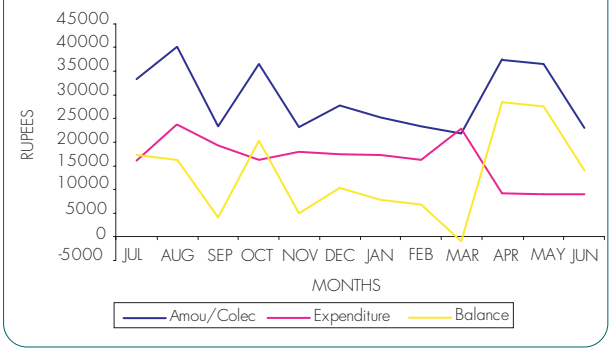


Table 14: Tariff collections, expenditure and profits

Month	Revenue (Rs)	Expenditure (Rs)	Balance (Rs)
2002 July	33,317	15,972	17,346
August	40,059	23,766	16,293
September	23,263	19,229	4,134
October	36,582	16,319	20,263
November	23,119	18,069	5,050
December	27,736	17,416	10,320
2003 January	25,144	17,242	7,902
February	23,251	16,347	6,904
March	21,916	22,858	-942
April	37,493	9,100	28,393
May	36,532	9,000	27,532
June	22,953	9,000	13,953

US$1 = Rs95

Source: Survey Data (2003)

payment for one to two months, making lump sum payments with the harvest or labour wages received after harvesting. This is reflected in April/May (wet season harvest) and September/October (dry season harvest).

Regular expenditure for the CBO usually consists of the salaries for the two caretakers and the monthly electricity cost. Apart from these fixed costs, there is the need for routine maintenance and sometimes major repairs to the pump. The major cost item so far has been electricity. A change in the government's electricity tariff policy has raised the cost from Rs6,000 prior to March to Rs12,000 in March (Table 14). This is reflected in the high expenditure for March 2003. However, the total profit for the reference period for the CBO is in the range of Rs150,000. With the anticipated increase in tariff proposed by the CBO, net profits can increase, thus further strengthening the CBO financially. As stated earlier, the CBO currently has bank savings of Rs600,000 and it is now considering venturing into other income-generating activities, like purchasing paddy for future sales. This will strengthen its claim as a 'people-based company' One of the strengths of the CBO in Diyabeduma is that the office bearers are very active, educated and knowledgeable.

New demands and emerging institutional issues

An issue of importance is the demand for new connections, to meet which the CBO is planning an additional borehole. However, as finances are not adequate for this purpose, the CBO is canvassing government organisations and projects to raise funds. It is confident that there exists the knowledge and technical capacity to implement the additional borehole. Meanwhile, the increase in membership has meant additional income for the CBO. As a consequence, some members of the CBO executive committee have not been happy with the audits done by the NWSDB and have requested an independent audit. These are problems that the CBO will have to resolve.

Moreover, expansion will mean that it will not be possible to maintain present CBO status as a voluntary organisation. If the CBO is expecting to be more commercially oriented, it will have to register as a 'people-based company' (welfare-oriented non-profit-making) under the Companies Act. This will give it more legislative powers and will mean it must be accountable to its membership.

Emerging village organisations are often faced with the threat of political victimisation from various forces. In Diyabeduma, there is a threat from a local power base, which wants to acquire ownership of the CBO and manage the project. The Diyabeduma CBO has managed to overcome this, but there is still a great deal of indirect influence from these forces wanting it to give in to their demands.

Provisions of the new legislation (the NWSDB Amendment Bill of 2003) are expected to empower the NWSDB to enter into joint schemes with any local authority, CBO or person to improve the efficiency of water supply. In addition, the legislation provides authority to the minister in charge to make an order to transfer any NWSDB scheme within the area of any local authority to such local authority or any CBO established under the law, to ensure an efficient provision of water services.

Box 3: Political influence and rural water supply

Diyabeduma CBO, as a non-political organisation, was functioning well with the support of the community. This was envied by some political members of the local authority. Whereas most rural initiatives undertaken by the local authority have failed, Diyabeduma water supply project has been successful. Furthermore, the CBO was generating money through the monthly tariff; for these reasons the local authority has sought to assume control of the project from the CBO.

However local authority are only allowed to intervene in rural development project where they are found to be detrimental to the community or have involved large scale corruption.

None of this was reported from Diyabeduma. Therefore, it has not been possible for local politicians to grab power and ownership of the Diyabeduma rural water supply project.

Non-beneficiaries

One of the fundamental problems of the DRA approach is that it is biased towards direct beneficiaries, ignoring non-beneficiaries who are also part of the community. In Diyabeduma, the non-beneficiaries have to depend on their traditional water points, such as the tube wells, for all their water demands. Under the Rural Water Supply and Sanitation Policy, tube wells should be managed by a three-tiered maintenance policy, consisting of the NWSDB, the Consumer Society and the PS. Experience from Diyabeduma contradicts this policy.

Since obtaining a water supply, beneficiaries have moved away from the tube wells. However, those who are non-beneficiaries of the water supply system have to depend on the same point sources while maintenance of these has to be shared among a lesser number of water users than before. Prior to the water supply scheme, tube well users saved Rs50 per annum for maintenance. According to the three-tiered policy of tube well maintenance, a tube well is constructed for 10 to 15 families or within a distance of 250 metres from one another. The consumer societies formed to maintain tube wells are expected to collect Rs500 per annum, of which Rs300 was to be deposited with the Pradeshiya Sabha (local authority) for major repairs and Rs200 to be kept with the consumer society for routine repairs. This system has been totally dismantled since the arrival of the water supply scheme. As a result, the poor are now unable to maintain the tube wells and some have opted to dig their own private wells.

As we have seen, in a worst case scenario, some of those who have become members of the water supply scheme still use the tube wells for high water-consuming activities in order to minimise metered water consumption. They do not contribute towards tube well maintenance as they

Photo © R. Ariyabandu

Pre-existing water sources: old tube wells

Photo © R. Ariyabandu

New piped water supply scheme under construction

identify themselves as domestic water supply users. The poor have lost their traditional water points while the wealthy have benefited both ways.

On the other hand, some non-beneficiary households have benefited from the water supply scheme. In the extension area of Diyabeduma, beneficiary households have allowed non-beneficiaries to take water from their domestic supply on payment of a fixed monthly tariff (Rs100). Although this is prohibited by the CBO, it is often conveniently ignored for the benefit of the poor.

Some rich households have now totally abandoned their own dug wells and the utensils used to collect water. Although the scheme has not failed for any significant length of time, frequent power disruptions owing to increasing droughts can be a cause for concern. Neglecting natural water points in favour of water supply could be disastrous if the water supply scheme failed through technical or power failure.

Photo © A. Johnstone

Habitual use of traditional water source

VI. Case study two: Kailapathana

Overview of water and livelihoods in Kailapathana

Kailapathana village is located in Kekeriwa Divisional Secretariat division of Anuradhapura District in the North Central dry zone of Sri Lanka. The average annual rainfall of the area is about 1,100mm. The rainfall distribution of the area shows a distinctly bimodal pattern; in the Maha season (October to January) it receives 800mm and in the Yala season (March to May) 300mm. The Colombo-Anuradhapura highway passes through Kailapathana Village, which provides the villagers with an opportunity to perform small-scale business opportunities.

A specific feature of Kailapathana village is that it consists of all major ethnic groups of Sri Lanka, namely, Sinhala, Tamil, Muslim and Burger. The ethnic groups are well mixed and live in harmony. The total number of families in the village at the time of project initiation was 105, with a population of about 447. These were at 139 and 523 respectively at the time of survey. There are a number of grassroots level organisations functioning in Kailapathana, namely, the Farmers Organisation, the Death Donation Society (DDS), the Fisheries Society, the Women's Association and the Sarvodhaya Volunteer Work Movement.

Status of water availability

Pre-project situation

The villagers of Kailapathana used to depend on multiple water sources for their daily water requirements: the Mahaweli seasonal water issues supplied through a distributory channel; the Alagamuwa minor tank located a mile away from the village; the Mirisgoniya oya – a small seasonal river located 1.5 miles away; shallow dug wells within the village; and one tube well. The major source of water for drinking purposes was 39 privately owned shallow dug wells, two common wells and one tube well. In addition to drinking water needs, private well owners used the well water for their livestock and for home gardening.

The main problem with the shallow dug wells in the village is that they dry up during the dry season. This is accelerated when Mahaweli water issues are suspended during harvesting and off-seasons (mid-January to March and September to October), because channel water is the source of water for the wells' recharge. Therefore, prior to the scheme, villagers faced tremendous difficulties for about four and a half months of the year. Fetching water from distant locations was a major day-to-day activity; it became the normal livelihood pattern of the villagers, taking an average of one to three hours a day. Shop owners used labourers to fetch water for their requirements, paying Rs25 per 200 litre water can; this cost the shop owners Rs75 per day but provided someone with a livelihood. The major drawback of the tube well water in the village is its hardness and salinity, which stops the villagers using it for drinking purposes.

Photo © R. Ariyabandu

Shallow dug wells: seasonal variation in quality and quantity

Post-project situation

The pipe-borne water supply started functioning in October 2002. The source of water was a large diameter dug well (eight metres in depth and six metres in diameter) located in a good groundwater-potential area of the village. The length of the main supply pipe system is 123 metres and the distributory pipe system is 4,230 metres. The capacity of the water storage tank is 30,000 litres; this is built at a height of six metres to provide necessary pressure. There are two electric water pumps for alternative pumping purposes to ensure a continuous water supply.

Out of 105 households in the village, 79 households received pipe-borne water connections before November 2003, i.e. 75% of the total population. These families now have secure water at their homestead; competitiveness for alternative water resources, such as village common wells, has been significantly reduced. However, the village community still depends on other water sources, especially during wet seasons.

Socio-economic status of the village

Kailapathana is blessed by Mahaweli irrigation water issues supplied during both Maha and Yala seasons. Although the village receives irrigation water from Mahaweli water, the total number of paddy landowners in the village is only 17. The rest of the people own only a half acre extent of upland within the homestead. The distribution of the village workforce given in Table 15 illustrates the livelihood pattern of the village.

Although the village is a located in a predominantly agricultural area, with the supply of Mahaweli irrigation water, only 5.5% of the labour force is involved in full-time farming. Lack of irrigated paddy land for the majority of the people in an irrigated agricultural village is another critical social problem. The situation has forced the villagers to work as wage labourers in the paddy lands within the village and outside and to depend on non-farm employment. Some villagers travel a long way from the village to labour during the paddy cultivating seasons. Some

other farmers also worked as a share tenants under various types of tenancy agreement with landlords, which provides them with marginal benefits. A large number of labourers work as metal crushers, construction workers and in other support services on a casual basis, i.e. in labour with intermittent income streams.

Table 15: Type of employment

Type of employment	No. of people
Wage labour	31
Foreign employment	23
Self-employment	18
Private sector	14
Livestock	13
Farming	12
Small-scale business	07
Fishing (inland fishery)	06
Unemployed	93

Source: Survey Data (2003)

Poverty, unemployment, capital unavailability, landlessness and land tenure are some of the main socio-economic issues faced by the people of Kailapathana village. Although most household heads are engaged in some sort of employment, about 42% of the total workforce is unemployed and 14% of the workforce is occupied in casual wage labour. A specific feature of the unemployed workforce is that the majority are young people with educational qualifications (GCE O Levels and GCE A Levels). Some are addicted to drugs. The main constraints for the development of young people in the village are the lack of vocational training to help them compete in the present job market, the lack of career guidance, and the lack of capital to initiate self-employment.

Poverty and unemployment prevailing at household level has forced some families to stop their children's schooling and use them for labour. Child labourers working in the construction industry, metal crushing and agricultural activities during the peaks of the seasons and in shops can be seen within and around the village.

The interior roads of the village are in poor condition and electrification of the interior sections of the village is yet to be carried out. The poor roads cause tremendous difficulties for the villagers, especially during rainy seasons. Another problem in the village is the lack of a community hall for common activities, participatory development programmes, religious requirements and other functions. Village-level public meetings are usually held in villagers' houses and other functions are held under the shadow of a large tamarind tree.

Poor house conditions and the lack of a sufficient number of houses is a critical problem for some villagers; this has arisen from the unavailability of land and a lack of capital. Several families often live together under one roof. This creates various social and cultural hindrances at the household level and has also lead to health and sanitary problems.

Wealth groups

The village population has been classified into three wealth groups for the purpose of analysis: high, middle and low. Although there is a clear difference in income level between high and low wealth groups in the Kailapathana community, it is difficult to differentiate the middle wealth group. The high wealth group differs from the middle wealth group in land ownership pattern, land size and ownership of productive assets. The following indicators were decided upon through key informant interviews and used for the wealth group classification.

1. High wealth group
   - Irrigated paddy landowners
   - Medium-scale businessmen, e.g. shop owners
   - Productive asset owners, e.g. of tractors
   - State and private sector employees (assured income)
2. Middle wealth group
   - Farmers
   - Small-scale businessmen
   - Medium-scale self-employment, e.g. three-wheel taxi drivers/owners
3. Low wealth group
   - Wage labourers (agricultural and non-agricultural)
   - Tenant farmers
   - Small-scale micro enterprise, e.g. brick-making

Out of the total households in the village, 20%, 39% and 41% belong to the high, middle and low wealth categories respectively. Ten households were selected randomly from each wealth category for the detailed analysis. Table 16 and 17 show the distribution of the land tenure pattern and the amount of land among different wealth groups.

Table 16: Distribution of land ownership by wealth groups (% of people)

Land Ownership	High Wealth Group		Middle Wealth Group		Low Wealth Group	
	High Land	Low Land	High Land	Low Land	High Land	Low Land
Single Ownership	90	50	90	10	70	–
Leased in	–	10	–	20	–	–
Tenants	–	–	–	10	–	10
Mortgaged in	–	–	–	10	–	–
Encroachment	10	–	10	–	30	–

Source: Survey Data (2003)

Table 17: Distribution of land size by wealth groups and type of land (% of people)

Extent (acreage)	High Wealth Group		Middle Wealth Group		Low Wealth Group	
	High Land	Low Land	High Land	Low Land	High Land	Low Land
0 < 0.5	80	–	90	10	90	–
0.5- 1	20	–	10	10	10	10
1 - 2.5	–	60	–	10	–	–
> 2.5	–	–	–	20	–	–

Source: Survey Data (2003)

As expected, high wealth groups are the highest income earners: about 90% earns a monthly income of over Rs10,000 (Table 18). Income for the high wealth group mainly comes from irrigated paddy land, state and private sector employment and business enterprises located on the sides of the Anuradhapura highway. The main income source for the lower wealth group is from labour in agricultural and non-agricultural sectors.

Table 18: Level of household income by wealth group

Income (Rs/month)	High %	Middle %	Low %
<1,500	–	–	–
1,501 - 3,000	–	–	10
3,001 - 5,000	–	–	40
5,001 - 10,000	–	10	30
10,001 - 20,000	10	50	–
20,000 >	90	40	–

Source: Survey Data (2003)

Community contributions

Kailapathana rural water supply project, as a community-centred development project, has ensured the involvement and contribution of the beneficiaries from the early part of planning stage. Most of the irrigation rehabilitation projects carried out in the past have had a component of community contribution in kind up to 10% to 15% of the project cost. However, the Kailapathana project received 22% of the total capital cost as a beneficiary contribution, including 4.6% in cash. The amount of cash was decided at the community action plan meeting with the participation of all CBO members, the PO and the officials from the NWSDB. Beneficiaries' income, willingness to pay, availability of labour days for the project and a ceiling of project allocation per beneficiary family for a pipe-borne water supply were considered in determining the household cash contribution. The cost sharing pattern of the project is given below.

Representatives from 84 households in the village contributed 16 days of labour at various stages of the project. The labour contribution came from both men and women. The CBO mobilised the labour at various times depending on the type of work and workload. The major activities carried out using community labour were the digging of the canal for the pipe line, fixing of pipe lines, filling of the canal, lining the interior wall of the well (water source) and construction of the pump house. The average opportunity cost of one day of labour has been estimated using the prevailing wage level in the area of Rs250. In addition to the sharing of the capital cost, it is the sole responsibility of the community to manage the water source efficiently and to undertake O&M.

Latecomers, who were not original members of the CBO and were not involved in the initial phases of project implementation, have to pay Rs10,000 (cash) for a connection. This money is deposited in the CBO account.[7] The specified amount can be paid in six instalments. The first instalment is Rs5,000 and the rest can be paid within a five-month period, with a minimum of Rs1,000 per month. In addition to the Rs10,000 payment to the CBO fund, new members also have to bear, as did existing members, the costs of a water meter (Rs1,900) and domestic plumping, which vary depending on the length of pipe lines and number of water taps to be installed in the household.

Table 19: Cost of the project

	RS	% of total
Total cost of the project	1,977,300	100
Community contribution in kind (1,344 labour days)	336,000	16.99
Community contribution in cash	92,000	4.65
Total community contribution	428,400	21.67
Project contribution (donor)	1,548,900	78.33

Community drop-outs and non-recipient household

The policy of the government of Sri Lanka is to provide safe drinking water to all by 2025. Access to safe water is recognised by the constitution of Sri Lanka as a basic need and right of every citizen. However, it has been estimated that 3% to 5% of potential beneficiaries are dropouts from rural water supply projects as a result mainly of marginalisation or poverty (NWSDB, 2003). Willingness of the village community to contribute a minimum of 20% of the capital cost of the project in both cash and kind, along with a readiness to take responsibility for sustainable O&M, is one of the prime criteria adopted in selecting villages for rural water supply projects using DRA. However,

Table 20: Overview of pipe-borne water supply in Kailapathna

Status	% of HH
Members with water connection at first stage.	69
Members with water connection at later stages due to late payment	6
Members paid cash and kind, but no connection due to non-payment of meter fee	1
Members without connection after initial cash contribution but no labour contribution	6
Members who did not mobilize cash or kind	3
Non –members (did not request water connection)	15

Source: Survey Data (2003)

the current approach is clearly failing to benefit certain very needy but marginal segments of the community. It is important to find ways of improving outreach if the government is to achieve its stated objective of providing safe water for all by the year 2025.

Kailapathana village was not exceptional in the above-mentioned selection criteria. The available data show that 15% of households in the village are non-members of the CBO and made no contribution to the project. The major reasons for the non-involvement of this segment of the community are: i) poverty; ii) lack of faith in the successful completion of the project owing to unpleasant past experiences; iii) availability of alternative water resources for domestic use; and iv) non-preparedness to take the burden of monthly tariff payments for an entire lifetime. About 10% of the CBO members who have contributed to the project have not benefited from access to a pipe-borne water supply due to incomplete contributions or the inability to pay for water meters and to bear the domestic plumping cost. The details of the non-recipient households are given in Table 20.

Implementation of DRA in the village context: approach and acceptance

In the initial stages of the DRA in Kailapathana, the NWSDB put posters up there and in surrounding villages in May 1998, asking village-level community organisations to make requests for a community-based rural drinking water supply scheme for needy villages. This matter was widely discussed at the village Death Donation Society (DDS), which was chaired by the current CBO president. The society unanimously agreed to submit a request to relevant authorities, with signatures received from the majority of villagers.

After a couple of months, some officials from a NGO called Sithuwama came to the village and announced that it had been selected for investigation. Sithuwama is a local NGO involved in the implementation of various community-based rural development projects in the past couple of years, with experience in the participatory development approach and the necessary capacity to mobilise the people. It was selected as PO after a competitive bidding process, then held a series of group discussions with various segments of the village community and also key informants to gain an understanding of water availability and accessibility, difficulties in obtaining safe water and strength of grassroots organisations.

Box 4: Success of the VPP Approach

A couple of years ago, a subsidized latrine project was implemented by the local government authority (Pradeshiya Sabha) in the village. The project selected just seven beneficiaries and provided Rs15,000 each to construct a latrine. The motivation of the project and selection criteria was purely political, and there was no component to monitor progress. Out of seven households, only two invested the subsidy money for latrine construction. However, the sanitary project implemented by the Kailapathana CBO, which had a subsidy of only Rs3,000, has completed 91 latrines within a very short period using the VPP approach.

At the next stage, the village-level CBO was formed, with the participation of the majority of village peoples and officials from the PO. Villagers were asked to be official members of the CBO, paying Rs5 as an entrance fee. Office bearers for the CBO were elected at this meeting by consensus of the members. The village was divided into four zones based on the geography of the village; zonal leaders were appointed by respective communities in order to devolve the CBO activities and to increase the efficiency of the community mobilisation process. Beneficiaries in the zones were formed into several groups, consisting of seven to eight households per group. Training was provided to zonal leaders on various aspects of community mobilisation, group dynamics, leadership skills and organisational management. Zonal leaders commenced the people mobilisation process with the assistance of group leaders and they also acted as a linking agent between the zonal community and the CBO.

At the project planning stage, the general meeting of the community was organised by the NWSDB and the PO through the CBO. The villagers conducted a PRA, with the guidance of the NWSDB and the PO, to identify the available water resources and a feasible water supply option for the village. The PRA was carried out by several groups and at the end, interestingly, all the groups unanimously chose the pipe-borne water supply as the preferred option. Socio-economic baseline data were also collected by distributing a questionnaire to participants; duly filled questionnaires were collected immediately. The purpose of the survey was to understand the socio-economic profile of the community, water resources in the village, time spent to fetch water, seasonality and accessibility of water resources, and difficulties experienced owing to lack of water supply projects. The results were analysed for project planning purposes but not presented to the village community. The PO listed the possible water supply technologies that could be implemented but at this stage did not indicate the requirement for financial contribution to cover the capital cost. The beneficiaries were also not required to choose a technology at this juncture.

Capacity development of the CBO commenced with the active participation of PO. The first training stage dealt with the process of people mobilisation, for CBO leaders, zonal leaders and group leaders. The second training stage was a three-day programme for CBO and zonal leaders on organisational management, financial transactions, and bookkeeping etc., conducted by the NWSDB. Then project authorities described the forthcoming sanitary and environment project. CBO members were asked to apply to receive subsidies to construct privately owned latrines. In order to initiate the latrine construction works, a first instalment of the subsidy value of Rs1, 250 was provided to members. Each member had to contribute Rs50 to the CBO fund. Depending on the progress of construction, the other two instalments of the subsidy were distributed among members, at values of Rs1, 000 and Rs750 respectively. Again, beneficiary members had to pay Rs50 to the CBO fund on each occasion. 91 households benefited (75 households that had had temporary latrines and 16 households that had had no latrine facilities) from this sanitation project. The PO conducted an awareness programme on sanitation, cleanliness and importance of use of latrines, distributing a package of materials among beneficiaries, including soap and toilet cleaning brushes. The project authorities used the latrine project as an entry into the water supply project, creating confidence and trust for the forthcoming project, which would need much more participation and contribution. According to CBO officials, this entry approach made very good headway in convincing and creating trust among villagers about the feasibility of the proposed water supply project.

During the sanitation project, the NWSDB introduced the concepts of cost sharing, ownership and sustainable O&M of the future water supply scheme. They explained the different water supply technological options and their total costs, and the contribution necessary for recovering part of the capital cost and estimated O&M requirements. Interestingly, all the participants reiterated their previous choice of a pipe-borne water supply, despite it necessitating the highest contributions from beneficiaries. The poor groups in the meeting stated their inability to contribute the entire required amount and join the project but said that they would support it, at least for the benefit of future generations.

By that time, the latrine project had been completed and people were starting to sense the project benefits. Those who wished to acquire a pipe-borne water supply were requested to pay Rs100 to the CBO fund to acquire a membership. 85 households paid the membership fee for the drinking water project. Simultaneously, an environmental project was implemented by the PO, at Rs10,000 for full membership. Under this project a coconut seedling and a high-breed mango plant were distributed to all members. The package also included a one-day training programme on home gardening. The CBO provided the monitoring for this project.

At the next stage, the PO started the preliminary works for project implementation. They began by surveying to estimate the length of the pipeline needed (main and lateral), the hydrology of the village aquifer, a feasible location for the well, and estimated well capacity, by predicting demand increase in the following 15 years, taking population growth into consideration. The demand estimate was carried out according to the guidelines of the NWSDB; the major drawback was non-consideration of future demand in terms of increased living standards, livestock numbers, agro-based industries and other income-earning self-employment projects, which could arise from the availability of secure water.

At this stage, the exact amount of the community contribution (16 labour days and Rs1, 100 in cash) required for the project was officially declared by the PO. A deadline was given to the CBO by the PO to raise the necessary funds through the community cash contributions. Zonal leaders and group leaders played a dominant role in convincing the people in line with the project and in raising the funds. However, there was a deficit of Rs29, 000 (31% of the total cash contribution) at the time of the deadline; the CBO bridged this gap by obtaining a loan from the village Death Donation Society at 4% interest. This was a progressive step taken by the CBO, in that it shouldered the risk of the poorer members to keep the project going. These people received a longer time period to pay. In the meantime, two-day intensive training was given to the CBO on construction works and the joining of pipelines.

A general meeting of the CBO was subsequently conducted every month to discuss progress and problems in the ongoing project and to obtain the suggestions of the community regarding the water supply project. When there was poor attendance at the general meetings, zonal

Box 5: Water needs and priorities

Murungahitikana is a neighbouring village of Kailapathana, where the second phase of the Kailapathana water supply project is being implemented. One zone of this village is near the Mahaweli irrigation channel and therefore has a good groundwater aquifer. At the VPP, the community of this zone rejected the piped water option and requested a subsidy to line unprotected wells already in the homestead. The project agreed to provide Rs9,000 per household to cover 50% of the project costs for 17 households. The beneficiaries were expected to mobilize the rest of the resources. The CBO monitored the progress of the project to disburse the subsidy on an instalment basis.

The reasons for the rejection of a piped water supply are as follows:

1. Doubts about the success of a community-centred approach and therefore unwillingness to provide cash and labour for the project.
2. Perceptions of the monthly tariff as a major burden on household expenditure.
3. Problems in mobilising 16 labour days for the piped water project.
4. The construction of wells in the homestead provides full property rights in water access and freedom of water use.
5. The lining of wells provides security for children.

The benefits of individual wells over piped supplies risks associated with seasonal water scarcity due to fluctutations in the water table.

meetings were organised to discuss zone-specific problems and activities.

Determination of tariff structure

The decision on the tariff structure was taken at a CBO general meeting. By this time, beneficiaries were aware of their duty to manage the system in that they had to make a monthly payment for the treated water supplied to the homestead. The tariff structure was calculated with the participation of all stakeholders, using the following criteria: approximate monthly electricity cost; cost of water treatment; payment of salaries (for the caretaker); approximate monthly cost of any emergency repairs (main and lateral lines); and depreciation of the water pump (10% per annum).

A decision was made to levy a fixed service charge of Rs35 per month, irrespective of level of consumption, and a flat rate of Rs12 for each unit of water consumed (cubic metre). The tariff collection was to be deposited in the CBO account for use in sustainable O&M. However, the CBO realised after two months that the average amount of water used by beneficiaries was less than expected (40–45 lpcpd); income earned was therefore not sufficient to cover O&M costs. Another public meeting was held to reform the tariff structure after studying the NWSDB billing system currently practised in urban water schemes. The process was assisted by a technical assistant (TA) and an engineering assistant (EA) from the project. It was decided to introduce a block use tariff system (Table 21) and increase the current fixed charge from Rs35 to Rs50 per month. The proposed block tariff structure provided a cross subsidisation between low water users and high water users. The new tariff system was agreed by the members and an agreement was signed between the CBO and the beneficiaries.

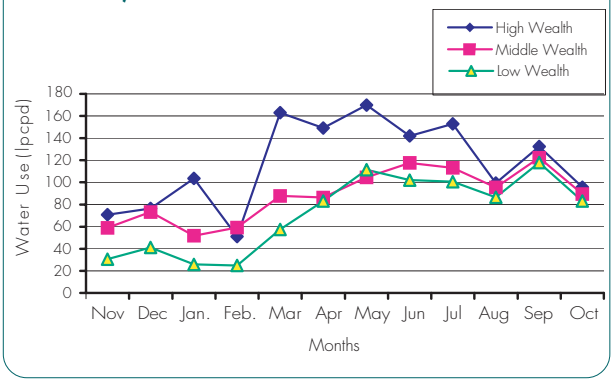
A tariff bill is sent to each household at the end of every month and users have to pay the treasurer of the CBO. If anyone fails to make a payment for a continuous three-month period, a red notice will be sent to request immediate settlement. Another month will be given for this settlement. In the case of failure to settle, the water connection will be cut off. According to the CBO, there have been red notices sent but no water connection has been cut off yet.

Table 21: Monthly tariff structure

Units (m^3)	Rate
Fixed charge	50
0–1	0
1–5	06
6–10	08
11–15	10
16–20	15
21–25	20
> 25	25

Source: CBO Documents

Figure 12: Average monthly pipe water uses among different wealth groups (Nov 2002 – Oct 2003)



Household water consumption

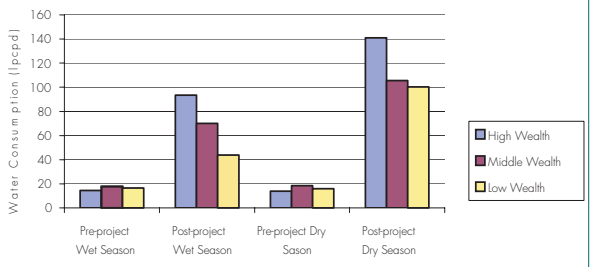
Water consumption data were analysed to observe the difference between household water consumption among the wealth groups, both in dry and wet seasons. Average water consumption from pipe-borne water projects among high, middle and low wealth groups is 117, 88 and 72 lpcpd respectively. The results indicate the distinct difference in water consumption among all three wealth groups, though there is little difference in income level between middle and low wealth groups. This suggests that water consumption is itself an important indicator of wealth. The pattern of water consumption over a one-year period is demonstrated in Figure 12. Average water consumption during the pre-project wet season (pre-wet) versus post-project wet season (post-wet) and the pre-project dry season (pre-dry) versus post-project dry season (post-dry) is given in Table 22 and Figure 13. Pre-project data show the quantity of water brought to the household only. They do not include water utilised away from the household, such as the irrigation channel, the minor tank, and common wells for bathing and washing. Post-project water data (pipe water use) include water used for all or some sanitary requirements as well.

The difference in the quantity of water consumption between the pre and post-project situations as perceived by beneficiaries is by and large a result of the improvement in water use for sanitary needs at household level. High water consumption during post-project dry seasons as compared with post-project wet seasons indicates the dependency on alternative water sources for high water use activities (bathing, washing of clothes) during wet seasons, in an effort to reduce the tariff payment, and the lower or non-accessibility of alternative water sources

Table 22: Water consumption at homestead – pre vs. post project situations (lpcpd)

	Pre-project Wet	Post-project Wet	Pre-project Dry	Post-project Dry
HWG	14.48	93.43	14.00	141.00
MWG	17.70	70.10	18.60	105.55
LWG	16.58	43.81	16.00	100.31

Figure 13: Average per capita water consumption by wealth group (pre and post-project scenarios)



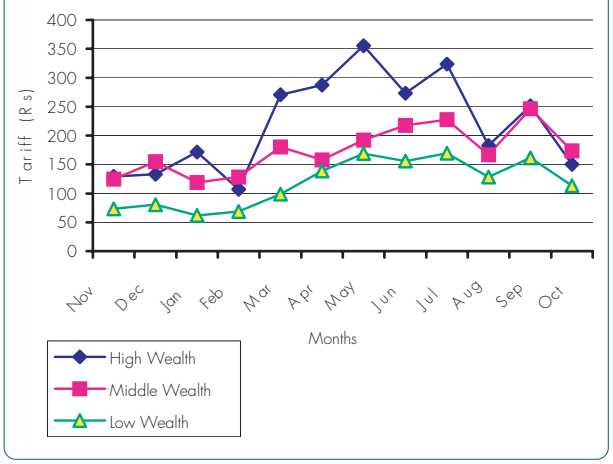
during dry seasons. The average level of increase in water use in dry seasons among low-income categories is 57%, whereas it is only 33% among middle and high-income categories. This finding highlights that the highest level of dependency on alternative water sources is that of low wealth groups during the wet season.

Pattern of tariff payments

In line with pipe water consumption, there is a distinct difference in tariff payments among wealth groups. The average monthly tariff of the high wealth group is Rs220; it is at Rs175 and Rs118 for middle and low wealth groups respectively. The tariff payment pattern over the year in different wealth groups is shown in Figure 14, which clearly shows that low wealth is a limiting factor in water consumption.

Some members of the high wealth groups spent Rs2,000 to 3,000 per month in fulfilling water requirements in the pre-project situation. The present project has resulted in a large cost reduction for the high wealth group in obtaining water. In addition to normal daily water use, rich and poor households spend an additional Rs200–300 per day during house construction, and additional amounts of money for special occasions. House construction typically takes place during the dry season when there is less agricultural wage labour available. In the past, purchasing and transporting water for house construction represented a major expenditure. Household connections have therefore resulted in major savings in both time and money and have made house improvements more affordable, especially for poorer households.

Figure 14: Average monthly tariff by wealth group (Nov 2002–Oct 2003)



Impact of cost recovery on wealth groups

As discussed in previous sections, the cost recovery policy adopted in rural water supply schemes has two components: partial capital cost recovery and then full recovery of O&M cost. Table 23 and Table 24 show the impact of the cost recovery policy on monthly family income. Table 24 shows that lump sum payments made at once for capital cost recovery represent 9% to 96% of household income within the community. The impact is very high on the low wealth group (25% to 96% of monthly income) whereas for the high wealth group the contribution is less than 20% of monthly income. This illustrates the difficulties faced by poor households on joining the scheme (Table 23).

The impact of the monthly tariff payment on monthly family income was also analysed for different wealth groups. This also has more impact on the low wealth group monthly income. The low wealth group pays up to 5% of monthly income in tariff payments, whereas the high wealth group pays a maximum of 2.7% (Table 24).

Trade-off in cost recovery

Trade-offs from the capital cost recovery policy of the water supply project are much higher than the monthly tariff payment. Since the monthly tariff at the moment is less than 5% of monthly income, it is generally within the payable limit even for the poorest group. However, the low wealth group has had to sacrifice or postpone a number of planned activities owing to initial payments for water supply. The trade-off of the initial payment is outlined in Table 25. This is important, as it shows the significance for poor households of 'consumption smoothing', i.e. spreading

Table 23: Initial contribution for capital cost recovery (% of monthly income)

Wealth Group	Average Contribution	Range
High	12.65	9–18.95
Middle	30.30	22–58.69
Low	53.30	24.54–96

Source: Survey Data (2003)

Table 24: Monthly tariff (% of monthly income)

Wealth Group	Average Contribution	Range
High	1.23	0.46–2.73
Middle	1.97	0.62–3.33
Low	2.64	1.01–5

Source: Survey Data (2003)

Table 25: Trade-off of capital cost recovery by wealth group

Low Wealth Group	No	Middle Wealth Group	No	High Wealth Group	No
1. Reduce food expenditure, especially on meat and fish	3	Postpone house repairs	1	Postpone house repairs	1
2. Use the small savings kept for emergency needs (drought periods)	2	Use savings kept for purchasing household furniture	1	Use money kept for investing in existing business	1
3. Postpone house repairs	1				
4. Sell bricks made for house improvement	1				
5. Pay from daily wage	1				
6. Labour for additional hours	2				

Source: Survey Data (2003)

expenditure evenly to avoid shocks and stresses. A single lump sum payment represents a major burden for poorer households; it is necessary to devise mechanisms to ensure that this does not prohibit these households from gaining benefits. Attention should be given to targeting poor households without creating management problems for the CBO.

The monthly tariff payment is not a burden for higher and middle wealth groups. However, low wealth groups tend to save in advance from their daily or occasional labour earnings for the payment of the tariff. Some households save Rs5–10 per day for this purpose.

Box 6: Capital cost recovery and trade-offs

Kandasamy is a wage labourer belonging to the low wealth group. He works for the government-owned Mahaweli Authority of Sri Lanka during weekdays and occasionally hires out his labour during weekends in order to obtain additional income. He normally uses these additional earnings on liquor at the weekends. A major portion of his Mahaweli salary is used to pay the monthly food bill at the village grocery shop. Since his housing conditions are very poor he has applied for a housing loan from the Employment Provident Fund (EPF) through his employer.

Water fetching is a critical problem for his family, especially during dry seasons. The main source of drinking water is from the common well located at the village mosque a quarter of a mile away from his home; sanitary water needs are met by the irrigation channel, again located a quarter of a mile away. During the dry seasons, the family had to walk to Mirisgonioya, three miles away from the home.

Kandasamy is optimistic about getting a pipe-borne water connection, although the capital cost payment was difficult for him. He managed to pay only a part of the grocery bill in that particular month and the capital cost from the rest of his salary. By that time, he had received the EPF loan and he used this money to settle the grocery bill by postponing his house improvement. He was also forced to reduce his liquor consumption.

Impact of the water supply project

Improvement of household water security

The major impact of the Kailapathana rural water supply project as perceived by beneficiaries is access to reliable safe drinking water at the homestead. There has been an increase of up to 10 times in water consumption since implementation. Water fetched during the pre-project period was mainly for drinking, cooking and sanitation (excluding bathing). The amount of water fetched (lpcpd) during the pre-project wet season and pre project dry season by all three wealth groups was almost equal (Table 26), which shows that the basic livelihood water requirements for drinking, cooking and sanitation (excluding bathing) are more or less the same, irrespective of wealth. Increased water consumption at household level since the project therefore indicates the improvement in sanitation. Another reason for increased water consumption in the post project scenario is the use of pipe-borne water for the home garden and for livestock reared at household level. Increased water consumption in the project area is solely for own consumption: there is no evidence of water selling. Home garden cultivation mainly involves growing ornamental plants and a few perennial crops, such as coconut, mango and other fruit trees. As the project commenced only about one year ago, it is not possible to assess the changes in household income from the home garden; it will take a few more years for the perennial trees to provide income.

The next important benefit from access to pipe water is the saving of labour time previously incurred in water fetching. Table 26 indicates the time saved in terms of fetching water for domestic needs and of washing and bathing.

Data show that low wealth groups have saved an average of two and a half hours per day during the dry season on fetching water for domestic needs. Time spent on bathing and washing clothes is additional to the above time. The most important feature of the improvement in social welfare during the dry season is use of the pipe water supply for

Table 26: Average time to collect water (minutes)

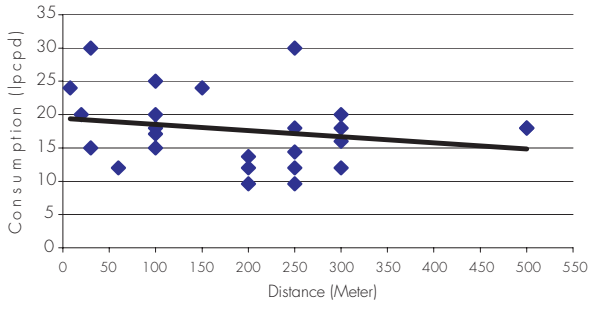
	Water use	Pre-project wet season	Post-project wet season	Pre-project dry season	Post-project dry season
High Wealth Group	Domestic needs	60	0	60	0
	Bathing/washing	20	10	50	0
Middle Wealth Group	Domestic needs	50	0	60	0
	Bathing/washing	50	35	70	0
Low Wealth Group	Domestic needs	95	0	150	0
	Bathing/washing	45	35	80	60

Source: Survey Data (2003)

all water requirements by all wealth groups, except a dependency on alternative water sources for bathing and washing by some in the low wealth group. However, during the post-project wet season, Kailapathana villagers belonging to all wealth groups use alternative water sources for bathing and washing. This is not only to reduce the tariff payment, but also is due to the traditional habit of using ample amounts of water for bathing. The use of open canals and the village tank by high wealth groups as well as other groups is proof of this.

An analysis was made to understand the relationship between the quantity of water consumption and the distance to the water source in water fetching during the pre-project scenario. The results are illustrated in Figure 15; this shows only a very slight decline and therefore not a significant relationship. The maximum distance travelled is 550 metres, which understandably does not make a significant difference in water consumption.

Figure 15: Water consumption vs distance (pre project–dry season)



Enhancement of women's and children's welfare

Women are the main water fetchers in Kailapathana: men leave the households early in the morning. Table 27 shows the main water fetcher for domestic water needs in each wealth group. We can see that welfare gains for women are much higher from the project than for men.

The water consumption pattern discussed in the previous section highlights the increased use of water for sanitary requirements at household level as a result of the water project. The availability of water for sanitary requirements at the homestead has greater advantage for women and children. Children need more water for washing and other sanitary requirements, up to several times a day; village women no longer have problems using irrigation channels and public wells for bathing, especially during night hours. Incidences in poor households of stomach-related diseases in children have been reduced in the recent past: the availability of pipe water has been of great social and cultural benefit for women and children. Saved time is used by women in looking after their children, house maintenance, home garden activities, and participation in social and religious activities. Some women work longer hours in the field during peak seasons and cases are reported of self-employment at household level, providing additional household income.

Increase of household income

The majority of people in the village are casual labourers attached to the agricultural and non-agricultural sector. Agriculture labour demand is seasonal, when farmers work for longer hours. Availability of water at the household level allows them to stay in the field until late evening, as they do not have to fetch water as in the past. Some

Table 27: Water fetchers at household level

Water fetchers	High Wealth Group		Middle Wealth Group		Low Wealth Group	
	No	%	No	%	No	%
Housewives	9	90	6	60	7	70
Men	1	10	2	20	2	20
Female children	–	–	2	20	1	10

Source: Survey Data (2003)

householders in the poor wealth group used to reserve a few days per month for washing their clothes. The pipe water supply has allowed them to utilise these labour days when labour hiring-out opportunities are available. These farm families now earn an additional monthly income of Rs1,000 during planting and harvesting times.

A number of micro enterprises emerged in the village after project implementation. A few poultry farmers have started businesses and 10–15 families have been involved in brick-making. Availability of additional time for labour supports these activities. Brick-making is possible only during the dry season, when families can earn up to Rs8,000–10,000 per month. People belonging to the high wealth group are involved to some extent in home gardening, especially that of perennial crops such as coconut and fruit plants. It has only been possible to grow these crops since the arrival of a reliable household connection. As mentioned earlier, beneficiary households will realise the benefits from these crops through improved nutrition and reduced food bills in a few years time.

Land value

Appreciation of land value is an indirect benefit. The value of highlands has increased from Rs100, 000 to Rs300, 000 per acre within a period of one year, purely as a result of the availability of a pipe-borne water supply. This has been confirmed by comparing land values of neighbouring villages during the same time. Monthly rent paid to roadside shops has also increased, providing benefits for both shop owners and shopkeepers. Five or six households that were resettled in the village from the eastern part of the country because of the civil war are now willing to sell their value-appreciated land and go back to their original locations. Some of them have already sold their land and left the area with additional income, which has helped them to settle back into their ancestral area now peace has prevailed.

Capacity building of the community

The DRA project implemented in Kailapathana has made a remarkable contribution to developing skills in and knowledge of various aspects of community development, participatory planning and organisational management. The strength of the CBO has increased enormously; it has now developed the capacity to handle future village development activities with community participation. The village has created wider linkages and networks among various outside organisations and people from all over the island who visit the village to learn the experiences of the water supply project, i.e. that water supply development is an important entry point or platform for other community-based development initiatives.

Sustainability of the drinking water supply project

Financial sustainability

Mobilisation of the necessary financial resources for sustainable O&M is the responsibility of the CBO, using an appropriate tariff system. It collects a sufficient amount of money from the monthly tariff for routine O&M works, emergency repairs and future replacement expenditures. The savings from the monthly tariff outlined in Table 28 indicate the prospects for the future expansion of the project and for replacement of major components of the pump and its utilities. In addition to the balance shown in the table, the CBO has deposited a fixed amount into the CBO account, earned from the profit of construction contracts. The major monthly costs are the electricity tariff and a payment of Rs3, 000 for the pump house operator. The electricity charge is not included in the expenditure column until September: expenditure shown in other months indicates actual requirement of O&M expenditure excluding electricity.

Another aspect of financial sustainability is that no water connection so far has been cut off through non-payment of tariffs, including from the low wealth group; requests for new connections have been increasing. Although there can be delays of two or three months in settling tariffs by low wealth groups during the dry season, owing to lack of labour opportunities, people generally settle bills with the start of the cultivation season.

Table 28: Income from tariff collection and new water connections

Month	Revenue (Rs)	Expenditure (Rs)	Balance (Rs)
2002, December	5,223	2,108	3,115
2003, January	5,450	2,799	2,650
2003, February	10,338	2,304	8,034
2003, March	6,428	3,067	3,361
2003, April	6,991	2,210	4,781
2003, May	15,954	3,485	12,469
2003, June	14,814	3,872	10,943
2003, July	19,032	3,862	15,170
2003, August	22,912	4,760	18,151
2003, September	10,666	20,249	-9,583
2003, October	18,102	3,000	15,102
TOTAL	135,915	51,716	84,199

Source: CBO Records – Kailapathana.

Physical sustainability

Results of the sample survey indicate that almost 100% of beneficiaries are satisfied with the ongoing O&M of the scheme handled by the CBO. All the sample beneficiaries are satisfied with water services provided by the CBO, including adequacy, timeliness and reliability of water supply, routine water-meter reading, and the quality of repair works. The main duties of the pump house labourer are: operating the water pump; considering the water level of the storage tank and well; distribution of water; cleaning of the water storage tank; identifying damages in the distributory system and conducting repairs; chlorination of water; provision of new water connections; cleaning of the pump house surroundings; monthly meter readings; distribution of water bills; and maintenance of water consumption data. The pump house operator is being paid Rs3, 000 as a monthly salary by the CBO. Another person has been trained for the job as a substitute in emergency situations.

The entire water distribution system in the village has been divided into several small sections. Water users in respective areas are responsible for protecting the pipe network and are answerable for any damage caused to the system. This is another measure successfully practised by the CBO to ensure sustainability and increase the sense of ownership among members. No damage has been done by the community to the scheme yet and members are taking care to protect the scheme as their own.

Institutional sustainability

Successful management of the scheme by the CBO itself is a good indicator of institutional sustainability. Members were asked their thoughts on the performance of the CBO leadership committee members: 90% said the performance of all was 'very good'; 10% said it was 'good'. 90% of members were in agreement with past decisions taken by the CBO. About 70% of CBO members have participated in more than 75% of CBO meetings, while 67% of members have attended 50% to 75% of past meetings. Only 7% of members have never participated in CBO meetings.

Accountability and transparency of an organisation is a key factor in determining long-term sustainability. About 75% of beneficiaries feel that the CBO is managing accounts in the proper manner. However, 66% of members are not aware of financial transactions and expenditure information. This situation might have an effect on the sustainability of the CBO in the long run, since beneficiaries are sensitive about the money matters of their organisation. The CBO is maintaining political neutrality and a good relationship with all major political parties, in order to obtain possible development support in the future.

The research team observed that a key reason for the success of the CBO management and of the project was the commitment shown by the leadership and office bearers. It is noteworthy that the CBO president is not even a beneficiary of the pipe water scheme. CBO office bearers provide their services as voluntary community work without any direct economic incentive. As a result, questions of institutional sustainability arise: about 50% of sample beneficiaries believed that it would be difficult to find suitable replacements for CBO office bearers if they retired or resigned. The Kailapathana water supply scheme therefore needs to identify people from the community and train them for future leadership. The lack of a direct incentive mechanism to become a CBO office bearer makes it difficult to achieve this task. However, the project has provided indirect benefits to the office bearers, such as enhanced status in society, advance intelligence on water supply and other village-level development activities, and capacity development in leadership skills and organisational management.

Increasing demand for water

The water supply scheme intended to provide water for Kailapathana by taking into consideration average rural water requirement (70 lpcpd) and the population growth rate for the next 15 years. The major drawback of this approach is that it does not take into account increase of per capita water use, which will come with the improvement of livelihoods, the increase in self-employment and the expansion of livestock enterprise. It is evident from the data obtained from the start of the project (a one-year period) that the average per capita water use in the dry season is over 100 lpcpd beyond what was estimated, irrespective of wealth group. It is too early to comment on this issue but it is clearly necessary to consider all factors when estimating future water demand. The potential for future expansion of the project with the income earned at present by the CBO, without external financial support, is doubtful.

In addition, there are about 400 cattle in the village at present, which have to depend to some extent on the pipe water supply during the dry season. The normal water source for cattle is the irrigation channels, which are closed during off-seasons. According to CBO officials, the water requirement for cattle is 10 litres per day. The household-level brick-making self-employment which has started in the village also needs additional water.

The above analysis highlights the potential scarcity of water unless some regulation of the water supply is planned for future sustainability. It would also be possible to introduce two different tariff structures for commercial and domestic needs, as in Diyabeduma.

Non-beneficiaries

The drop-out of marginalised peoples from the water supply project is a basic problem in the DRA. Inability to pay for the project is the key reason for non-inclusion of this potential section of the community. However, there have been advantages and disadvantages for this marginalised group. Advantages are that competition for water from common wells has been reduced. At the same time, though, maintenance of these water resources, especially of the tube well, has become a burden for the marginalised community: maintenance used to be looked after by larger parts of the community. This highlights the importance of protecting and maintaining alternative water sources, since

these are beneficial for the entire community during bad years. The responsibility for maintaining alternative water resources, like common wells and tube wells, should be given to the CBO to ensure the sustainability of those resources.

Although there is no remedy proposed in the DRA framework to incorporate the marginalised community, the CBO has adopted several measures to include them as project beneficiaries.

1. Provision of subsidised loans from the village Death Donation Society.
2. Arrangements to enable them to obtain a sum of cash from compulsory savings from government poverty alleviation subsidies (Samurdhi) to pay for the water connection.
3. The facility to pay the initial capital contribution on an instalment basis.
4. Arrangements for poor households to contribute labour on behalf of high wealth groups (who wish to pay more money instead) to make the money to pay for the project cash contribution.

However, there are households able neither to pay cash nor to contribute labour for the project. Moreover, latecomers are penalised, as the subsidy is only available for a short period of time. This is a major problem with DRA implemented on a project-by-project basis, as in Sri Lanka. The challenge of institutionalising DRA has yet to be addressed effectively. Important questions surround capacity building and ensuring sufficient flexibility in institutional arrangements to enable an effective response to changing patterns of demand in the longer term.

Box 7: Marginalised people and access to water

Mohan is a non-agricultural labourer. His wife works in metal crushing. He participated in the initial CBO meeting and obtained the money to pay the membership fee. At the time of project implementation, his son was seriously sick and was admitted to Kandy Hospital, located about 80km away from Kailapathana. During his hospitalisation, he not only lost his own labour days, but also could not contribute to the 16 labour days for the water supply project. As a result of the financial hardship caused, he was unable to pay the initial financial contribution as well. According to the CBO general decision, non-contributors in project implementation have to pay Rs10,000 in cash to get a water connection, which is beyond people like Mohan.

VII. Issues and emerging lessons from implementing DRA in Sri Lanka

As stated earlier, Sri Lanka has been implementing rural water supply projects through DRA since its first CWSSP in 1995. A decade of experience with DRA has allowed practitioners an information base to improve on the DRA concept and its practical implications. The following are some of the key lessons learned over the past decade in implementing the ADB III-assisted rural water supply project and the first World Bank-assisted Community Water Supply and Sanitation Project (CWSSP I).

- The involvement of local authorities and water users is desirable from the outset of the project to ensure effective transfer of ownership, O&M and financial management.
- Capacity building of local authorities and CBOs is essential for effective implementation and sustainability of water supply projects. With respect to local authorities, improvements are required in human resources, availability of funds and physical resources.
- CBOs should be legally empowered and recognised. CBO activities should be diversified to support the sustainability of the organisations. Reliable back-up support from local authorities, the NWSDB, and the private sector should be ensured.
- Providing knowledge and opportunity for participation in the decision-making process has improved the community contribution.
- Government agencies have been playing the role of facilitator rather than that of provider.
- A greater impact on village livelihood is observed owing to the integration of water supply, sanitation, environment and hygiene education.
- The introduction of the Participatory Rapid Rural Appraisal (PRRA) in DRA has improved the understanding of livelihoods.
- The role of women has been recognised and encouraged in the process of project implementation. Table 29 indicates the participation of women in CBO activities in ADB III projects over the past four years.
- Access to water and saving on labour time previously used to fetch water has encouraged people to start various income-generating activities at household level. These activities have had a direct impact on household income, poverty and livelihoods.
- The poorest of the poor appear to be marginalised in implementing DRA in water supply and sanitation. This could be due to an inherent weakness in the approach. Attention has now been given to including marginalised groups into the mainstream by introducing appropriate subsidies.
- Agreeing to collective community demand has often camouflaged the real demand of sub-communities and households. This has resulted in unsustainable options being implemented.
- There has been inadequate flexibility in including all sections of the community, including the poorest of the poor, and in providing a mix of technological options in a single community.
- The DRA is too rigid towards community cash contributions. Less attention is given to a community's socio-economic conditions or the seasonal nature of income.

Table 29: Gender composition in CBOs

District	President		Secretary		Treasurer		Vice-president		Joint Secretary	
	M	F	M	F	M	F	M	F	M	F
Anuradhapura	84.6	15.4	60.3	39.7	71.8	28.2	68.6	31.4	–	–
Puttalm	93.9	6.0	63.6	36.4	80.3	19.7	69.7	30.3	36.4	63.6
Kegalle	88.7	11.3	60.6	39.4	68.3	31.7	56.3	43.7	31.0	69.0
Kalutara	97.6	2.4	53.7	46.3	78.0	22.0	22.0	78.0	80.5	19.5
Monaragala	90.9	9.1	55.7	44.3	88.6	22.7	96.6	14.8	50.0	50.0
Hambantota	96.0	4.0	62.9	37.1	72.6	27.4	66.1	33.9	41.9	58.1
Total	90.6	9.4	60.1	39.9	74.9	26.7	66.3	35.3	64.3	35.7

Source: Dissanayake (2003)

- Traditionally, there is a social status attached to pipe-borne water, as with household electricity; social status can override 'demand' in a typical DRA. Though this has not yet been substantiated through primary data, this could be an issue threatening the sustainability of RWS projects.

Source: NWSDB (internal memo) 2003

Improving the effectiveness of DRA in water supply and sanitation projects in Sri Lanka: emerging issues and challenges

Although DRA has been a very useful way to approach a wide section of the community on a sustainable basis, evidence from case studies indicates that it has its own drawbacks preventing higher effectiveness.

Understanding demand beyond willingness to pay

DRA as implemented in Sri Lanka is too biased towards community cash contributions (cost recovery). This is clearly reflected in the VPP process, where inability to contribute cash on time could lead to losing benefits from the project, collectively or individually. As the responsibility for cash contribution lies with the CBO and not individually, the possibility of the entire community losing its benefits is greater. The approach should be more sensitive to socio-economic conditions and the seasonal nature of income in the rural communities.

Flexibility in payment options

To accommodate socio-economic conditions and the seasonal nature of income, the approach has to be more flexible. The approach could facilitate sub-community or household-level demand assessments. This could, however, become an obstacle in target-oriented programmes, as reaching sub-communities can take more time and resources, even though a more comprehensive coverage can be achieved.

DRA could also achieve the flexibility to monitor project implementation. The approach considers demand depending on willingness to pay initial cash contributions and reflects less on subsequent contributions (cost of water meters) as part of willingness to pay.[8] This has substantially shifted the thinking on demand responsiveness based on willingness to pay. While all costs, including capital and O&M, are discussed in the VPP, the cost of water meters has been an issue which has decided the number of households with and without water supply. Details of this issue are discussed in the two case studies separately.

DRA helps communities to come to a consensus on the most financially suitable option. This invariably means a majority decision, leaving out the (sometimes significant) minority. The poor and less fortunate make up the minority that has to depend on unsustainable and poor quality water supply which in most cases has to be managed by themselves without any external assistance.

Mixed technology options

One way to improve the effectiveness of DRA in this situation is to accommodate mixed options. However, for this one has to be more flexible in the selection of technologies, cash contributions and financial management. It would be more complicated for the CBOs to collect community contributions from two different options requiring different levels of contributions.

Deterioration of existing point water sources

In improving the water security of the majority through the pipe water supply, traditional point sources have been neglected. This has been evident in both case study locations, where tube well maintenance has been neglected owing to the shift in tube well use to pipe water supply use.

Determination of future water demand

One of the important issues that has emerged with the implementation of DRA is the determination of future water demand. Improvement in water security has paved the way for additional water-based income-generating activities at household level. Furthermore, improvements in lifestyle through improved water security require increased use of water. These factors have to be recognised in determining future water demand; this should not be limited to population growth predictions.

VIII. Conclusions

Implementation of rural water supply projects through DRA has improved since the first CWSSP in 1991. Limited involvement of DRA in the initial projects has grown into full-scale intervention, with social mobilisation, village participatory planning, feasibility, options of informed choices, community action plans to set tariffs, and cost recovery as elements of the approach. The approach has been adopted in thousands of rural water supply projects under ADB III and CWSSP II projects, both funded by multilateral lending agencies.

The introduction of DRA to rural water supply and sanitation projects has improved the sense of community ownership and the commitment to implementing rural projects by the state and the recipient community. The approach has also improved the sustainability of rural development infrastructure and instilled a commitment to O&M with total community participation.

The approach adopted in Sri Lanka to sustain rural water supply projects has focused more on building strong and committed village institutions. These institutions, in the form of community-based organisations for rural water supply, are presently functioning as voluntary organisations with authority derived from their own constitutions. However, recent policy changes at the centre are expected to provide wide-ranging authority to CBOs to function as independent organisations for rural development.

Implementation of rural water supply and sanitation projects using a demand responsive approach has benefited the majority. More specifically, the poor have benefited more in relation to the rich in the community. Saving time through easy access to water has given the poor more time for wage labour and self-employment. Improving quality time in the family and the benefits to children in terms of more time for studies and recreation have relieved the burden on children as water carriers and the scope for self-employment activities. Domestic pipe-borne water has improved security and privacy for women, while humiliation often faced by women and children as water carriers has been totally eliminated.

While DRA is expected to be a good tool for improving efficiency and sustainability and reaching the poor more effectively, it certainly has its own drawbacks. Findings from the research indicate that DRA is intrinsically biased towards cost recovery, therefore tends to marginalise the poorest of the poor among communities. The project target of achieving a given set of goals and the CBO's attitude towards achieving them have sometimes led to neglecting the poor and the marginalised. The approach lacks flexibility towards reaching sub-communities and individual households, while the implementation process does not capture seasonality in rural income and the socio-economic conditions of specific groups within the community. DRA, as implemented in Sri Lanka, is oriented towards achieving the needs of the majority; the voiceless minority can be excluded from the mainstream water supply process. However, a recently introduced NWSDB subsidy system could cater for these minorities. Apart from these interventions, though, the 'economic drop-outs' within the CBO membership are left without any option to get back into the water supply mainstream. The introduction of community-based loan schemes through the CBOs and other village institutions has not been adequately focused to relieve the burden of some of the drop-outs.

The methodology adopted in the study highlights the problems faced by the community in accessing water supply, even after becoming members of community-based organisations. This underlines an interesting point in achieving the policy goal of reaching water for all by 2025. The strength of the methodology is that it shows where communities have been denied a household safe water supply for economic and other implementation reasons. Therefore, policymakers using this methodology will be able to include the 'unexpected drop-outs' in the mainstream of water supply, which will eventually contribute to reaching the overall policy goal of water for all.

One of the more serious problems of DRA and its majority concern is neglect of other point sources of water generally found in the village. The attraction of a pipe water system for the majority has increased the pressure on the minority to maintain point water sources like tube wells and community dug wells. In some cases, as found in Diyabeduma, tube wells have been totally neglected owing to lack of resources among the smaller user group for maintenance, and there has been exploitation by the rich at the expense of the poor. Understanding water, poverty and its linkages to livelihood improvement will be vital to improve the efficiency and effectiveness of DRA in future rural water supply projects.

The case study research, being partly methodological, raises some key issues through the piloting of the use of the household economic approach as a practical and affordable means of analysing DRA.

The following are some of the ways the study can contribute to wider knowledge in implementing rural water supply projects using demand responsive approaches as a means of achieving livelihood improvements for the poor.

- It provides decision-makers with information on cost recovery and its impact on rural livelihoods.
- It provides information on the different stages of cost recovery, where the poor can get marginalised from the mainstream process.
- It shows the number of households that will opt out of the process for economic and other reasons.
- It suggests opportunities for introducing mixed technological options as a result of cost considerations.
- It identifies policy options for subsidies and cross subsidisation, to improve equity.
- It identifies access and sustainability of traditional point

sources to cater for a wider community and to act as back-up support.

Current projects, ADB IV and CWWSP II, and rural water supply projects will be the beneficiaries of this research. However, understanding water, livelihoods and poverty through DRA will require further research, which will be possible under future rural water supply and sanitation projects.

Annex 1. Summary of policy issues and its significance to DRA

Legislation	Year of implementation	Key components	Significance to DRA
Urban Council Ordinance	1940	Establishes and maintains public water supplies. Residential assessment rates cover domestic water supply.	Water supply functions as a supply utility by the state. No concern for demand.
Pradeshiya Sabha Act	1987	Establishes and maintains water supply for the benefit of people of PS area. Could charge and enforce rates for water use. Standposts established and maintained by PS provide free water for domestic use for inhabitants within the limits of PS. Non-domestic water use charged on a flat rate.	Water supply as a function of PS to rural communities. Partial cost recovery through domestic water tariffs. Community demand is considered along with political will to supply domestic water.
National Water Supply and Drainage Board Act	1974	Responsibility of O&M taken over by NWSDB. Introduction of pricing policy for domestic and industrial water use. Volumetric-based cost recovery for O&M and partial cost recovery on capital cost. Introduction of subsidies for domestic water use to maintain social equity.	Some elements of DRA, such as cost recovery, operational responsibility and subsidies for the poor.
Draft National Water Resources Act	2003	Introduction of IWRM concept. Decentralisation of decision-making to water users at river-basin level. Equitable and efficient water resources allocation to all stakeholders. Establishment of a new institutional structure for holistic water resources management.	DRA not a guiding principle for policy formulation. However, some key elements, such as IWRM, decentralisation, and equitable water resources allocation, are embedded in the legislation.
National Policy on Water Supply and Sanitation	2002	Introduction of water supply sector reforms. Empowerment of local authorities, CBOs and rural communities to take over rural water supply schemes. Promoting partnerships between NWSDB and rural water service providers. State to play the role of facilitator. Cost recovery in rural areas for sustainable O&M. Introduction of appropriate subsidies for poor to cover lifeline water requirements for consumption and hygiene.	Most elements of DRA included, with the exception of providing an informed choice of options to water users in rural areas.
National Policy on Rural Water Supply and Sanitation	2001	In addition to the elements mentioned above: Provision of water supply and sanitation to be people-centred and demand-driven. Government, provincial councils and local authorities to regulate and facilitate sector activities. NGOs, CBOs and private sector to function as service providers.	All elements of DRA are included in the policy, with an informed choice of option given to water users.
Water Services Reforms Bill	Tabled in Parliament in October 2003 but challenged in Supreme Court and referred back to the Ministry.	Regulation and monitoring of water services. Regulation of tariffs. Standards for water quality. Compliance with consumer protection requirements. Facilitation of private sector participation in water supply.	Top-down authoritarian, with low priority given to demand from rural communities

Annex 2. Early development of water supply in Sri Lanka

The history of the pipe-borne water supply in Sri Lanka dates back to the eighteenth century. Records reveal that about seven pipe-borne supply systems were in operation by 1900. Most of these facilities were meant for privileged target groups, like the railway quarters, military forces, government officers and quarters, hospitals, and other privileged citizens living in large townships. All these consumers enjoyed free water, while the respective municipalities were responsible for operation and maintenance of systems subsidised through assessment rates. Most of these projects were implemented by line departments in a typical top-down approach, with feasibility, design and construction done by technical expertise in the respective projects. The technologies used in these projects were the best available rather than the most appropriate. Past evidence reveals that most of the water supply systems constructed at the time were supply-driven, with big towns and the rich as the recipients. The poor in the same vicinity were supplied by public standposts.

Before the establishment of the provincial councils in 1987, the matter of water supply was with the urban councils (Urban Councils Ordinance, 1940). When an urban council in a town establishes and maintains a public water supply for the benefit of the residents in the area, they are allowed to use water for 'domestic purposes' without paying any additional fee. The assessment rates residents pay to the urban council cover the cost of water provision.

Domestic purposes were defined as water supply *not* meant for horses, cattle, and washing vehicles kept for sale or hire, or for the supply of any trade, manufacture or business. The definition further stated that domestic purposes would not include water for swimming pools, fountains, ornamental or mechanical purposes, or for irrigation. Urban councils, however, may supply water for purposes other than domestic on such terms and conditions agreed upon by the urban council and the beneficiary party, as may be prescribed by law. These definitions in the pre-independence era did not anticipate the increase in demand for safe water for domestic use as envisaged in the present context.

With the establishment of the provincial councils under the thirteenth amendment to the constitution in 1987, Pradeshiya Sabhas (local authorities) were given the responsibility for water supply for any person residing within the limits of the PS. The PS had to establish and maintain water supplies for the benefit of people and could charge and enforce rates in respect of water so provided. However, water from public standposts established and maintained by the PS would be given free to inhabitants within the limits of the PS for domestic use.

This provision vested upon the PS still stands, and they are accredited institutions in rural areas for water supply for the poor. However, owing to the political nature of selecting the PS, impartiality in provision of water supply to the rural masses cannot be guaranteed.

Establishment of the National Water Supply and Drainage Board

The NWSDB was established in 1974 by a parliamentary statute, taking over the operation of water supply schemes. However, municipalities capable of operating their own schemes continued to do so.

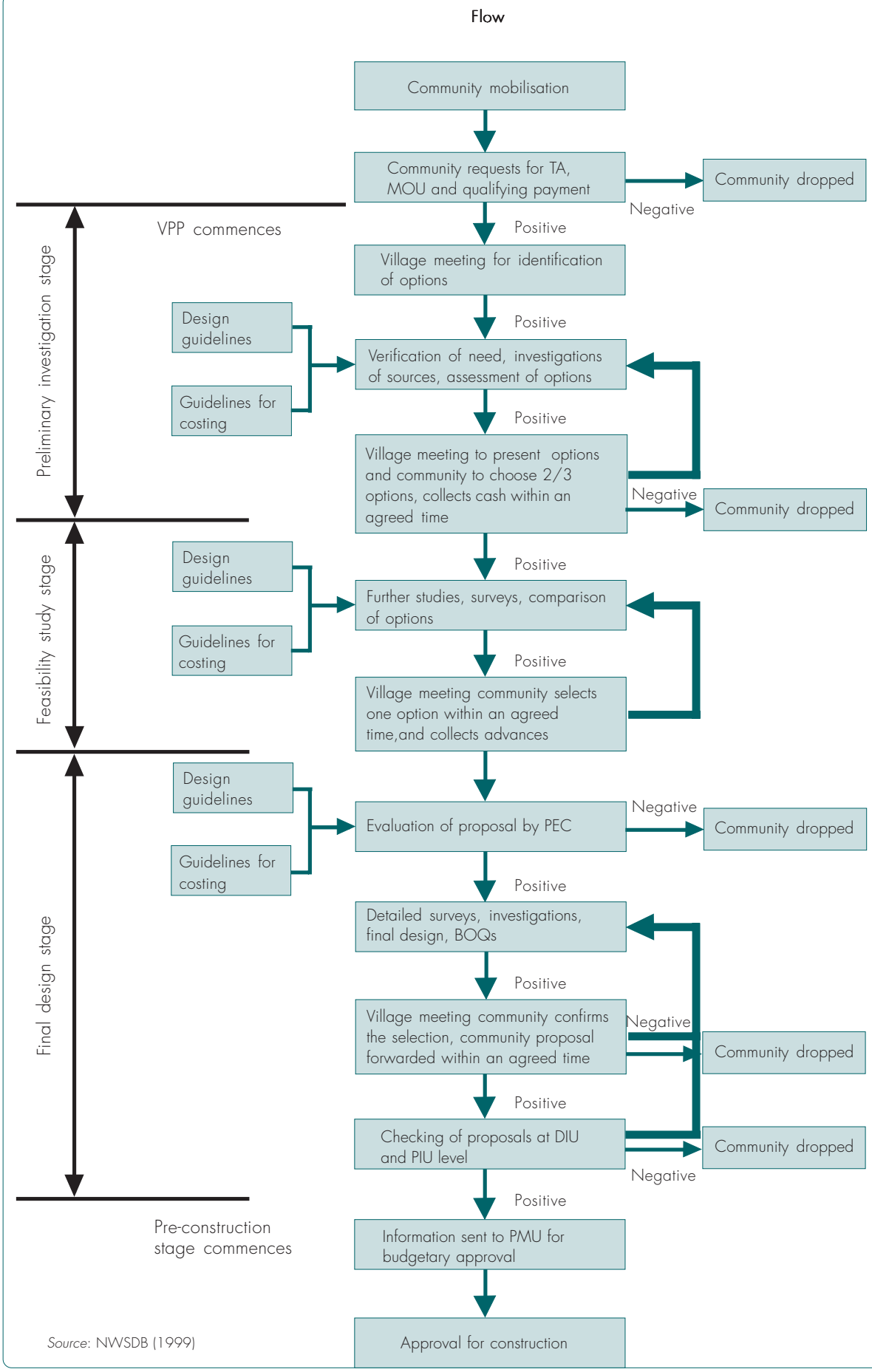
Until 1975, water for domestic use and industry was supplied free of a direct charge. After 1975, domestic users were charged on an annual assessment rate based on house and property value, and non-domestic users were charged on a flat rate basis by the local authority. From 1983, consumers were charged on a volumetric basis in order to recover O&M costs and part of the capital cost. The NWSDB does not charge a full cost recovery, since the water supply is a public utility; it uses a policy of 'affordable tariff', based on the cost incurred to the Board in water treatment and distribution.

In order to achieve social equity and the availability of safe water for subsistence purposes, water is subsidised for the domestic sector, schools and religious institutions. Most standpipe water users either do not pay for the water they use or pay a nominal flat rate subsidised by the government or by provincial authorities. The NWSDB collects an annual revenue of Rs80.6 million (2.04%) from billing standpost water users (National Water Supply and Drainage Board, Annual Report 2002). This does not represent the real use of water by the users.

One of the features of the water pricing policy (National Water Supply Board Act of 1974) adopted by the NWSDB is that the tariff is intended to serve as a mechanism for demand management. The Board intends to reduce the water consumption from 150 litres per capita day (lpcd) to 120 lpcd in the greater Colombo area and the disparity of water charges between the domestic and non-domestic sectors to 1:4, from 1:6 at present. This would effectively reduce the cross subsidisation.

However, according to past experience, price has not been an effective tool in demand management of domestic water supply in Sri Lanka. This is due to the fact that water costs are an insignificant portion of the household budget, thus the level of consumption does not respond much to price changes. Besides, Sri Lanka is rated at the top for 'unaccounted-for-water'. Information from NWSDB for 1995 indicates that, unaccounted-for-water (losses) represents approximately 35% of total production and non-revenue water (losses plus delivery to non metered users) is 51%. A study on unaccounted-for-water reveals that 20% of the water waste takes place at household level owing to faulty plumbing and transmission lines (Water Resources Secretariat, 2000). Therefore, for pricing to be effective it has to be coupled with metering, education and awareness of and investment in leakage prevention.

Annex 3. Village participatory planning process



Source: NWSDB (1999)

Main Activities	Main Outputs	Step Ref No.
(Described elsewhere)	(CBO already formed)	
– Community request PO to send the TA – PO mobilises the TA	Request for technical assistance, MOU, qualifying cash contribution	1
– TA describes the process – Community provides all their ideas, expectations, views regarding water supply		2,3,4
TA – Gets further information through informal discussion – Visits all possible options – Evaluates them – Verifies sanitation need		
– TA presents the evaluation of options to the community – Community discusses them and selects 2–3 options for further study – PO forwards a report to the PIU and receives comments	Agreed minutes of meeting community agreement	5,6,7
– TA does further investigations and surveys water supply – TA performs hydraulic calculations, costing – CBO finalises the sanitation proposal	Investigation report	8,9,10,11,12
– TA presents the evaluation of options to the community – Community discusses them, selects one – Community collects 25% of the required cash contribution – PO forwards a report to DIU	Agreement with community 25% of cash contribution or Rs 75,000 Feasibility report	13,14, 15
– PEC visits the site – Appraises the report	PEC approval	16
– TA does detailed surveys – Refines/performs hydraulic calculations – Prepares BOQs,costs estimates		17
– TA presents details of the proposal – Community discusses, consents – Community discusses the mode of implementation, contributions etc. – PO forwards a report and detailed designs to PIU	Collection of 100% of cash requirement Final Design Report	18, 19, 20
– EA checks the investigations, designs, estimates – EA forwards the details through SE to DM		21
– AGM (RWS) checks the budget against the allocations, and checks the other details conformity with project policies		22
– PMU approves the scheme for construction	Approval for construction	22

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Endnotes

[1] By 1999, 67% of the population had safe drinking water coverage. The figure is expected to increase to 78% by 2005.

[2] although any GN division within the former town council areas which has a population of over 6,000 population will not be considered as a rural area.

[3] A norm adopted by Sri Lanka through experience of implementing rural water supply projects since 1979.

[4] It is a common site in rural Sri Lanka before elections to observe drains being dug on the pretext of laying pipe lines or electricity poles lying at the side of the road.

[5] The costs indicated above are only for the initial membership of 180 households. The CBO adopted various strategies for subsequent entrants. New members after the construction stage were charged on the following basis: community contribution Rs2,600*20% = Rs3,120; supply connection Rs3,500*20% = Rs4,200; total for a new connection Rs7,320. Those households who gave their community contribution (cash and kind) and were not able to get a connection at the construction stage were to be given the supply connection at any time for Rs3,500. No surcharge of 20% would be added as they had shown some commitment towards collective action. Any new member requesting water supply connections where extension of the supply lines would be required would have to pay the total cost of extension plus other charges (community contribution and connection cost) with a 20% surcharge.

[6] This is typically a one-off lump sum payment although it is sometimes spread over several months. In all cases contributions must be received before construction commences otherwise households are 'dropped'.

[7] This amount was arrived at according to the following criteria: CBO entrance fee – Rs100.00; community contribution (in cash) Rs1, 100.00; community contribution (in kind) Rs4, 000.00; maintenance carried out for the project in the past Rs200.00; value for the other volunteer works carried out in the past by CBO Rs2, 500.00; other expenses Rs100.00; penalty for non-participation Rs2, 000.00 = total Rs10, 000.00.

[8] This was later corrected in subsequent projects. The case study projects were some of the initial water supply projects to have been implemented.