Taking on New Challenges

A Compendium of Good Practices in Rural Water Supply Schemes
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<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>BPL</td>
<td>Below the Poverty Line</td>
</tr>
<tr>
<td>C</td>
<td>centigrade</td>
</tr>
<tr>
<td>CI</td>
<td>cast iron</td>
</tr>
<tr>
<td>DANIDA</td>
<td>Danish International Developmental Agency</td>
</tr>
<tr>
<td>DI</td>
<td>ductile iron</td>
</tr>
<tr>
<td>DOEACC</td>
<td>Department of Electronics and Accreditation of Computer Courses</td>
</tr>
<tr>
<td>DPMU</td>
<td>District Programme Management Unit</td>
</tr>
<tr>
<td>DSR</td>
<td>Detailed Scheme Report</td>
</tr>
<tr>
<td>DWSD</td>
<td>Drinking Water and Sanitation Department</td>
</tr>
<tr>
<td>DWSM</td>
<td>District Water and Sanitation Mission</td>
</tr>
<tr>
<td>DWSS</td>
<td>Department of Water Supply and Sanitation, Punjab</td>
</tr>
<tr>
<td>ESR</td>
<td>elevated storage reservoir</td>
</tr>
<tr>
<td>GLSR</td>
<td>Ground Level Storage Reservoir</td>
</tr>
<tr>
<td>GoI</td>
<td>Government of India</td>
</tr>
<tr>
<td>GoJ</td>
<td>Government of Jharkhand</td>
</tr>
<tr>
<td>GoK</td>
<td>Government of Karnataka</td>
</tr>
<tr>
<td>GP</td>
<td>Gram Panchayat</td>
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<tr>
<td>GPWSC</td>
<td>Gram Panchayat Water Supply Committee</td>
</tr>
<tr>
<td>GVS</td>
<td>Gram Vikas Samiti</td>
</tr>
<tr>
<td>HP</td>
<td>horse power</td>
</tr>
<tr>
<td>IEC</td>
<td>Information, Education and Communication</td>
</tr>
<tr>
<td>ISA</td>
<td>Implementation Support Agency</td>
</tr>
<tr>
<td>JSERC</td>
<td>Jharkhand State Electricity Regulatory Commission</td>
</tr>
<tr>
<td>JUS</td>
<td>Jal Upbhokta Samiti</td>
</tr>
<tr>
<td>kl</td>
<td>kilolitre</td>
</tr>
<tr>
<td>km</td>
<td>kilometre</td>
</tr>
<tr>
<td>km²</td>
<td>square kilometres</td>
</tr>
<tr>
<td>KKW</td>
<td>Karnataka Rural Water Supply and Sanitation Agency</td>
</tr>
<tr>
<td>KSS</td>
<td>Kokkunnu Swajaldhara Samiti</td>
</tr>
<tr>
<td>kW</td>
<td>kilowatt</td>
</tr>
<tr>
<td>KWA</td>
<td>Kerala Water Authority</td>
</tr>
<tr>
<td>LPH</td>
<td>litre per hour</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------------------------------------</td>
</tr>
<tr>
<td>LPM</td>
<td>litre per minute</td>
</tr>
<tr>
<td>lpcd</td>
<td>litre per capita per day</td>
</tr>
<tr>
<td>m</td>
<td>metre</td>
</tr>
<tr>
<td>m³</td>
<td>cubic metre</td>
</tr>
<tr>
<td>mm</td>
<td>millimetre</td>
</tr>
<tr>
<td>MBR</td>
<td>master balancing reservoir</td>
</tr>
<tr>
<td>MIS</td>
<td>Management Information System</td>
</tr>
<tr>
<td>MLD</td>
<td>million litres per day</td>
</tr>
<tr>
<td>MVWSS</td>
<td>Multi-Village Water Supply Scheme</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-governmental Organisation</td>
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<tr>
<td>NRDWP</td>
<td>National Rural Drinking Water Programme</td>
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<tr>
<td>NRWSS</td>
<td>Nenmeni Rural Water Supply Schemes</td>
</tr>
<tr>
<td>NSVS</td>
<td>Nenmeni Shudhajala Vitharana Samiti</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>Operation and Maintenance</td>
</tr>
<tr>
<td>PRI</td>
<td>Panchayati Raj Institution</td>
</tr>
<tr>
<td>PSP</td>
<td>Public Stand Post</td>
</tr>
<tr>
<td>QMS</td>
<td>Quality Management System</td>
</tr>
<tr>
<td>RWSS</td>
<td>Rural Water Supply Schemes</td>
</tr>
<tr>
<td>SHG</td>
<td>Self-Help Group</td>
</tr>
<tr>
<td>SLEC</td>
<td>Scheme Level Executive Committee</td>
</tr>
<tr>
<td>SIP</td>
<td>Silver Ionisation Plant</td>
</tr>
<tr>
<td>SNK</td>
<td>Shikayat Nivaran Kendra</td>
</tr>
<tr>
<td>SO</td>
<td>Support Organisation</td>
</tr>
<tr>
<td>SWSM</td>
<td>State Water and Sanitation Mission</td>
</tr>
<tr>
<td>URWSSP</td>
<td>Uttarakhand Rural Water Supply and Sanitation Project</td>
</tr>
<tr>
<td>UWSSC</td>
<td>User Water and Sanitation Sub-Committee</td>
</tr>
<tr>
<td>VWSC</td>
<td>Village Water and Sanitation Committee</td>
</tr>
<tr>
<td>WASMO</td>
<td>Water and Sanitation Management Organisation</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organisation</td>
</tr>
<tr>
<td>WSP</td>
<td>Water and Sanitation Programme</td>
</tr>
<tr>
<td>WTP</td>
<td>Water Treatment Plant</td>
</tr>
<tr>
<td>WUC</td>
<td>Water User Committee</td>
</tr>
<tr>
<td>ZPED</td>
<td>Zilla Panchayat Engineering Department</td>
</tr>
</tbody>
</table>
Provision of safe drinking water is a basic necessity and has been a major topic for key political discourses in the country over the last decade. The Government of India has been focusing on safe drinking water since 1972-73 when it introduced the Accelerated Rural Water Supply Programme (ARWSP) to assist States/Union Territories to accelerate the coverage of drinking water in the country. Despite increased outlays since then, access to safe drinking water in India remains a challenge. Apart from access, water quality and sustainability of resources (water points and infrastructure developed) are issues of major concern.

The National Rural Drinking Water Programme (NRDWP), which is supplementing the efforts of the State Governments by providing technical and financial assistance, is looking at rural drinking water from a holistic viewpoint. The Ministry has shifted its focus from hand pumps to piped water supply systems with the aim of providing monitored clean water and is focusing on those States which have low levels of piped water supply.

The Water and Sanitation Program has compiled an excellent collection of success stories and best practices from the States of Kerala, Karnataka, Maharashtra, Gujarat, Jharkhand, Punjab and Uttarakhand which address these key constraints. Some of these success stories, such as the Asoga village intervention in Karnataka which showcases a unique demand driven approach to facilitate participatory decision making leading to community ownership, the Bidholi piped water supply scheme in Uttarakhand which manages and recovers 100 per cent operation and maintenance costs from the community, the Shikayat Nivaran Kendra experiment in Punjab which uses information technology for online web enabled centralised complaint redressal and the Water and Sanitation Management Organisation experiment in Gujarat where the registered body acts as a facilitator in developing water and sanitation facilities owned and managed by communities, are all outstanding examples of how to address various challenges and shortcomings the programme is facing.

I am sure that this compendium of best practices can play a major role in educating the State Governments and translating some of the learnings from these success stories to their State models to give a fillip to the NRDWP interventions in the country.

New Delhi
6th February 2015

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Foreword
Acknowledgements

This Compendium of Good Practices in Operation and Maintenance of Rural Water Supply Schemes was prepared by the Water and Sanitation Program at the request of the Ministry of Drinking Water and Sanitation, Government of India.

The data and insights provided by officers from a host of state and local agencies in the states of Gujarat, Jharkhand, Karnataka, Kerala, Maharashtra, Punjab and Uttarakhand are highly appreciated. We also acknowledge the experiences of individual schemes shared by the communities and other local stakeholders who play an important role in capturing the benefits of the schemes.

The team that worked on the Compendium comprised Mr. Mariappa Kullappa, Senior Water and Sanitation Specialist, Water and Sanitation Program and Mr. Srinath N. Anekal (Consultant) with support and inputs from Dr. Manish Kumar, Senior Institutional Development Specialist, Dr. Suseel Samuel, Water and Sanitation Specialist, Ms. Vandana Mehra, Communication Specialist, Mr. Srinivasa Rao Podipireddy, Senior Water and Sanitation Specialist, Ms. Smita Misra, Lead Water and Sanitation Specialist and Mr. Suryanarayana Satish, Senior Social Development Specialist.

The guidance and support provided by Ms. Vijaylaxmi Joshi, Secretary, Mr. Saraswati Prasad, Joint Secretary (Sanitation), Mr. Satyabrata Sahu, Joint Secretary (Water), Mr. Sujoy Majumdar (Director) and Ms. Sandhya Singh, Joint Director, in the Ministry of Drinking Water and Sanitation are gratefully acknowledged.

February 2015, New Delhi
Innovative Approaches to Sustainable Operation and Maintenance

Asoga Village, Belgaum District, Karnataka
Asoga village in Karnataka has used a unique demand-driven approach to facilitate participatory decision making at all levels, leading to the community’s ownership of the scheme and its willingness to pay the water tariff promptly.

Background
Before the implementation of the scheme, Asoga, a village comprising 225 households, met its water supply requirements from three bore wells fitted with hand pumps and a piped water supply with an open well as the source. Water from the open well was pumped to the 25,000-litre capacity ground level storage reservoir (GLSR) using 5 horse power (HP) submersible pumps through a rising main. Water from the GLSR was then supplied to the village through a 1.13 kilometre (km) distribution network and seven stand posts. Despite the Malaprabha River flowing adjacent to the village, the yield of the open well reduced drastically during the summer months and the village regularly suffered from a shortage of drinking water.

In 2004-05, the Government of Karnataka (GoK) implemented a new piped water supply scheme through the Jal Nirmal Project. This World Bank assisted rural drinking water supply project introduced a new participatory approach to planning and implementation of the scheme, making it mandatory for the Village Water and Sanitation Committee (VWSC) under the Gram Panchayat (GP) to assume responsibility for its operations. User involvement brought about a vast change: from being passive recipients of water supply services provided by the state, the villagers became owners and providers of services.

The initial community consultation workshop for the scheme was held on 8 April 2004, which was attended by a majority of the households. To address chronic water shortage in summer, the villagers demanded that the river be used as a source of water supply. The Zilla Panchayat Engineering Department (ZPED), GoK, was involved in preparing a detailed scheme report (DSR). The initial design, comprising basic components such as an intake well, a jack well, a water treatment
The per capita cost came to ₹6,585 which was significantly higher than the World Bank funding norms of ₹2,000 per capita. Hence, alternatives were studied.

**Technical Evaluation in Consultation with the Community**

During the search for a suitable site to construct the jack well, the technical team came across a natural stone bund formation which acted as a barrage across the river’s course resulting in 45–60 feet of standing water. The standing water ruled out the construction of a jack well at this location. The technical team, in consultation with the VWSC, then came up with the idea of a slide rail arrangement (see Box 1.1 for details) to draw water from Malaprabha River. The slide rail arrangement significantly brought down the cost to ₹42.30 lakh or ₹3,482 per capita, still higher than the World Bank’s funding norms. So, further modifications were studied.

Once the slide rail arrangement for drawing river water was finalised, the technical team faced another problem: availability of land for the Water Treatment Plant (WPT). The initial calculations indicated a requirement for a 300 metre (m) x 200 m site to house WTP components including the slow sand filter. As Asoga is a small village, surrounded by forests, such a large area of land was not available nearby. Therefore, the technical team decided to test the applicability of a bed micron sand filter in place of the conventional slow sand filter for water treatment. The bed micron sand filter was found to be compact,

**BOX 1.1: SLIDE RAIL ARRANGEMENT**

The slide is fabricated using 100 millimetre (mm) ‘C’ channel structural steel. The channels are embedded on the river bank with a concrete block and provided with 20 mm mild steel bars at an interval of 450 mm at the bottom so that the channels are perfectly parallel to each other. In the groove of the channels, a sliding platform with wheels is inserted with a mono-block submersible pump mounted on the top. To slide the platform along the channels, the platform is tied with a mild steel wire rope to a pulley and drum arrangement installed on the river bank. By rotating the drum, the pump can be lowered or raised according to the water level in the river.
clean, user friendly and cheaper, compared to the slow sand filter. The bed micron sand filter is made of a ferro-reinforced plastic and consists of a multi-port valve with a backwash facility. It contains layers of coarse sand, fine sand and anthracite. Additionally, it was found that a 2 HP pump would suffice to operate the filter which was significantly lower than the power needed for a slow sand filter. Moreover, it also had a provision for incorporating the chlorination process. With unit capacities of 10,000 litre per hour (LPH) and 20,000 LPH and no maintenance requirements, the filters are eminently suitable for a village with a small population.

The Karnataka Rural Water Supply and Sanitation Agency (KRWSSA) carried out a technical evaluation of the filter. Its use in the scheme was approved after the filter met the technical requirements. More importantly, the villagers expressed satisfaction with the resultant quality of the water. It was, therefore, decided to use the bed micron sand filter for the scheme.

After these modifications, the final cost of the Asoga water supply scheme came down to ₹11.86 lakh or ₹977 per capita. Along with drainage and lane improvements, the total cost was fixed at ₹17.60 lakh or ₹1,449 per capita.

Since the VWSC was involved in the planning and design of the project, it was also entrusted with the task of constructing the water supply work in accordance with the World Bank’s W-6 document. The scheme was successfully completed and commissioned on schedule at a total cost of ₹19.22 lakh. At present, 227 of the 280 households have private connections while the rest are supplied water through public stand posts (PSPs). No metering has been provided in the scheme.

**Operations and Maintenance Training**

After the scheme was completed, VWSC members were provided training on its operations and maintenance (O&M). GP functionaries and VWSC office bearers were trained on maintaining books of records and selected water persons were trained on technical aspects of maintaining the project. In all, 250 villagers were imparted O&M training, covering various levels of operations.

Additional O&M drives and campaigns were also conducted regularly to ensure villagers’ continued participation. Of late, cross-scheme exposure visits have also been arranged for VWSC office bearers and technical staff so that best practices in the region can be adopted in the Asoga scheme.

**O&M Costs**

The VWSC has been operating the scheme since its inception. It prepares an annual budget for the scheme’s O&M. For example, for 2013-14,
O&M is expected to cost ₹1,07,030 against an estimated revenue stream of ₹1,08,800, generating a small surplus of ₹1,770. However, if the estimated expenditure for operating the scheme with the bed micron sand filter is compared to the cost of operating it with the traditional slow sand filter, there is a saving of approximately ₹33,040 for 2013-14. Hence, the use of the bed micron sand filter has greatly reduced the O&M costs; these reductions are primarily in the electricity charges that would have been incurred otherwise. In fact, over the years, the VWSC has, on average, generated a surplus of ₹1,896 annually and in only one year has the expenditure been more than the income (Table 1.1).

<table>
<thead>
<tr>
<th>No.</th>
<th>Year</th>
<th>Income</th>
<th>Expenditure</th>
<th>Surplus</th>
</tr>
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<tr>
<td>1</td>
<td>2012-13</td>
<td>1,07,036</td>
<td>1,02,653</td>
<td>4,383</td>
</tr>
<tr>
<td>2</td>
<td>2011-12</td>
<td>98,532</td>
<td>94,782</td>
<td>3,750</td>
</tr>
<tr>
<td>3</td>
<td>2010-11</td>
<td>92,560</td>
<td>91,354</td>
<td>1,206</td>
</tr>
<tr>
<td>4</td>
<td>2009-10</td>
<td>90,560</td>
<td>87,969</td>
<td>2,591</td>
</tr>
<tr>
<td>5</td>
<td>2008-09</td>
<td>84,536</td>
<td>86,982</td>
<td>-2,446</td>
</tr>
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Conclusions

The success of the Asoga Water Supply Scheme clearly shows the difference that a committed leadership and a motivated community can make in achieving the sustainability of a scheme. It also demonstrates the importance of determining the implications of scheme design on implementation and O&M costs so that appropriate measures, taken at the initial stages, can make the scheme affordable for the community. Such initiatives can be replicated across the state and similar benefits realised on other schemes as well.

Inputs from Mr. R.P. Kulkarni, Chief Engineer and Additional Director (Technical), Karnataka Rural Water Supply and Sanitation Agency (krwssa@gmail.com).
Delivering Potable Water to Households
Beru Village, Ranchi District, Jharkhand
Taking on New Challenges | A Compendium of Good Practices in Rural Water Supply Schemes

Background
The Beru Water Supply Scheme in Ranchi district in Jharkhand had been in existence since 1988. However, it was plagued by inadequate supplies, an unreliable service, illegal connections and non-payment of water charges.

The Panchayati Raj Institution (PRI) elections, held in Jharkhand in 2010 after 32 years, heralded a change for the Beru GP and its water situation. The campaign for change was led by Mr. Rakesh Bhagat, newly elected President of the GP.

Mr. Bhagat was determined to drive participatory development of the village but since responsibility for only drinking water provision was vested with the PRIs at that time, this became the focus of the GP’s actions.

As a first step, a 12-member VWSC was formed, including six women with the President of the GP as its President, a member of the Block Panchayat as Vice-President and a Jal Sahiya (a woman volunteer selected from the community to work on water and sanitation) as the Treasurer.

Soon after it was formed, the VWSC faced the challenge of taking over a water supply system that was dysfunctional, and a community that was unsure of the way forward but which was looking at the new leadership to deliver improved water services.

When the VWSC took charge of the scheme, there were 135 registered house connections and a number of illegal connections. The VWSC also noted that water tariff collection was poor and that a funds crunch was the key factor affecting the operations of the scheme.

**Box 2.1: History of the Beru Piped Water Scheme**

1987-88: Scheme commissioned – water was sourced from Baridih Nullah and pumped using a 3 HP submersible pump into a water tower with a capacity of 13,000 gallons

1997-98: Baridih Nullah choked so an underground source used and another 3 HP pump installed to pump water to the water tower

2000: The borehole became dysfunctional

2001: Another borehole constructed near the water tank and fitted with a 3 HP pump and the scheme made functional

2002: A 5 HP pump fitted to a borehole in the locality to serve uncovered population with direct water supply

2009: A second borehole was constructed near the water tank

2011: Scheme handed over to the VWSC
A meeting of the VWSC was held in mid-2011 in which the members agreed that resource mobilisation through collection of water tariff and legalisation of unregistered connections were critical for operationalising the scheme. Mr. Bhagat held discussions with the officers of the Drinking Water and Sanitation Department (DWSD), Government of Jharkhand (GoJ), and agreed with the officers’ assessment that the scheme had a troubled history (see Boxes 2.1 and 2.2) and its revival would require resources to repair technical faults and ensure timely and adequate water supply. He also acknowledged the crucial role that community members needed to play to ensure the scheme’s success. However, he was confident that, once services improved, consumers would agree to pay the outstanding tariff, and resources for future operations would be generated.

Once the problems had been understood and possible solutions arrived at, the VWSC convened a Gram Sabha meeting and began mobilised the entire village. The community, particularly direct beneficiaries (households with house connections), expressed their grievances. A summary of the community’s concerns is provided in Box 2.3.

**Interventions and Innovations**

The VWSC then addressed the concerns of the community. Firstly, Mr. Bhagat made an innovative appeal to the existing beneficiaries through personal letters, requesting them to pay the water tariffs. The letter urged that the registered users should pay the water tariff, including dues for the past one year (payable in three instalments within financial year 2011-12). Secondly, the VWSC engaged an agent to collect the water tariff; it was agreed that the agent would get an incentive of 10 per cent of the total revenue collected in a month. Thirdly, the VWSC appointed a pump operator to ensure that water was stored in the overhead tank and supplied in a timely manner. He was also directed to attend to technical breakdowns promptly and ensure all repairs were completed within 24 hours.

These measures paid rich dividends. With consistent water supply to the habitations, the users were more than willing to pay the charges and the VWSC balance sheet started showing a surplus for the first time. On 31 March 2012, the VWSC had a surplus
Encouraged by the performance of the VWSC, DWSD committed to transfer an equal amount, that is, ₹35,000 as incentive. The funds came in November 2012 and the balance in the VWSC account swelled to ₹70,000.

The incentive amount provided by DWSD along with the existing balance encouraged the VWSC to embark on the next level of improvement in service delivery. A second bore hole was constructed near the overhead tank and fitted with a 3 HP submersible pump. As a result of enhanced water withdrawal capacity, the scheme started supplying water twice a day – once in the morning and once in the afternoon.

The final challenge was to include excluded hamlets/population, some of which were located in a scattered geographical area of about 2 to 3 square kilometres (km²). Mr. Bhagat, with active support from DWSD, worked out a design to connect all boreholes to the overhead tank and to ensure that the tank was filled to capacity. Secondly, a process was initiated to install a mini-piped water supply scheme in the other VWSC (Baridih) under the Beru GP. Thirdly, a pre-feasibility report was prepared with the aim of installing a new piped water supply scheme (sourcing water from Baridih River) for the entire Beru GP which is expected to be functional in the next five to seven years.

**Success Factors**

In the final analysis, setting up a system which (a) ensured a high level of service delivery; (b) introduced a system for collecting water tariff; (c) regularised illegal connections; and (d) promoted concurrent monitoring of the physical performance of the scheme/financial performance of the VWSC contributed to improved service levels in the Beru GP.

Some other factors which contributed to making this scheme viable included:

**Community empowerment**: The 2010 PRI elections were a boon for the Beru community as they gave members an opportunity to empower themselves and elect persons from within the community who were desirous of taking up leadership roles to help rectify a dysfunctional village water supply scheme.

**Stakeholder consultations and involvement**: The VWSC discussed issues on water services with consumers and with the local office of the DWSD and arrived at solutions. Additionally, the VWSC President initiated individual correspondence with households that enabled him to develop the rapport necessary for implementing the innovative measures agreed to for improving water services.

**Transparency in governance**: Since its inception, the VWSC promoted transparency in its working. For example, its President corresponded personally with consumers on water bills (including overdue amounts) and provided them with a definite timeline for making these payments. Additionally, he shared the VWSC balance sheet with them, resulting in the community

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**BOX 2.3: KEY CONCERNS RAISED BY CONSUMERS AT THE TIME OF HAND OVER OF SCHEME**

- Even when the piped water supply scheme was functional, there was no regular water supply; the timing of supply was not convenient for the users and the duration of supply was inadequate and irregular
- There were inordinate delays in repairing breakdowns; users suffered from uncertainty as they had no information about the nature of the breakdown and steps taken to mend the fault
- Many households had illegal house connections; users said that they had no hesitation in paying for the water as long as all beneficiaries were made to pay as per standard guidelines
- The most challenging issue raised by the community was that only about 50 per cent of the population was being served by the scheme; as a village level unit, the VWSC should take steps to cover all households
- The community agreed to pay for consuming drinking water if high quality service was guaranteed

...
understanding the linkage between prompt payments and guaranteed water services. Further, the cash incentive provided by the government for the VWSC’s achievements was set aside to implement measures to improve the services further.

**Prompt maintenance services:** The Beru GP developed an excellent working relationship with DWSD which resulted in the VWSC carrying out prompt maintenance work without undue disruption of water supply services. For example, two incidents of pump breakdowns resulted in repairs being attended to within two working days.

**Strong leadership:** One key aspect that has contributed considerably to an improvement in water services is the focused and systematic approach towards achieving a goal, the hallmark of a strong leadership.

**Conclusions**

The systematic approach employed by the VWSC of the Beru GP can be replicated across the country to ensure improved water service delivery. In recognition of his efforts in improving the water service delivery to the Beru GP, Mr. Rakesh Bhagat was one of the awardees at the Foundation Day of Jharkhand on 14 November 2012.

*Inputs from Mr. Sudhir Prasad, IAS, Additional Chief Secretary, Government of Jharkhand, Mr. Ram Bilas Sinha, Superintending Engineer, Ranchi Circle, DWSD, Mr. Prabhat Kumar Singh, Executive Engineer, Ranchi West, DWSD and Mr. Rakesh Bhagat, Mukhiya, Beru Gram Panchayat.*

**BOX 2.4: EVIDENCE OF SUCCESS**

- The number of registered scheme users has increased from 135 at the time of the scheme’s hand over to 207 at present; a few new households are added every month
- The VWSC account balance has increased from zero to about ₹30,000. The balance sheet is shared with the community and this has resulted in community members taking pride in the fact that they are contributing to the VWSC’s enhanced financial performance
- Water supply has improved from two hours per day in the morning to twice a day (morning and afternoon) for two hours each. The improvement in the physical performance of the scheme has added to the credibility of the VWSC and its leadership
- Two incidents of pumps breaking down resulted in repairs being attended to promptly within two working days. Such quick responses helped the VWSC gain the confidence of the community in its ability to provide the services
- Payments of water tariffs are more spontaneous, regular and timely. At present, the VWSC is working on the idea of levying late payment charges and has seen an encouraging response from the households
- Comprehensive planning was done before laying the pipelines in all uncovered hamlets so as to reach 100 per cent piped water coverage within the next one to two years
Promoting Equity and Sustainability in Rural Water Supply

Dakshina Kannada District, Karnataka
Decentralised professional management, metering and technology adoption in Dakshina Kannada district, Karnataka, have contributed significantly to ensuring sustainable water supply.

**Background**

The Sector Reform Programme of the Government of India (GoI) was initiated in early 2000. Soon after, a number of GPs introduced innovative measures aimed at achieving sustainability of rural water supply schemes (RWSSs). In the Dakshina Kannada district in Karnataka, which had always been at the forefront of innovation in the state, the GPs successfully introduced decentralised professional management, 100 per cent metering of all household connections, computerised billing and mobile-controlled pump operations. These measures are not a common feature across all GPs as yet, but represent successful local initiatives undertaken by individual GPs in the district.

Dakshina Kannada district lies along the western coast of the state, from the Western Ghats to the Arabian Sea. The district is divided into five talukas and 203 GPs; it has 368 villages and 3,592 habitations housing a population of about 2.09 million (2011 Census). Dakshina Kannada is known for achieving total sanitation, a high level of literacy and good socio-economic conditions. Scattered habitations, isolated households, a hilly terrain and saline water are some of the key challenges in this district. It also grapples with the problem of high rainfall (an annual average of 3,912 mm) as well as high runoff without much retention of water resources because of a lateritic soil. A majority of the households have kitchen gardens with a few fruit bearing trees that are normally irrigated by water coming from drinking water schemes.

The Karnataka Panchayati Raj Act, 1993 entrusts the GPs with O&M of water supply schemes, and provides for establishing VWSCs to operate and maintain water supply schemes under the guidance
of the GPs. In each village in the Zilla Panchayat (ZP), a VWSC has been formed. A VWSC comprises elected and non-elected members. Some VWSCs employ their own staff to carry out the day-to-day management of the water supply scheme. The scheme level committees are federated at the GP level and headed by the President of the GP. The VWSCs have been granted independence from the GPs in terms of management, accounting and financing systems. The VWSC meets once a month to review the scheme’s status and performance. It discloses the audited statement of income and expenditure in the Gram Sabha once a year. The autonomy of the water service providers has been taken a step further in the case of the Guthakadu village water supply scheme in the district. In Guthakadu, a registered cooperative organisation, the Guthakadu Rajeeva Gandhi Kudiyuva Neeru Balakedarara Sangha provides water to the village. The organisation submits the annual statement of accounts to the office of the Deputy Registrar of Cooperative Societies, Mangalore.

GPs in Dakshina Kannada district have separated the roles of entities responsible for supplying water and providing services. In the process, they have ensured that the quality of water service delivery is not compromised.

In 2002, GoK issued orders stipulating that the GPs should recover full O&M costs from users and that development grants should not be diverted to cover O&M expenses. An important measure that the GPs initiated to recover full O&M costs was to move towards metered house connections. The VWSC of the Kinnigoli GP first introduced 100 per cent volumetric metering. Its efficient management of the water scheme resulting from 100 per cent metering made headlines in the local media. The media attention attracted visitors from other GPs to study the system which involved practices adopted for household connections, regular meter reading, repair of meters and tariff setting to recover O&M costs fully. Thereafter, a number of GPs in the district replicated the metering system in their respective regions.

### Metered House Connections in Dakshina Kannada District

Enthused by the success of decentralised professional management of water supply and 100 per cent volumetric metering of household connections, a number of scheme providers initiated measures to achieve improved cost recovery. One such initiative was in the area of tariff setting. A majority of the VWSCs have adopted slab tariffs: the first level (representing 40-55 litre per capita per day (lpcd) consumption) is charged at ₹40-60 per month per household. Thereafter, a gradual incremental increase in tariff is implemented for higher consumption. Tariff setting is generally done at the VWSC level given the fact that the VWSC enjoys independence from the GP in terms of financing and accounting systems. For example, O&M, electricity and personnel charges are paid directly by the VWSC from the revenue collected from water services. This makes it easy to understand the overall surplus/deficit in water supply revenues that consequently triggers a
Taking on New Challenges | A Compendium of Good Practices in Rural Water Supply Schemes

Discussion when a tariff revision is required.

Additionally, a number of GPs have implemented computerised procedures for billing and collection to improve transparency. The procedure involves a bill collector visiting the metered household on a dedicated day and recording the reading in a simputer. Later, a hard copy of the bill, giving details of the applicable tariff and the amount to be paid, is provided to the consumer. In certain GPs, there is provision for on-the-spot bill collection during which time a receipt is also provided by the bill collector. The meter readings recorded in the simputer are downloaded to a desktop computer at the GP office to maintain a duplicate set of records. In GPs where the simputer is not used, provisions have been made to enter the bill details on a desktop in the office for easy data access.

Cost recovery has been another important offshoot of the proactive role played by the VWSCs in O&M of the water supply scheme. The excellent cost recovery resulting from the VWSCs’ decentralised practices has convinced a few GPs to adopt advanced technologies for improving certain aspects of sustainability. One such initiative was carried out in Hosangady GP where an SMS-enabled pumping system was introduced to control pump operations and associated costs. Kisan Shakti Pump Motor Controllers are used for this purpose. In SMS-enabled pumping systems, the pumps are equipped with a simcard that can control the operation of the pump’s motors. The operator needs to call the pump simcard number after which he is directed to start/stop the pump operation as per the water level in the bore well and/or overhead tank fed by the bore well. The SMS-enabled system has provisions for exchange of information with the pump operator regarding the status of the pump and the quality of electricity supplied on a real-time basis so that he can decide whether the pump should be switched on or not. Such an SMS-enabled pumping system reduces the wear and tear on the pumps and decreases operation and repair costs.

Success Factors
Key factors that have contributed to the success of RWSSs in Dakshina Kannada district include:

Motivated localised institutional arrangements
A majority of schemes in the district are managed by local institutions that have a motivated leadership which is willing to introduce new initiatives and has
the ability to implement these initiatives in a structured manner. For example, the introduction of SMS-based power controllers was done through discussions with farmers in the area and then presenting the concept to the GP before implementing it at a cost that the GP could afford. Information about local factors and the institution's ability to work around these became a critical part of the success.

**Effective communication among all stakeholders**

The functionality of the schemes is greatly dependent on communication between the community and the VWSC in each village. Effective communication among stakeholders in all phases of the project was a common feature in a majority of schemes in the district. This enabled the VWSCs to secure community contributions for scheme implementation. It also resulted in a sense of scheme ownership among community members, which has greatly contributed to their improved functionality.

**An efficient cost recovery plan**

A majority of RWSSs break down because of communities' failure to clearly define and structure cost recovery plans. However, local institutions raised awareness in communities with regard to who should be responsible for the O&M costs of the scheme. During these interactions, the institutions were made aware of the fact that the households did not want to pay a flat rate for unequal distribution of water. This aspect was addressed by enforcing metered connections in all households and designing a slab-wise water tariff linked to water consumption. The water supply schemes in the Dakshina Kannada district have seen excellent billing and collection percentages and a majority have been able to save funds for future repairs as well. These well-structured cost recovery plans have ensured the sustainability of the schemes.

**Conclusions**

The success stories of RWSSs in the Dakshina Kannada district showcase that:

- A motivated localised institutional leadership which understands local problems and provides solutions that are acceptable to the community will be able to successfully deliver high quality water services to the populace
- Innovative technologies can be utilised in RWSSs to lower O&M costs
- The sustainability of the schemes can be ensured when consumers agree to abide by an efficient cost recovery plan
- These concepts can be replicated across all villages if adequate awareness is created among stakeholders regarding their roles and responsibilities
- Implementing a scheme in a structured manner guarantees effective service delivery

For additional information about the scheme, contact Chief Planning Officer, Mangalore Zilla Panchayat, Dakshina Kannada District, Karnataka.
Users as Managers of Drinking Water Supply Systems

Water and Sanitation Management Organisation, Gujarat
Taking on New Challenges | A Compendium of Good Practices in Rural Water Supply Schemes

Background
With a per capita availability of fresh water at 1,137 cubic metre (m³) per year (less than 1,700 m³ per year), Gujarat is a water-stressed state. It has diverse geological, hydrological, climatic and soil conditions, all of which have implications for the status of surface and groundwater resources. Several regions in the state suffer from chronic water shortages. These shortages are reflected in a scarcity of potable water in many parts of the state, particularly in North Gujarat, Saurashtra and Kutch. The distribution pattern of rainfall in the state ranges from over 2,000 mm in the Dangs in South Gujarat to about 200 mm in Kutch. Historically, no serious drinking water problem has been reported in the state, except for a few references to shortages of drinking water in some situations.

This was largely due to the fact that the groundwater situation was fairly good in most parts and water was available even during droughts.

However, over time, with increased use of groundwater for irrigation, on the one hand, and declining use of traditional water systems of managing local water supply, on the other, the problem of drinking water acquired significant dimensions. Another major problem of rural water supply was with regard to its quality, especially the presence of excess fluoride, salinity and nitrates. In fact, over one-third of the habitats within the state (34.52 per cent) suffer from more than one water quality problem. Additionally, being a highly industrialised state, there are problems of water contamination from

WASMO acts as a facilitator in developing water and sanitation facilities in villages that are owned and managed by the communities on the principles of cost sharing and ensuring a decentralised service delivery with the ultimate aim of providing assured safe water in a sustainable manner.
solid and liquid waste disposal from industries and human settlements.

Regional water supply schemes have been implemented in the state as a replacement for traditional water systems to cover a number of villages. Additionally, at the village level, individual water supply schemes also exist in significant numbers. A comparison of regional and individual schemes shows that the performance of the latter is better than the former’s in most cases. The reasons for the former’s poor performance are not only found at the village level, but also at the project, regional and state levels. Moreover, regional schemes have a high per capita cost in capital investments as well as the O&M of the schemes.

It has also been estimated that during the summer months in drought years (which are frequent in Gujarat), more than 50 per cent of the villages suffer from shortage of adequate potable water. To overcome this, especially during the drought period, water is supplied through water tankers and, in extreme cases, supply is ensured through water trains. The state government spent about ₹125 to ₹150 crore annually on making emergency arrangements to overcome the scarcity during droughts up to 2002.

Several studies carried out on the status of regional water supply schemes’ infrastructure in the state advised changes in the approach and implementation of RWSSs in villages. This included a paradigm shift in the role of the government from a provider to that of a facilitator and priority to be accorded to community-managed systems. This resulted in the formation of the Water and Sanitation Management Organisation (WASMO) in 2002 to promote, support and monitor community participation and community-based management in water and sanitation projects.

**Overview of WASMO**
WASMO is governed by a governing body and headed by the Chief Executive Officer who is a government officer. He directly heads and supervises the technical cell, project management units, documentation unit, finance and accounts and the management support unit. Of these units, the technical cell guides the water supply, water resource management, environmental sanitation and water quality cells. The management support unit guides the administrative cell, human resource development and Management Information System (MIS) cells.
Strategy and Approach
WASMO’s approach (see Figure 4.1) is that of a facilitator in developing water and sanitation facilities in villages that are owned and managed by the communities on the principles of cost sharing and ensuring a decentralised service delivery with the ultimate aim of providing assured safe water in a sustainable manner. The empowerment of the communities is a process-driven approach, depicted in Box 4.1.

The second innovative mechanism was building strong partnerships with non-governmental organisations (NGOs), civil society and international organisations. WASMO has built partnerships with over 75 NGOs based on clarity in roles and responsibilities. This has led to the development of operational relationships, which recognise and capitalise on each other’s skills and strengths. Accountability, respect and trust have been the key elements for this synergy. NGOs have been selected through a structured process to act as implementation support agencies in the villages.

Further, WASMO is closely associated with the state office of UNICEF and its Child Environment Programme. In the early years, UNICEF provided cash support to build a district core team of the Swajaldhara Project. It also supported WASMO through training and field test kits for its water quality programme. Through support from UNICEF, WASMO has been able to organise various capacity building programmes for its staff on themes such as gender sensitisation, leadership and team building skills, documentation of processes and success stories.

A unique initiative supported by UNICEF, ‘office-in-a-bag’ (provision of stationery kits to Pani Samitis), which started as an experiment, has gained much favour with the community. This kit, distributed to community members at the beginning of programme

FIGURE 4.1: WASMO’S APPROACH
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Implementation, has been found to be very handy as it helps them maintain records from the very start and also helps in inculcating administrative discipline. Kits for O&M were also given to villages in order to facilitate simple maintenance and repair work at the village level.

Over the last decade, there has been a significant increase in the number of Pani Samitis and, as in October 2013, over 18,185 Pani Samitis had been formed which covered over 98 per cent of the 18,478 villages in the state. These Pani Samitis have taken up projects to improve water supply and sanitation service delivery in their respective villages as part of a demand-driven approach for which training and capacity building have been provided by WASMO and implementation support agencies. As in October 2013, over 13,449 projects had been approved, of which 10,231 had been completed. Additionally, the Pani Samitis have the discretion to take decisions on fixing tariffs for domestic and commercial use, levying special tariff for bulk water use such as construction, and provision of concessions for weaker sections of society as well as impose penalties for non-compliance. As of now, 7,131 villages have fixed tariffs which are also being collected. The tariffs range between ₹10 and ₹70 per household per month. Tariff transactions are carried out through a bank account, a precondition for availing a one-time O&M incentive. So far, over 2,836 villages have been paid the one-time O&M incentive.

WASMO has created a unique system through the ‘Atmarpan’ ceremony (dedication to self) for commissioning completed works to communities. It is an elaborate ceremony where all Pani Samiti members take an oath in front of their village communities to operate, maintain and manage the schemes. Since the ceremony is a public village function, a sense of responsibility is created among Pani Samiti members in caring for village assets.

**Innovations in Service Delivery**

To provide improved access to water supply through WASMO, the Government of Gujarat has introduced several innovations in service delivery:

**Household water connectivity and 24x7 supply**

Household connections and 24x7 supply are being promoted at the user level wherever they are technically and economically feasible. Household connections have a positive impact on family health and hygiene, especially for children, and on school and workforce participation. Women’s health too is positively impacted as their drudgery in fetching water is reduced and they can spend the free time on leisure, labour and educational attainment. As in October 2013, over 75 per cent of the households had individual water connections (Figure 4.2).
Dual water supply and strengthening of local sources

The Government of Gujarat implemented dual supply as a policy and encourages conjunctive use of water at the village level so that increasing demand for water is met locally and is supplemented by the State Water Supply Grid through quality assured safe water. Attempts are being made to strengthen existing drinking water sources, mainly those supporting regional water supply schemes, which are mostly underground water based. Technology interventions such as bore blasting and hydro fracturing have been undertaken after feasibility studies and this programme is being accelerated based on the impact seen so far.

O&M incentive policy

A one-time incentive for O&M of water supply systems has been put in place for villages which demonstrate the capacity to carry out O&M effectively for a year. This incentive is based on various factors such as regularity of water supply and tariff collection and payments, cleanliness in and around water supply components, villages and schools, and sanitation (Table 4.1).

Installation of meters

The Government of Gujarat has initiated the process of installing one water meter in each village covered under regional water supply schemes. Since the experience from the community-managed approach to

### TABLE 4.1: DETAILS OF FACTOR-BASED O&M INCENTIVE

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of Village Pani Samiti</th>
<th>District</th>
<th>Award Position for 2012-13</th>
<th>Cash Prize (₹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Shinay</td>
<td>Kutch</td>
<td>First</td>
<td>50,000</td>
</tr>
<tr>
<td>2</td>
<td>Motipura Veda</td>
<td>Gandhinagar</td>
<td>Second</td>
<td>35,000</td>
</tr>
<tr>
<td>3</td>
<td>Khirmani</td>
<td>Dang</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Kanakpar</td>
<td>Kutch</td>
<td>Third</td>
<td>25,000</td>
</tr>
</tbody>
</table>
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water supply has shown that generating awareness and ensuring community participation are very important for any service or system to be acceptable at the village level, WASMO has been assigned the work of installing meters and generating acceptance for this concept.

WASMO’s good work so far and the innovations in service delivery that the organisation has introduced over the years have won it awards at both the national and international levels:

- Prime Minister’s Award for Excellence in Public Administration in 2008
- United Nation’s Public Service Award in 2009
- CAPAM International Innovations Award in 2010

Conclusions

The WASMO experiment in Gujarat shows that the government can move from being a service provider to being a facilitator of services, provided it can make significant investments in creating the necessary infrastructure, developing skill sets among communities in technical, managerial and administration areas, and transfer decision making to the communities involved.

Inputs from Swajaladhara PMU at swajaladhara.wasmo@gmail.com; or +91 (0) 79 2324 7170.
Ensuring Sustainable Water Supply Through Community Ownership and Metering

Hebballi Village, Chitradurga District, Karnataka
Background

Hebballi, a village comprising 236 households, met its water supply requirements using a combination of bore wells and hand pumps. The water supply system was grossly inadequate. In fact, Hebballi faced all the water supply challenges that a typical village faces in this part of Chitradurga district in Karnataka – falling groundwater tables, frequent power outages, defunct water pumps and poor water quality. Disputes were regular at the water point and the situation became worse in the summer.

In 2003-04, GoK implemented a new piped water supply scheme through Jalanidhi, a Danish International Developmental Agency (DANIDA)-assisted rural drinking water supply project. Jalanidhi’s approach to planning, implementation and O&M of drinking water supply schemes, based on direct participation of the user community and the formation of a VWSC under the GP, transformed the village community from passive users to owners and providers of water services. GoK provided 85 per cent of the capital costs, users contributed 10 per cent and the remaining 5 per cent was provided by the GP. In order to enable the project to accomplish its stated objectives, GoK, DANIDA and other state agencies provided key support at critical times to all the stakeholders.

The scheme consists of two bore wells, at a depth of 400 feet below the ground level, which supply water to an overhead tank of 56,500 litre capacity. The bore wells have a 7.5 HP pump, an electrical system with a separate transformer to ensure adequate and high quality power when required, and gravity based distribution. Considering the inadequate availability of water during the summer months, the project included the construction of a recharge tank next to one of the bore wells. The VWSC has been independently managing the project with user charges for the last nine years.

Community participation, equity and sustainability played a significant role in the implementation of the Hebballi piped water supply project. For example, while the water supply system was constructed by a local contractor hired by the ZPED, the VWSC was involved in supervising the construction of the water supply system. This enabled the villagers to gain technical skills that later made it possible for them to provide quality maintenance of the facilities. According to Mr. Rameshwarappa, the current President of the VWSC, the VWSC took a conscious decision to take up construction supervision. This was influenced by the fact that there was a dedicated team of specialists from ZPED, DANIDA and NGOs who would guide them through the intricacies of a water supply project while local experience in construction would help in ensuring quality construction. VWSC’s involvement in construction supervision gave it a sense of ownership which has turned out to be a significant factor in ensuring that the system functions properly.

To ensure equitable distribution, Hebballi instituted mandatory metering of all connections including group connections. In another innovative move, a VWSC member became a distributor of water meters. His first main task was removing the apprehensions of the households as metering was the first of its kind initiative. Considering that the households were investing their hard-earned money into a system they were not familiar with, the committee felt that the close involvement of a local person would make them...
more confident about opting for metered connections. Currently, every drop of water that is supplied to Hebballi village is accounted for and promptly paid for. The ‘pay according to usage’ concept has not only boosted VWSC’s revenues but has also generated interest among other VWSCs in the region. Moreover, it has instilled a sense of accountability in the villagers that ensures less wastage of water. Currently, 218 of the 236 households in the village have individual metered connections. The remaining households are catered to through metered group connections.

The 10 dalit households in Hebballi village were initially reluctant to be part of the piped water supply scheme citing high connection and user charges. However, the provision of incentives enabled these dalit families to participate actively and ensured that their rights and needs were recognised. The incentives included waiver of connection charges, provision of group connections and timely release of the same quality of water as everybody else was getting.

During the initial phase of the project, connection charges (for the meter, the chamber housing the meter and drawing of a line to the household from the main line) of ₹650 per household were levied by the VWSC. Subsequent connections were charged at ₹850 per household. One connection per meter is ensured. Water tariff is fixed at ₹40 for the first 8,000 litres, ₹5 per 1,000 litres for additional consumption up to 12,000 litres and ₹10 per 1,000 litres thereafter. The terms and conditions covering the water connection are provided in a card to each of the households.

Bills are issued at the end of every month and payment is collected within 10 days. The largest O&M expenditure item is power bills, which are easily covered by the revenues generated. Besides this, staff salary is the only recurring cost. The VWSC has been able to generate surplus revenues which have been set aside as a sinking fund to be used for any major repairs.

In Karnataka, in particular, there is over-dependence on groundwater, especially deep groundwater, for domestic water supply. Overdrawing of a weak hard rock aquifer, especially for competing agricultural demand and inadequate attention to recharge, results in the drying up of bore wells. To counter this, a huge impounding tank has been built near one of the two bore wells, which covers a large catchment to ensure source sustainability. However, the impounding tank design is ineffective as the presence of sheet rock below the surface prevents deep percolation of the impounded water. While the efforts of the VWSC and villagers in visualising the importance of catchment management is laudable, it would have been more effective if professional assistance had been sought to design an effective catchment management structure.

**Conclusions**

As a result of the various initiatives undertaken at Hebballi, all the households get adequate quantity and quality of water every day. Additionally, the households express a high level of satisfaction with the scheme’s performance; this is reflected in the fact that the VWSC has 100 per cent collection within 10 days of billing. The metering of the water supply has been well received and the households appreciate the fact that the VWSC collects charges only to the extent of their use and sets apart surplus revenues as a sinking fund for maintenance and repairs. The excellent performance of the Hebballi water supply scheme has brought in visitors from VWSCs from across the state who have shown keen interest in replicating the scheme in their areas.

For additional information on the scheme, contact Mr. Rameswarappa, President VWSC, Hebballi at 973 147 0820.
Promoting Sustainability in Rural Water Supply through Strengthening of Local Institutions

Jharkhand
Background
With 76 per cent of its 32 million-strong population living in rural areas, Jharkhand is one of the least urbanised states in India. Its rural population is spread across 24 districts; in fact, the state is identified primarily as a tribal state with over 27 per cent of its population being tribal. The state has two types of RWSSs: piped water supply schemes and hand pump schemes. Over 8,865 piped water supply schemes and 72,474 hand pump schemes have been completed so far. At present, over 785 piped water supply schemes are under construction.

Over the years, GoJ has invested substantially in creating the necessary infrastructure for water supply to its rural population. A majority of the RWSSs in the state are groundwater-based and are constrained either by limited quantities of available water and/or the quality of available water.

Reform Measures Undertaken by GoJ
Since Jharkhand is a new state, funds for creating its water supply infrastructure were available under GoI’s programmes. GoJ provided matching funds. In certain cases, the community also contributed in terms of cash, land and labour to secure water services.

As with all infrastructure projects, ensuring last-mile connectivity to provide efficient and sustainable water services to the rural population was a major challenge. Hence, GoJ initiated a range of reform measures to ensure people’s participation in water supply schemes. These reforms were essential for overcoming two major hurdles: absolute shortage of village-level institutions for programme planning and delivery and the existence of left-wing extremism in over 75 per cent of the districts. The reform measures adopted by the Water Supply and Sanitation Department, GoJ, aim to enhance sustainability of water supply schemes through:
• Forming VWSCs
• Encouraging stakeholder involvement
• Strengthening VWSCs
• Empowering women
• Providing financial incentives to VWSCs
• Deploying emerging interventions

Formation of VWSCs
Over the years, VWSCs have emerged as one of the most effective people’s institutions for addressing the issue of planning and managing drinking water security programmes. The decision of handing over O&M of RWSSs to VWSCs largely had to do with empowering them and enhancing people’s participation. As of now, over 25,141 VWSCs have been formed across the state. And, in a departure from the usual practice, none of the VWSCs has government representatives as its members. Each VWSC comprises 12 members; half of them mandated to be women. The scheme-level committees are federated at the GP level and headed by the President of the GP. The VWSCs have been granted independence from the GPs in terms of management, accounting and financing systems. The VWSCs meet once a month to review the scheme’s status and performance. They disclose the audited income and expenditure statement in the Gram Sabha once a year. O&M of over 2,804 piped water supply schemes across the state was transferred to VWSCs in 2012; at present, over 4,197 single village schemes are ready for transfer as well. The success
story of one of the schemes that was transferred to the Water User Committee (WUC) in January 2011 is provided in Box 6.1.

**Encouraging Stakeholder Involvement**

Transferring the responsibility for O&M of the water supply scheme to the VWSC was, by no means, the end of the process of providing efficient water services. In fact, the existing situation in Jharkhand – of the long-term absence of PRIs and presence of left-wing extremism – called for a far-sighted approach and adoption of innovative processes to ensure people’s participation in providing efficient water services to rural households. The State Water and Sanitation Mission (SWSM) had excellent technical capabilities for creating the water supply infrastructure. Additionally, to ensure community participation, SWSM engaged the services of external stakeholders such as the NGO PRADHAN which had successfully implemented a similar water supply programme in Bhelkhera village in Koderma district (see Box 6.2 for details).

**Box 6.1: Case Study of the Charadih GP Multi-Village Scheme, Koderma District, Jharkhand**

A groundwater based Charadih Grameen Pipe Jalaparli Yojana was implemented in Charadih GP to cover four villages. Three villages, Charadih, Kanyavan and Putto, are located in the Charadih GP while Khanoongaon Bhiga is located in Jhumri Panchayat. At present, the multi-village water supply scheme (MVWSS) delivers water to three villages in the Charadih GP while the distribution network is being laid in Khanoongaon Bhiga village. The MVWSS consists of two bore wells that are located near the river and are fitted with a 5 HP submersible pump which delivers water to a 25,000 gallon capacity overhead tank located about 1,500 m from the bore well. Once the infrastructure to cover the three villages was in place, the project was handed over to a committee comprising members of all the three villages. The Jal Upbhokta Samiti (JUS) has been carrying out O&M of the project since 1 January 2011. At present, 213 private household connections have been provided at a payment of ₹310 each. To encourage all residents to take private connections, stand posts have been discontinued. A monthly tariff of ₹100 per household is levied. The connection fee and tariff are deposited in a separate bank account in the name of the JUS. At present, the JUS bank account has a balance of ₹2,49,780. Water supply is provided for 45 minutes every day in all the three villages. JUS holds monthly meetings to discuss issues pertaining to water supply and carries out remedial measures to ensure supply to all villages every day. Community participation in the scheme has been of a high order as reflected by the fact that one of the Samiti members provided private land for constructing the overhead tank.

In a departure from the usual norm in villages, male members of families were involved in fetching drinking water prior to this project. Now the project has enabled them to find regular job opportunities. Health benefits of the scheme are indicated by lower incidences of diarrhoea. Realising the economic and health benefits of the scheme, the community makes tariff payments promptly. The success of the project for the last two years has enabled JUS members to gain confidence to start planning the construction of an additional overhead tank to cover the water demand of all households and installation of solar pumps to reduce electricity charges. Thus, the transfer of the O&M of the water supply to JUS enabled the villagers to not only realise its benefits but also led to their developing a sense of ownership with a willingness to invest in its success.

Bank account and pass book in the name of the Water User Committee, Charadih
A community-based water supply programme for 20 villages has been rolled out through a tripartite partnership among the Water Supply and Sanitation Department, GoK; PRADHAN for facilitating field-level implementation; and UNICEF for providing support in field-level coordination, monitoring and reporting. PRADHAN’s primary role is mobilising local communities and providing technical support at the grassroots level. Accordingly, it forms SHGs in each village and develops their capacity to participate in community programmes. Women play a central role in the entire process and come forward to assist the VWSCs in regular operations of water supply schemes. Additional stakeholders have also been engaged to improve the efficiency of water service delivery as shown in Table 6.1.

Box 6.2: Case Study of Bhelkhera Village, Koderma District, Jharkhand

Bhelkhera is a tiny village with a population of 550 people. This village was adopted by the Damodar Valley Corporation as a part of its corporate social responsibility initiative to provide sustainable water services to residents. PRADHAN’s services were engaged to involve the community in decision making prior to and during the O&M period of the water supply project. PRADHAN created women’s self-help groups (SHGs) which were provided training on various aspects of community participation and made aware of the benefits arising from collective responsibility. By virtue of the excellent understanding on community participation developed by SHG members, some also became part of the Gram Vikas Samiti to ensure secure and sustainable water services in the village. The surface-based water supply project was implemented by the Gram Vikas Samiti (GVS) with technical support from PRADHAN and financial support from Damodar Valley Corporation at a cost of ₹1.1 lakh. Prior to the initiation of the project, GVS members made an exposure visit to a village in Odisha where PRADHAN was implementing a similar project.

The GVS has been providing O&M services since 2009; it supplies water twice every day and has achieved 100 per cent coverage. Each household in the village pays ₹40 per month (when the scheme is operated using grid-electricity) and ₹80 per month (when the scheme is operated using diesel). GVS members inform the villagers about the days on which the scheme is to be operated on diesel. Daily piped water supply to the households has enabled women and children to enjoy better health and also provided an opportunity to households to invest more time on farm work. This has increased their income levels significantly. The health and economic benefits have been so significant that one woman in the village remarked that they would never let the scheme fail.
**Strengthening VWSCs**

GoJ has made excellent progress in the formation of VWSCs. However, considering that elections to PRIs were not held in the state for over 32 years, the lack of experienced local leadership and absence of government representatives in VWSCs were causes for concern. In order to provide the necessary expertise to VWSCs, GoJ introduced a number of measures that eventually laid the foundation for the effective management of O&M of RWSS. One such measure encouraged the involvement of external stakeholders that had expertise in enabling community participation in VWSCs. The other measures initiated for strengthening VWSCs are provided in Table 6.2.

<table>
<thead>
<tr>
<th>No.</th>
<th>Name of Stakeholder</th>
<th>Started From</th>
<th>Brief Account of Work Carried Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TSRDS</td>
<td>2012</td>
<td>Community-managed RWSS is being replicated with the help of UNICEF in three blocks in one district</td>
</tr>
<tr>
<td>2</td>
<td>CIVIL SOCIETY ORGANISATIONS</td>
<td>2012</td>
<td>16 civil society organisations were selected as Block Resource Centres through a transparent process to scale up community involvement through appropriate Information, Education and Communication (IEC) work</td>
</tr>
<tr>
<td>3</td>
<td>BASIX</td>
<td>2010</td>
<td>Community-managed RWSS is being implemented through the VWSC as a pilot programme in 20 villages across six districts</td>
</tr>
<tr>
<td>4</td>
<td>PRADHAN</td>
<td>2010</td>
<td>Helping the department with professional manpower support to establish and strengthen SWSM</td>
</tr>
<tr>
<td>5</td>
<td>WATERAID</td>
<td>2010</td>
<td>Developed communication material and training modules for the Jal Sahiyas; 600 trained so far</td>
</tr>
</tbody>
</table>

**Empowering Women**

Realising that women are responsible for water for household use and face adversities due to lack of easy access to water, GoJ evolved measures to enable women to be the flag bearers of VWSCs. These included mandating 50 per cent women membership in field-level activities. Additionally, Jal Sahiyas or village women work as treasurers in each VWSC. As of now, over 25,141 Jal Sahiyas have been appointed who do scheduled work. In the absence of PRIs, the SWSM roped in SHGs and experienced and credible NGOs to participate in enabling women gain experience in managing the VWSCs for faster transformation.

**TABLE 6.1: LIST OF STAKEHOLDERS WORKING IN THE STATE RURAL WATER SECTOR**

<table>
<thead>
<tr>
<th>No.</th>
<th>Name of Stakeholder</th>
<th>Started From</th>
<th>Brief Account of Work Carried Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TSRDS</td>
<td>2012</td>
<td>Community-managed RWSS is being replicated with the help of UNICEF in three blocks in one district</td>
</tr>
<tr>
<td>2</td>
<td>CIVIL SOCIETY ORGANIZATIONS</td>
<td>2012</td>
<td>16 civil society organisations were selected as Block Resource Centres through a transparent process to scale up community involvement through appropriate Information, Education and Communication (IEC) work</td>
</tr>
<tr>
<td>3</td>
<td>BASIX</td>
<td>2010</td>
<td>Community-managed RWSS is being implemented through the VWSC as a pilot programme in 20 villages across six districts</td>
</tr>
<tr>
<td>4</td>
<td>PRADHAN</td>
<td>2010</td>
<td>Helping the department with professional manpower support to establish and strengthen SWSM</td>
</tr>
<tr>
<td>5</td>
<td>WATERAID</td>
<td>2010</td>
<td>Developed communication material and training modules for the Jal Sahiyas; 600 trained so far</td>
</tr>
</tbody>
</table>

**TABLE 6.2: INITIATIVES FOR STRENGTHENING VWSCS**

<table>
<thead>
<tr>
<th>No.</th>
<th>Key Measure</th>
<th>Physical Progress (As in June 2013)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Call centre where VWSC leaders register O&amp;M issues established</td>
<td>More than 1,000 grievances recorded; 80 per cent on time response; 60 GP Presidents interacted directly</td>
</tr>
<tr>
<td>2</td>
<td>A user friendly GPS-based monitoring system for concurrent M&amp;E of the project by the community</td>
<td>Applications pilot tested; VWSC representative can comment in local languages</td>
</tr>
<tr>
<td>3</td>
<td>Empowerment of VWSC through devolution of power; JE, AE and EE to report to GP, BP and ZP representatives</td>
<td>GP, BP and ZP can accord administrative approval to projects worth up to ₹10, ₹25 and ₹50 lakh respectively</td>
</tr>
<tr>
<td>4</td>
<td>Standard processes for enhancing VWSC participation in the water and sanitation sector developed</td>
<td>Separate diaries for functioning of Jal Sahiyas and block level workers developed</td>
</tr>
<tr>
<td>5</td>
<td>Conducting IEC and capacity building events at the village, Panchayat and district levels</td>
<td>10 television programmes involving VWSC leaders created; regular publication of information through local media</td>
</tr>
</tbody>
</table>

Note: GPS: Global Positioning System; M&E: Monitoring and Evaluation; JE: Junior Engineer; AE: Assistant Engineer; EE: Executive Engineer; BP: Block Panchayat; ZP: Zilla Panchayat
Table 6.3 provides the progress achieved against each initiative for women’s empowerment in improving water supply services.

**Financial Incentives for VWSCs**

Ongoing and efficient O&M was an important issue in ensuring the long-term sustainability of the benefits of RWSSs. The SWSM understands that typically successful projects are those in which the rural populace regularly pays tariffs and which are run by financially self-sustaining water supply institutions. The VWSCs have been able to successfully generate revenues through efficient tariff collection. The tariff collection ranges from ₹35,000 (Vrindavanpur village with 120 households) to ₹10 lakh (Nuamundi Village with 192 households). Additionally, SWSM is aware that services which rely on the users to finance ongoing running costs will only be sustainable if the willingness of users to pay is sustained. To achieve this, transparency and accountability in the functioning of VWSCs is essential. Additionally, to sustain users’ willingness to pay, GoJ is providing appropriate institutional support to the VWSCs. Table 6.4 provides a list of these support strategies.

**Impact of Reducing Electricity Tariff**

Energy charges, that is, the cost of electricity, makes up 80 percent of O&M of rural pipe water supply schemes. The village community was either unwilling to get separate household connections for drinking water or was coping through illegal connections for both water and electricity.

From August 1, 2011, a separate service category was allotted for rural drinking water supply managed by GPs/VWSCs through the Jharkhand State Electricity Regulatory Commission (JSERC) tariff order for FY 2011-12. Initially, tariff was reduced for loads exceeding 4 kilowatt (kW). Subsequently, JSERC, in its tariff order for FY 2012-13, added three service categories with a further reduction in tariff, that is,

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**TABLE 6.3: INITIATIVES FOR WOMEN’S EMPOWERMENT**

<table>
<thead>
<tr>
<th>Particulars of the Initiative</th>
<th>Started From</th>
<th>Present Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Involved women members in tube well maintenance (tool kit) and masonry work</td>
<td>2011</td>
<td>Started from Saranda; more than 400 women trained and employed, 32,000 women will be trained during the Plan period</td>
</tr>
<tr>
<td>VWSC mandated 50 per cent women’s participation and appointment of Jal Sahiyas as treasurers</td>
<td>2010</td>
<td>Over 1,50,000 women are involved; 25,141 Jal Sahiyas appointed; over 25,000 women service providers engaged</td>
</tr>
</tbody>
</table>

---

**TABLE 6.4: SUPPORT STRATEGIES FOR FINANCIAL INCENTIVES**

<table>
<thead>
<tr>
<th>No.</th>
<th>Key Strategy</th>
<th>Physical Progress (as in June 2013)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lowering tariff for electricity unit charges for VWSC-managed water supply</td>
<td>Electricity charges have been reduced from ₹4.40 per unit to ₹1.40 per unit for VWSC-managed water supply schemes. This has resulted in easy transfer of O&amp;M of 196 rural piped water supply schemes</td>
</tr>
<tr>
<td></td>
<td>schemes from ₹4.40 to ₹1.10</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Matching grants for successful O&amp;M</td>
<td>VWSCs that have successfully managed O&amp;M of rural water supply schemes get a matching grant from DWSD. As of now, matching grants of over ₹29.34 lakh have been disbursed</td>
</tr>
</tbody>
</table>
DS-I(b) for less than 2 kW, DS-II for 2-4 kW and DS-III for schemes exceeding 4 kW. As of now, the electricity tariff as applicable to VWSC-managed water supply schemes is ₹1.40 per unit which is significantly lower than ₹3.50 per unit in 2010-11 and ₹2.40 per unit in 2011-12. Figure 6.1 provides details of the annual electricity bill for rural water supply schemes in Jharkhand.

As indicated in Figure 6.1, the annual electricity bill of a rural water supply scheme reduced by 32 percent in 2011-12, 44.5 percent in 2012-13 and 62.5 percent in 2013-14 as compared to respective previous years.

As a result, there is a demand for a dedicated feeder for each rural mini piped water supply scheme and this has also paved the way for transparent energy management and assured payment by the user. This is contrary to the earlier situation where there was a higher tariff scheduled but few payments were received. Also, in the last three years, the number of VWSC-managed schemes has grown from a mere handful to 100. The schemes are now able to register a higher number of legal users and collect fees on a regular basis. Fifty schemes of the total hardly ever depend on DWSD for regular O&M.

Impact of Matching Grants for Successful O&M

Facing a challenge in access to water, more than 70 VWSCs in Jharkhand regularly collect a water tax as a norm and have prohibited the use of stand post sand other free service provisions. This, in turn, has ensured participatory governance of schemes and proper O&M of drinking water infrastructures. In new schemes, provision of household connections

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Name of GP</th>
<th>District</th>
<th>Revenue Collected [₹ Lakh]</th>
<th>Incentive Received [₹ Lakh]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mahudi Chaibasa</td>
<td>14.12</td>
<td>13.10</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>E. Shivibari Dhanbad</td>
<td>8.38</td>
<td>3.00</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Jaw Har Nagar Ramgarh</td>
<td>6.50</td>
<td>2.21</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>S. Agyarkund Dhanbad</td>
<td>6.47</td>
<td>2.60</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>N. Siulibari Dhanbad</td>
<td>5.40</td>
<td>1.80</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>S. Chittarpur Ramgarh</td>
<td>5.25</td>
<td>5.25</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>S. Siulibari Dhanbad</td>
<td>3.63</td>
<td>1.43</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Mahudi Ram Garh</td>
<td>3.57</td>
<td>3.70</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Charadih Koderma</td>
<td>3.14</td>
<td>1.95</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Kapali Sarai Kela</td>
<td>2.53</td>
<td>1.24</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>S. Agyarkund Dhanbad</td>
<td>2.74</td>
<td>1.24</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>N. Agyarkund Dhanbad</td>
<td>1.74</td>
<td>1.43</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>62.97</strong></td>
<td><strong>38.85</strong></td>
<td></td>
</tr>
</tbody>
</table>
and testing for water has been made mandatory. In piped water supply, DWSD, GoJ, is working with the motto: SHSZ [Service Hundred Subsidies Zero].

Presently DWSD, GoJ, encourages VWSCs to take up O&M of piped water supply schemes on the principle of matching grants. In the process, DWSD provides an equivalent support to performing VWSC who have assets of their own. Table 6.5 lists 12 such VWSCs that lead in water revenue collection.

**Emerging Interventions**

The initial steps taken by GoJ have created an excellent foundation for ongoing and efficient O&M of RWSSs. At present, the government is introducing a community consultation process to ensure community ownership of planned water supply schemes. Additionally, international agencies and donor organisations including UNICEF, Global Sanitation Fund (GSF), Water and Sanitation Program (WSP), Water Aid and Plan India are involved as capacity building partners. The government is also keen to introduce a set of techno-managerial innovations to ensure and enhance people-centric project planning and management (Table 6.6).

**Conclusions**

The success stories of RWSSs in Jharkhand highlight the fact that VWSCs can deliver high-quality water supply services when a committed state government understands the local problems and devices solutions that are acceptable to the community. Moreover, it also shows that sustainability of the schemes can be ensured when consumers agree to pay tariffs promptly and the government rewards their willingness to pay by ensuring transparency and accountability in the functioning of the VWSCs and providing appropriate incentives for sustaining the willingness to pay. Most importantly, it illustrates that GoJ is willing to continuously intervene and provide institutional support to the communities for addressing emerging issues during the earlier stages and also for ensuring the sustainability of the schemes.

Inputs from Mr. Samir Kumar Dawn, Chief Engineer cum Executive Director, Drinking Water and Sanitation Department, Government of Jharkhand, Mr. Devbrat Bunia, Project Coordinator, WSP, Jharkhand and Mr. Kallol Saha, State Coordinator (Hydrogeology), State Project Management Unit, State Water and Sanitation Mission, Jharkhand.

**TABLE 6.6: EMERGING INTERVENTIONS IN JHARKHAND**

<table>
<thead>
<tr>
<th>Particulars of the Initiative</th>
<th>Started From</th>
<th>Present Coverage</th>
<th>Scope of Replication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public-private partnership at the Panchayat level for piped water supply including O&amp;M</td>
<td>2012</td>
<td>More than 100 schemes ready for implementation</td>
<td>Mode may be adopted in the World Bank programme</td>
</tr>
<tr>
<td>Engaging VWSCs in preparing micro-plans on water security and sustainability</td>
<td>2011</td>
<td>164 VWSC have started this work on a pilot basis</td>
<td>4,000 VWSCs during the Plan period (144 in Murhu block in Khunti district have already initiated the programme)</td>
</tr>
<tr>
<td>Collaborative projects with corporate social responsibility initiatives</td>
<td>2012</td>
<td>1 project with financial outlay from ECL nearing completion</td>
<td>One started at Deoghar; more than 15 waiting; convergence possibility across minimum 18 districts in the state</td>
</tr>
</tbody>
</table>
A Community-led Approach Towards a Secure Future
Kandoli Water Supply Scheme, Uttarakhand
The sustainability of the scheme has been ensured through the user committee’s capacity to effectively manage and recover 100 per cent O&M costs from a community that is willing to pay for efficient water supply services.

**Background**

In Uttarakhand, MVWSSs have been delivering water services over the last five decades. One such multi-village scheme, the Bidholi Piped Water Supply Scheme was implemented in 1960. It supplied water to Kandoli village located at the tail-end of the piped water supply scheme. Kandoli is a peri-urban village which is scattered over 11 habitations with about 348 households. It is situated 20 km from Dehradun in Sahaspur block. The primary occupation of the local population is agriculture, though a section is in the defence and government sectors.

Over the years, the demand for water increased throughout the region and a resource crunch did not allow upgradation to meet the increased water demand. Gradually the supply to Kandoli decreased and availability varied between 15 to 25 lpcd. This led to the village community becoming dependent on traditional water sources for its drinking water needs. However, to access traditional water sources, the local population had to trek 1 to 3 km across an undulating terrain and spend up to four hours per day to collect water. These factors led to the need for a paradigm shift from a supply-driven approach to a demand-driven one. On the basis of a request from the community for inclusion in the World Bank-assisted Uttarakhand Rural Water Supply and Sanitation Project (URWSSP), the village was selected under Batch-1 of the project in 2006-07. The local rural community showed demand responsiveness with willingness to share in the capital cost and 100 per cent of O&M costs.

The water supply scheme was completed by the User Water and Sanitation Sub-Committee (UWSSC) in 2009-10. Since then, the UWSSC has been operating and maintaining the water supply scheme successfully from self-generated revenue without any support – technical, financial or institutional – from the state government. There is a sound financial management system in place. UWSSC has efficiently managed a cost recovery system for more than three years with the active involvement of the GP and regular capacity building by the District Programme Management Unit (DPMU).

Kandoli was awarded the Nirmal Gram Puraskar in 2009. The local population prides itself for living in a clean and self-sufficient environment.

**Details of the Scheme**

The water supply scheme is a gravity-based scheme with water being drawn from Guchka Gadhera located in one of the habitations in the village. The water is pumped along a 7,814 m rising main to the 80,000 litre capacity reservoir. Thereafter, it is supplied to individual households with the help of a 21.5 km distribution network. At present, 228 households have opted for private household connections and the demand for additional connections has been increasing every month. The scheme has been implemented at an approximate cost of ₹93 lakh with about ₹80,250 being contributed in cash by the community.

Conceiving and implementing the project was not easy. The project implementing agency had to create awareness among various stakeholders, including communities. Moreover, the capacity of the community to come together to execute a large water supply project was limited. In order to overcome these
challenges, the agency hired the services of an NGO which was involved in capacity building among the community. This led to the formation of the UWSSC which worked with the NGO to execute the water supply scheme.

Financial Performance of the Scheme

Each scheme beneficiary contributes ₹40 per month into the UWSSC O&M account. Thus far, ₹7,11,247 has been deposited in the account. UWSSC has maintained records on the various aspects of O&M and makes the documents available for audit. The transparency in its functioning is also reflected in the fact that the committee presents its income and expenditure statement every month to the local population. Additional meetings are organised by district implementing agency officials to provide support/guidance to the GP for addressing critical issues so as to ensure the smooth operations of the scheme. More importantly, the NGO has performed well in sensitising beneficiaries, resulting in their understanding their role in the sustainability of the scheme, as is evidenced by the fact that every beneficiary follows the rules laid down by UWSSC. Further, the community has understood the criticality of women’s participation and has not only ensured that certain UWSSC members are women but it also ascertains that they actively participate in UWSSC meetings. The O&M income and expenditure details of the scheme, since it was handed over to UWSSC, are provided in Table 7.1.

At present, a surplus of ₹1,48,719 has been generated through prompt collection of water tariff and ensuring that repair costs are kept to a minimum by carrying out regular and periodic maintenance activities.

Success Factors

- The key stakeholders, project implementing agency, NGO and UWSSC ensured transparency at all stages to successfully achieve community participation in all phases of the project.
- The continuous acute shortage of water in the village during the pre-project stage compelled the community to seek alternatives for a reliable and adequate quantity of potable water, especially during the summer season.

<table>
<thead>
<tr>
<th>Period</th>
<th>Opening Details</th>
<th>Collection Details</th>
<th>Expenditure Details</th>
<th>Closing Details</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Head ₹</td>
<td>Head ₹</td>
<td>Head ₹</td>
<td>Head ₹</td>
</tr>
<tr>
<td>From 2 July 2011 (Exit Date) to (23 May 2011)</td>
<td>Bank 65,000</td>
<td>Water Tariff 368,896</td>
<td>CT Salary 100,000</td>
<td>Bank 159,993</td>
</tr>
<tr>
<td></td>
<td>Cash 0.00</td>
<td>Bank Interest 9,222</td>
<td>Chlorinator 2,500</td>
<td>Cash 0.00</td>
</tr>
<tr>
<td></td>
<td>Other 0.00</td>
<td></td>
<td>Repairing 12,625</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>From exit to till date 168,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total 65,000</td>
<td>Total 378,118</td>
<td>Total 283,125</td>
<td>Total 159,993</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Others</td>
<td></td>
</tr>
<tr>
<td>May 2011 to March 2012</td>
<td>Bank 159,993</td>
<td>Water Tariff 101,900</td>
<td>CT Salary 40,000</td>
<td>Bank 125,229</td>
</tr>
<tr>
<td></td>
<td>Cash 0.00</td>
<td>Bank Interest 5,236</td>
<td>Chlorinator 0.00</td>
<td>Cash 4436</td>
</tr>
<tr>
<td></td>
<td>Other 0.00</td>
<td></td>
<td>Repairing 97,464</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total 159,993</td>
<td>Total 107,136</td>
<td>Total 137,464</td>
<td>Total 129,665</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Others</td>
<td></td>
</tr>
<tr>
<td>April 2012 to March 2013</td>
<td>Bank 129,665</td>
<td>Water Tariff 154,740</td>
<td>CT Salary 60,000</td>
<td>Bank 148,719</td>
</tr>
<tr>
<td></td>
<td>Cash 0.00</td>
<td>Bank Interest 6,253</td>
<td>Chlorinator 0.00</td>
<td>Cash 0.00</td>
</tr>
<tr>
<td></td>
<td>Other 0.00</td>
<td></td>
<td>Repairing 81,939</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total 129,665</td>
<td>Total 160,993</td>
<td>Total 141,939</td>
<td>Total 148,719</td>
</tr>
</tbody>
</table>
• An NGO was involved as a link between the beneficiary community and the implementing agency. Acting as a catalyst, the NGO assisted in motivating and mobilising the community. The capacity building of community members in their envisaged roles and responsibilities in the planning, execution and management of the water supply scheme was executed by the NGO.

• IEC activities, mainly to promote ownership and the decentralisation agenda, were carried out by the project authorities on a large scale through workshops, exposure visits, competitions and electronic and print media.

• Partial capital cost sharing (either in cash or kind including labour or both) and 100 per cent responsibility for O&M by the community led to a sense of belongingness and ownership among the community leading to sustainable delivery of water supply and sanitation services.

• An innovative measure, ‘Insurance Coverage’ of the water supply scheme’s assets after the construction phase, initially for a period of three years from the date of commissioning, largely contributed to the O&M of the scheme without further government intervention.

Sustainability of the Scheme

• The Kandoli Water Supply Scheme can be considered sustainable because of its proven ability to supply water in adequate quantities and of good quality to all 11 habitations throughout the year. Moreover, services are provided by a trained local institution, UWSSC, that is transparent in its working and comprises members of the community. Further, the community is satisfied with the service which is reflected in their prompt payment of tariffs to UWSSC. More importantly, the tariff covers O&M, administrative and replacement costs.

• There is also ample evidence to suggest that the Kandoli Water Supply Scheme will remain sustainable. This includes the realisation of surplus revenue over the last three years, UWSSC’s willingness to effect timely revision of tariffs to keep pace with the increasing O&M expenditure, carrying out regular preventive maintenance activities including monitoring the quality of the water, and recognised management capacity of the UWSSC to sustain adequate services to keep pace with population growth.

Conclusions

The success of the Kandoli Water Supply Scheme shows that a demand-driven approach for implementing a project can provide efficient water services if all stakeholders perform their roles effectively without losing sight of the objective of the project.
Implementing a Community-managed Sustainable Rural Water Supply Scheme for Poor Households

Kokkunnu Water Supply Scheme, Kerala
**Background**

The management of drinking water supply in a high population density state such as Kerala becomes important mainly due to the state’s paradoxical situation of ‘scarcity in the midst of plenty’ as well as excessive water demand. Some of the other challenges in the state include:

- People’s preference for a dispersed settlement pattern that throws up a challenge for water supply coverage.
- Their traditional belief that only water obtained from open wells is suitable for drinking and cooking purposes.
- As a general practice, the economically-backward households live in elevated areas that have limited access to open wells and water services, raising concerns about equity.

Mookannur village, located in the Mookannur GP in Aluva taluka in Ernakulam district received water supply from the RWSS implemented by the Kerala Water Authority (KWA). However, the scheme did not cover the elevated areas located in Wards IV, IX and X. And barely 25 per cent of the people in these areas had access to open wells; they had to walk uphill to collect water from a distance of 300-400 m. Gastro-intestinal diseases were common during early November and late June-July every year.

In 2002, GoI introduced Swajaldhara, a scheme for improving water supply coverage in rural areas. The scheme incorporated a new approach to extending water supply coverage. The approach called for implementing a demand-driven water supply scheme with a mandated 10 per cent contribution from the beneficiary community and the remaining 90 per cent of the cost being borne by the government. In order to take advantage of the scheme, the Kokkunnu Swajaldhara Samiti (KSS) was formed in 2004 with the objective of implementing a water supply scheme for the economically backward families in the elevated areas.

KSS approached the DWSM, housed within KWA, which agreed to plan and design the scheme. The new scheme was perceived to be more effective as it was demand driven and took the water needs of households into consideration. The local church proved to be a guiding force for KSS and its participation won the confidence of the 256 families that became members of the Samiti by paying a membership fee of ₹150 each.

The DWSM-designed scheme consists of a 6 m diameter open well along with a pump house that is provided with two 10 HP pump sets that pump water from the open well to the overhead tank on Kokkunnu hill. The open well and pump house are located in the lower zone of the Ayacut area in the
Chalakudy irrigation project main canal. The land required for the open well and pump house was purchased by KSS. One pump operator has been employed by the Samiti to carry out the O&M of the pumping system.

A pumping main, 100 mm in diameter and 585 m long, connects the pump house with the overhead tank. The land required for the overhead tank was sold to KSS by one of the beneficiaries of the scheme. The scheme is designed to cater to an ultimate water demand of 0.12 million litres per day (MLD) that accounts for 40 lpcd supply for the beneficiaries. All major roads have pipelines from which the individual metered house connections are taken. A small pond beside the open well ensures a high water table in the open well.

The estimated cost for the project was ₹19 lakh with beneficiary contributions amounting to ₹1.90 lakh. This worked out to a beneficiary contribution amount of ₹750 per household; this amount was fixed by KSS for the 256 households that initially became members of the Samiti. Poor households were allowed to pay the beneficiary contribution in six instalments. In addition to the membership fee and beneficiary contribution, the households had to incur an expenditure of approximately ₹2,000 each for connections from the main distribution line to the meter.

Construction began in 2004 and the project was inaugurated on 17 February 2008 by the then Union Minister, Mr. Vayalur Ravi. KWA performed the quality assurance and KSS undertook the supervision of the construction. Despite this, the project resulted in a cost over-run of approximately ₹4 lakh. The additional amount was paid to the contractor from the use fees collected from the beneficiaries, with the final payment being cleared in 2012. The excellent rapport developed among the various stakeholders during the implementation period ensured that the contractor did not charge interest on the delayed payment.

After the successful commissioning and operation of the scheme, there were additional demands for new connections. Demand from 30 families from a poor housing colony tested KSS’ skills in evolving an inclusive approach to service delivery. The Samiti decided to reduce the membership fees and retain the initial ₹750 connection charges (instead of the ₹2,000 in 2008) and provide metered connections to these 30 households. In 2012, when the regular connection charges were ₹5,000 per household, KSS arranged
sponsorships for those households that could not afford to pay. As on date, 15 families have benefited from the sponsorship arrangements. Households pay for the connection from the main distribution line to the household meter. Currently, 525 families are provided with metered house connections by KSS (Table 8.1).

### TABLE 8.1: COST OF SCHEME PARTICIPATION

<table>
<thead>
<tr>
<th>Period</th>
<th>Membership Fees</th>
<th>Connection Charges</th>
<th>Cost for Pipe, Labour and Meter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial</td>
<td>₹150</td>
<td>₹750</td>
<td>₹2,000</td>
</tr>
<tr>
<td>2008</td>
<td>₹150</td>
<td>₹2,000</td>
<td>₹2,000</td>
</tr>
<tr>
<td>2012</td>
<td>₹150</td>
<td>₹5,000</td>
<td>₹2,000</td>
</tr>
</tbody>
</table>

In the five years since the project was commissioned, the water supply scheme has been successfully operated by KSS; an elected 13-member executive committee manages the scheme. The executive committee meets every month to resolve vital issues pertaining to operations. It also has the authority to decide on issues concerning O&M, including fixing tariff and connection charges, and improving coverage through provision of appropriate concessions to beneficiaries. Additionally, the general body of the beneficiary group meets once a year. The church plays an active role in facilitating the executive committee and general body meetings, and ensures that the concerns of the beneficiaries are addressed effectively during these meetings.

### TABLE 8.2: TARIFF STRUCTURE

<table>
<thead>
<tr>
<th>Year</th>
<th>Basic Tariff</th>
<th>Tariff for Additional Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>₹30/10 kilolitre (kl)</td>
<td>₹3/kl</td>
</tr>
<tr>
<td>December 2012</td>
<td>₹30/7 kl</td>
<td>₹6/kl for consumption between 8 and 15 kl</td>
</tr>
<tr>
<td></td>
<td></td>
<td>₹10/kl for consumption between 15 and 25 kl</td>
</tr>
<tr>
<td></td>
<td></td>
<td>₹30/litre for consumption &gt;25kl</td>
</tr>
</tbody>
</table>

The billing and collection of tariff are also carried out by KSS. Two women meter readers have been appointed by KSS; meter reading is done within the first five days of a month. The meter readers also prepare the bills at the time of meter reading and hand them over to the households. One bill collector has been appointed by KSS whose responsibilities include maintaining accounts. All expenses incurred on O&M are borne by the Samiti. A separate account register is maintained for income and expenditure incurred on O&M. At the end of the year, KSS’ accounts are audited by a chartered accountant and the audited statement is presented to the general body. Thus far, KSS has been able to stay financially-surplus every year despite providing concessions to poor households. In fact, the Samiti is willing to consider subsidising monthly charges on a case-to-case basis if such a request comes from any of the beneficiaries.
KSS has been able to provide 24x7 water supply services to all households. The services are only curtailed during power outages. Its performance in providing water services has been appreciated by the beneficiary group. In fact, a beneficiary mentioned that the households were very happy with the fact that the water was supplied at a good pressure even in households on higher elevations. Another householder, living in one of the poor housing colonies, mentioned the huge economic benefits that the scheme had brought to his six-member household and expressed his gratitude to KSS for being flexible in making the scheme accessible to poor households. An executive committee member attributes the scheme’s success to mandatory metering of connections, among other reasons.

The Kokkunnu Water Supply Scheme has all the features that ensure sustainability of a RWSS. These include a highly-motivated water committee at the local level in the form of KSS which has not only been involved in all phases of the project but also its O&M. The communication mechanisms adopted right from the initial phases of the project, involving all stakeholders, ensured that the demand-driven scheme had the necessary participation threshold levels for starting the scheme. Moreover, the Swajaldhara guidelines that require the involvement of professional organisations such as the DSWM to plan and design the scheme won the confidence of the participating households and they had no hesitation in making beneficiary contributions to secure GoI funding for the scheme. In addition, the leadership role played by the church has been very critical in ensuring that this demand-driven water supply project was not only successfully implemented but also later maintained with the same commitment by KSS members.

**Success Factors**

The Kokkunnu Water Supply Scheme is a unique project in the sense that it showcases the possibility of implementing a demand-driven water supply project with the specific purpose of covering poor households while incorporating all aspects of sustainability. The project was planned and implemented by involving DWSM in the initial designing and later for carrying out a third-party quality assessment of its construction. The GP played an active role in securing the necessary land for KSS on which the open well and overhead tank could be located. Supervision of the construction was done by KSS members who also gained a good understanding of the technical aspects of the scheme in the process. Over the last five years, the scheme has earned a surplus resulting in KSS having a fixed deposit of ₹7 lakh. This money can be used for any major maintenance/repair work as the system ages. The financial surplus can be attributed to the fact that KSS has ensured 100 per cent metering while strictly adhering to the billing and collection procedure. Also, while ensuring an inclusive approach towards providing water supply to all the households, KSS strictly enforces penalty for payment violations. The Samiti has been able to maintain 100 per cent billing collection during the last five years. Further, the executive committee consists of qualified members who have retired from high positions in the government and/or the private sector and who are contributing their time and skills on a voluntary basis. Their involvement, coupled with the church’s guiding force, has enabled KSS to carry out timely changes in connection charges and tariff structure for sustaining the scheme while also adopting innovative ways to improve water supply coverage to the poor households.

For additional information on the scheme, contact: Professor Jose Pappu, Member, Executive Committee, Kokkunnu Swajaladhara Samiti at +91 (0) 484 269 4970.
Factoring in Demand to Ensure a Secure Water Future

Lakhani Village, Bageshwar District, Uttarakhand
Background

Uttarakhand Peyjal Nigam initiated the Arsa Water Supply Scheme in 1984 to supply water to Lakhani village in Bageshwar district in Uttarakhand. Over time, with an increase in the population, the scheme, maintained by the Uttarakhand Jal Sansthan, saw a decline in per capita availability of water; it also suffered from a supply deficit, frequent breakdowns and delayed redressal of complaints. The villagers became totally dependent on a local water source, Arsa Gadhera, whose water could not be classified as clean and potable. The failure of the scheme resulted in a GP resolution in 2007 requesting the state government to improve the water supply and sanitation services in the village under the World Bank-funded URWSSP.

All projects implemented under URWSSP use a demand-driven approach. Prior to the start of the project, the villagers were made aware of the key principles of this approach:

- Giving an informed choice to the communities through participatory planning and involving the community in implementing the scheme in order to ensure ownership
- Complete community management and responsibility for O&M
- Cost recovery, capital cost sharing and 100 per cent O&M
- Promoting more options for service delivery
- Integrating water supply, sanitation, environment management and hygiene education.

In line with these key principles, a significant change was required in the roles and responsibilities of the government agencies, village elders, communities and NGOs. Accordingly, URWSSP adopted a process that ensured that all key principles of the demand-driven approach were achieved through the implementation of the project.

Process Adopted

Pre-feasibility

A pre-feasibility study was conducted to make an assessment of the current situation with respect to drinking water shortages, household service levels, source supply levels and the extent of labour involved in securing daily water needs. In addition, the pre-feasibility study covered an assessment of the villagers’ ability and willingness to make contributions towards the capital cost of the infrastructure and taking complete responsibility for O&M as well as its 100 per cent costs.

Planning phase

During the planning phase, an agreement with the support organisation (SO), the Hill Welfare Society, Garur, Bageshwar, was entered into on 19 June.
2007 to provide services for enabling community participation in the scheme. The planning duration was six months. The SO deployed its team comprising a community facilitator, engineer and community worker to disseminate the project’s principles and procedures, leading to community mobilisation and preparation of the villagers for implementing the scheme. The UWSSC, comprising 12 members, was constituted to manage and execute the water supply scheme. UWSSC gave due importance to the inclusion of women representatives and Schedule Caste members. Various technical options were discussed in community-wide and ‘Agree-to-do’ meetings.

Discussions on technical options included those on gravity, pumping, rainwater harvesting tank and reorganisation of the existing scheme. Finally, the gravity-based scheme from Arsa Gadhera was unanimously approved by the community. The availability of discharge in the Arsa Gadhera was found to be around 156-200 litre per minute (LPM) throughout the year which was sufficient to meet the village's water demands. The culmination of the planning phase resulted in the preparation of the DPR. The total estimated cost arrived at was ₹49.97 lakh.

Implementation phase

The implementation phase quadruple agreement became effective from 10 July 2008. During the implementation phase, source work comprising the installation of a French well, storage work comprising six reservoirs of different capacities, a 5,990 m supply network, a 9,457 m distribution network and 62 PSPs was commissioned. The water supply scheme was commissioned on 4 April 2011.

Evidence of Performance

Tariff billing and collection

Each household pays ₹15 per month as user charges to UWSSC to cover the O&M cost of the water supply scheme. Since August 2011 (when the UWSSC took over the O&M of the scheme), the scheme is operating satisfactorily and meeting its recurring costs without external support from the government. In fact, the UWSSC has been able to generate surplus funds to the tune of ₹40,000 after meeting all its expenditure on O&M.

Transparency and accountability

Community-wide meetings are organised regularly to share income and expenditure statements with the villagers. This reflects complete transparency in O&M of the scheme. Meetings are also organised by DPMU officials at regular intervals to provide support/guidance to the GP to ensure the smooth functioning/operation of the scheme. UWSSC also resolves disputes at the village level and involves villagers in contributing their efforts to the scheme’s operations. Transparency at every stage has largely contributed to community satisfaction and ownership.

Women’s participation

Every family/beneficiary follows UWSSC’s rules/regulations. This may be attributed to the active participation and contribution of a woman as a UWSSC member.

Success Factors

Training and capacity building

Appropriate training and information provided at every step/phase, that is, pre-feasibility, planning, implementation and O&M phases, as per the policy of the sector programme played a key role in the success of the Lakhani Water Supply Scheme.

Active community participation

Owing to the demand-driven approach, the villagers became aware of their role in the participation and
construction of the scheme and the benefits that can be derived through participation. Moreover, the community contributed in terms of cash and labour during the planning and construction phases of the scheme. This created a feeling of ownership and willingness to participate actively.

**Transparency and accountability**
Throughout all phases of the project, UWSSC shared details of all costs incurred on the project, water testing results, etc., with the community. Further, UWSSC members diligently supervised the construction to ensure high-quality work. Active community participation and transparency led to a feeling of accountability among the villagers who have now resolved to participate in the work on source sustainability catchment area, soak pit construction and drainage facilities to ensure the continued success of the scheme.

**Effective leadership**
The local leadership understood the importance of the long-term sustainability of the scheme. UWSSC regularly collects user fees to meet the O&M costs for the Lakhani Water Supply Scheme. Further, the leadership ensures that all conflicts regarding water are resolved at the UWSSC level itself.

**Conclusions**
The Lakhani Water Supply Scheme showcases the fact that effective institutional arrangements and involvement of the community in decision making can create willingness to participate in the scheme and a sense of ownership among the villagers. Proper delegation of responsibility generated an interest in managing physical and financial arrangements effectively as well. The feeling of ownership derives from the involvement of the community in identifying the water source, planning the water supply scheme, community contracting and procurement process and O&M. Additionally, the community uses the time saved in fetching water for other productive work to improve their financial status. Every household maintains a kitchen garden and produces green vegetables for its own consumption. This has resulted in considerable savings. Cattle also get safe water for drinking and this has resulted in higher milk yields and low incidence of animal diseases. The scheme has also had positive health benefits on children. The villagers’ appreciation of the project is also reflected in their cash and labour contributions for capital infrastructure and regular tariff payments since the scheme was commissioned.

*For additional information on the scheme, contact: Mr. Deep Chandra Punaetha, Project Manager, District Project Management Unit, Suajal Project, Khaetwal Bhawan, Block Road, Kathayatbara, Bageshwar-26342; e-mail: dpmu_bag@rediffmail.com, Mobile 975 670 5868.*
Ensuring Sustainable Water Service Delivery through Innovative Approaches and Quality Management Systems

Daryapur Water Supply Project, Amravati District, Maharashtra
Background
Amravati, Akola and Buldhana districts are situated in the basin of River Purna in Maharashtra, covering an area of 4,692 km². The groundwater in this area is saline and unsuitable for human consumption. Sweet water is available as seasonal surface water from the main rivers Purna, Chandrabhaga, Sapan, Bordinalla and Bhuleshwari. They partially fulfilled the requirements of drinking water. RWSSs which were executed in this area between 1964 and 1969 served the villages in the region as did individual schemes with supply wells on the bank of Rivers Shahanoor and Chandrabhaga which served the towns of Anjangaon Surji and Daryapur. The O&M of these schemes was tedious and expensive. Additionally, in the last few decades, scanty rainfall resulted in ad-hoc augmentation of sources. As per a chemical analysis, the quality of water supplied to the villages and towns from these sources was brackish. Water services were also affected because of pump failures, load-shedding, etc., leading to a number of agitations for improved water services.

Combined Water Supply Scheme
In 1997, the Government of Maharashtra proposed a combined scheme to source water from Shahanoor Dam to provide water services to Anjangaon and Daryapur towns and 156 villages. Since the source was common, it was decided to propose a combined scheme at a cost of ₹162.31 crore. This represented a saving of ₹82.63 as the cost of implementing individual schemes for Anjangaon, Daryapur and the 156 villages would have been higher. The key technical features of the scheme are provided in Box 10.1. To avoid institutional problems of maintenance, the government approved the proposal that Maharashtra Jeevan Pradhikaran (MJP) would maintain the project – a departure from the earlier practice of involving local institutions.

MJP, formerly the Maharashtra Water Supply and Sewerage Board, was established to achieve rapid development and proper regularisation of water supply and sewerage services in the state. After the 73rd and 74th Constitutional Amendments, the role of the local bodies became crucial and MJP undertook an internal reorganisation to assimilate the changes in its role. It created specifically designed circle offices that were responsible for providing support on O&M, project management consultancy, advanced technology incorporation and execution of urban and rural schemes within the circles. One such circle is the Water Management Circle in Nagpur which is responsible for urban and rural schemes in the districts of Amravati, Akola and Bhuldhana.

Prior to launching this initiative, MJP held a stakeholders meeting with key beneficiaries and stakeholders, Members of the Legislative Assembly, sarpanches, Panchayat members, municipal council members, council presidents, and tehsildars to create awareness about the expected cost savings and to seek their support in the execution of the project. Community participation also played an important role right from the inception of the project in pipe laying and land acquisition.

During the execution of the project, Gram Sabhas were organised in every village by MJP. During these meetings, group discussions with villagers were initiated regarding the functioning of the scheme, its benefits, proposed rates of water supply, time of supply and

Participatory approaches used in every phase of the project, together with innovations introduced to overcome site-specific challenges have contributed significantly to its long-term sustainability
other difficulties during functioning. This exercise was carried out in all the villages to ascertain the demand, and communities’ responses regarding house connections. All the villagers were willing to pay ₹500 as a deposit and initial monthly water charges of ₹50. They also agreed to the concept of eliminating PSPs. For economically weaker sections, group connections were provided by sharing expenditure.

**Innovative Approaches in the Scheme**

Innovation and environment friendliness are the hallmarks of the Daryapur Combined Water Supply Scheme. One of the key innovative approaches used is of the regional topography being fully utilised and the entire system being run by gravity, starting from canal tapping to serving every consumer throughout the project area.

The project was also designed to overcome the key challenge of implementing hydraulics that had a total fall of more than 120 m creating excessive velocities. A new method for controlling gravity was introduced which was fixed at the salient location on the line. Even with a large gradient, water at the topmost MBR can be maintained at or near the full supply level. This is the key to the unique operation of the system. System pressures are retained thereby enabling even the last village to get water from the MBR. Site-specific technology for controlling gravity was developed in-house by MJP engineers for this scheme and applied successfully. The system runs 24 hours a day. However, supply to the villages is not continuous but given only at one time. The project has the capacity to double the supply over a period though.
Scheme Outcomes
Innovative approaches in implementation have resulted in positive outcomes that have led to the overall sustainability of the project and also its acceptance by the community:

- Metallic lines which have been incorporated have minimised water leakages and are reliable
- Maintenance cost of the scheme is very low
- Willingness to pay panipatti is highlighted due to increased level of service by way of house connections to every consumer and visits by MJP’s personnel to redress consumer grievances
- Awareness on water conservation among the beneficiary communities is at a high level
- An excellent example of people’s participation has been depicted in contributions of Loksahabhag at ₹100 per connection. Additionally, group connections have been provided for poor households to ensure equity
- Reduction in water wastage has been observed due to elimination of PSPs and provision of metered connections
- This surface-based water supply scheme has resulted in an increase in groundwater levels in the region as groundwater extraction has stopped
- A recent survey indicates positive lifestyle changes and reduced medical expenses among beneficiaries because of the high-quality treated water.

The successful design, implementation and operation of the Daryapur Combined Water Supply Scheme have resulted in the scheme winning many awards at both state and national levels:

- In 2004-05, MJP/contractor made it to the Limca Book of Records for implementing one of the largest regional water schemes in the country
- In 2006, the Maharashtra Energy Development Agency awarded MJP, Daryapur Division, for its achievement in energy conservation
- In 2008, MJP was a finalist at the National Urban Water Award for exemplary performance in urban water management contributing to improved quality of life in India

However, the MJP’s Water Management Circle in Nagpur is not one to rest on its laurels. Recently, the circle initiated another innovative approach to ensure successful operations of the combined water supply scheme for years to come. Hence, the division’s procedures, including those involving, among other things, planning, design and implementation, procurement management and O&M under the international ISO 9001 Quality Management System (QMS) standards have been documented. Every procedure used for O&M, including the scheme’s operations, managing the spare parts, testing the water quality, billing and collection, have been documented. Staff members have been trained extensively on QMS to ensure that all the work undertaken by the division is as per internationally accepted quality standards. QMS was verified and certified by BSCIC Certifications Private Limited on 31 July 2013 and is valid for a period of three years. The ISO 9001 QMS certification of the division has ensured that the Daryapur Combined Water Supply Scheme will be able to provide water services to two towns and 156 villages in a sustainable manner for years to come.

For additional information on the scheme, contact: Mr. D. L. Borkar, Executive Engineer, Maharashtra Jeevan Pradhikaran, Works Division, Daryapur, District Amanavati, Maharashtra State.
Enhancing Service Delivery through Private Sector Participation in the Provision of Drinking Water Supply in Rural Areas
Mamdapur Multi-village Scheme, Belgaum District, Karnataka
**Background**

MVWSSs are being established across the country, to provide complete water supply coverage to rural areas despite local water scarcity and increasing contamination of sources. In such circumstances, it becomes necessary to make use of distant water sources. The Mamdapur MVWSS in Karnataka is one such scheme that caters to more than nine villages in Belgaum district with the water being sourced from Ghataprabha River. The MVWSS replaced an earlier system that sourced groundwater from either bore wells or open wells. Many of the villages supplied by the groundwater-based system experienced water scarcity due to the failure of a majority of the bore wells.

In 2005, GoK started implementing the Mamdapur MVWSS under the Jal Nirmal project with assistance from the World Bank.

As with any MVWSS, the Mamdapur scheme consists of two facilities: a common facility and an in-village facility. The common facility is used to source water from Ghataprabha River and supply treated water to the overhead tank in each of the villages. The in-village facility, which consists of the overhead tank and the distribution network, is used to supply...
water within the village boundaries. In general, the operation of a MVWSS involves two distinct entities, one for operating the common facility and the GP/VWSC operating the in-village facility. The project was commissioned in March 2009 and O&M of the common facility was performed by the district support unit of the Karnataka Rural Water Supply and Sanitation Agency (KRWSSA) while O&M of the in-village facility was carried out by respective village-level committees. However, during 2009, the KRWSSA invited bids from private players to undertake O&M of the common facility of the Mamdapur MVWSS for a period of three years. Bangalore-based Niketan Engineering and Projects Private Limited was selected as the O&M contractor which started providing services from April 2010. This case study documents the O&M practices of the contractor that have resulted in enhancing the performance of the Mamdapur MVWSS. Table 11.1 provides the technical details of the Mamdapur MVWSS.

### TABLE 11.1: SNAPSHOT OF MAMDAPUR MVWSS

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Mamdapur Multi-Village Water Supply Scheme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year of Implementation</td>
<td>2009</td>
</tr>
<tr>
<td>Total Project Cost</td>
<td>₹919.79 lakh (not including the in-village facility)</td>
</tr>
<tr>
<td>Drinking Water Source</td>
<td>Ghataprabha River (about 30 km from Gokak town towards Belgaum)</td>
</tr>
<tr>
<td>Gram Panchayat and Villages Covered</td>
<td>Mamdapur GP - Mamdapur, M. Shivapur, Dundanatti and Ajankatti villages, Maladini GP - Maladini and Upparhatti villages, Hirenandi GP - Hirenandi, Panchayakanhatti and Chikkanandi villages</td>
</tr>
<tr>
<td>Connections</td>
<td>A combination of private household connections and stand posts</td>
</tr>
<tr>
<td>Water Demand</td>
<td>70 lpcd</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>Common facility consisting of a jack well and a pumping system, 3.42 MLD capacity WTP, MBR and a related water transmission network</td>
</tr>
<tr>
<td></td>
<td>In-village facility consisting of an overhead tank and a distribution network for each of the nine villages</td>
</tr>
<tr>
<td>Tariff Structure</td>
<td></td>
</tr>
<tr>
<td>Year</td>
<td>Consumption Slab</td>
</tr>
<tr>
<td>------</td>
<td>------------------</td>
</tr>
<tr>
<td>2009</td>
<td>No limits</td>
</tr>
<tr>
<td>2013</td>
<td>No limits</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>Common Facility:</td>
</tr>
<tr>
<td></td>
<td>In-village Facility:</td>
</tr>
</tbody>
</table>

On-site dosing test for disinfection
KRWSSA’s district support unit used a unique management approach to involve a private contractor to improve the scheme’s performance. The agency unbundled the management function and outsourced the O&M of the common facility to the private contractor while the VWSCs manage water distribution at the village level. Thus, bulk water supply and water distribution have been unbundled. Bulk supply is being managed by a professional contractor, Niketan Engineering and Projects Private Limited, which has entered a joint enforceable contract with the Chief Executive Officer, Zilla Panchayat, Belgaum and Joint Committee, Mamdapur MVWS Scheme. The involvement of the private O&M contractor has made a substantial difference in service delivery with a majority of the people expressing satisfaction with the service quantity and quality. It has also resulted in KRWSSA initiating new bids at the end of the expiry period to the current contract.

Details on the performance of the scheme with regard to key parameters are provided in Table 11.2.

Over the last three years, the O&M contractor has earned the confidence of the villagers who vouch for the excellent service provided. During certain stages of the contract period, when the release of government funds was delayed, the community pitched in to support the contractor. The reasons for the success can be traced to the good beginning made by the contractor wherein experts from the contractor’s team conducted an extensive study to understand the root challenges in the scheme and devise an O&M strategy to ensure that bulk water is delivered to village overhead tanks on a regular basis. The O&M strategy included carrying out scheme-specific training programmes for all the staff employed by the O&M contractor. Additionally, the O&M contractor also participated in stakeholder consultations to understand the service delivery requirements from the stakeholders’ perspective. Inception meetings with community leaders in each village were conducted to explain the service model along with the role that the VWSC needs to play to ensure good water services to the community. These meetings were important to get every stakeholder on board prior to the actual start.
TABLE 11.2: SNAPSHOT OF THE O&M PERFORMANCE OF THE MAMDAPUR MVWSS

<table>
<thead>
<tr>
<th>O&amp;M Contractor Name</th>
<th>Niketan Engineering and Projects Private Limited, Bangalore</th>
</tr>
</thead>
<tbody>
<tr>
<td>O&amp;M Contract Period</td>
<td>29 April 2010 – 28 April 2013</td>
</tr>
<tr>
<td>Contract Value</td>
<td>₹41.61 lakh per annum</td>
</tr>
<tr>
<td>Main Responsibility</td>
<td>Provide the required quantity of good quality bulk water to all the scheme villages, repair all components, maintain a log book, create awareness on O&amp;M involving Joint Committee/GP/VWSC/user community</td>
</tr>
<tr>
<td>Staff Strength and Responsibilities</td>
<td>12 including one manager who is an expert in community activities, one engineer, one supervisor, three pump operators, five valvemen, one mechanic/electrician</td>
</tr>
<tr>
<td></td>
<td>The manager and engineer have over 10 years of experience in the water supply sector</td>
</tr>
<tr>
<td>Service Indicators</td>
<td>Supply of Bulk Water Quantity – As per the requirements of each of the villages in the scheme</td>
</tr>
<tr>
<td></td>
<td>Disinfection of Water – Water disinfected as per the quality of the treated water so that residual chlorine is maintained while supplying to each of the villages under the scheme</td>
</tr>
<tr>
<td></td>
<td>Quality of Treated Water – Tested every day prior to supply to each village</td>
</tr>
<tr>
<td>Documentation</td>
<td>Involves documenting all aspects of maintenance, quality testing, spare parts availability and management</td>
</tr>
<tr>
<td>Social Indicators</td>
<td>Communities claim that sick days have decreased significantly since the scheme has been implemented</td>
</tr>
<tr>
<td></td>
<td>Women express relief from the drudgery involved in collecting water</td>
</tr>
<tr>
<td></td>
<td>Children admit that they have more time for studying and recreation</td>
</tr>
<tr>
<td></td>
<td>Women’s involvement in VWSCs has shown a steady increase and Community consultations on water issues have increased</td>
</tr>
<tr>
<td>Community Involvement</td>
<td>During repair work, Joint Committee/GP/VWSC and other elders are present</td>
</tr>
<tr>
<td></td>
<td>Villagers have direct contact with senior agency staff</td>
</tr>
<tr>
<td></td>
<td>Chlorination test for treated water carried out in the presence of villagers</td>
</tr>
</tbody>
</table>

of the contract period. Further, the O&M contractor maintained excellent relationships with both the district support unit in Belgaum district and the agency’s headquarters in Bangalore.

Details of the scheme’s performance over the last three years are provided in Table 11.3.

Conclusions

The involvement of the private sector in the O&M of MVWSS’s common facility has provided the local community a role and an
TABLE 11.3: PERFORMANCE OF THE MAMDAPUR MVWSS

<table>
<thead>
<tr>
<th>Sl. no.</th>
<th>Parameter</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>House Connections</td>
<td>Increasing from 908 (16.6%) in April 2010 to 1,660 (30.4%) in April 2013. More households have expressed an interest in individual connections once the distribution network within the village improves.</td>
</tr>
<tr>
<td>2</td>
<td>Supply Hours</td>
<td>Supply hours have increased from 1-2 hours/day in April 2010 to 2-3 hours/day in April 2013.</td>
</tr>
<tr>
<td>3</td>
<td>Tariff Billing and Collection</td>
<td>Increased from ₹2.5 lakh in 2009-10 to ₹13.5 lakh in 2012-13.</td>
</tr>
<tr>
<td>4</td>
<td>Power Charges</td>
<td>FY</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2010-11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2011-12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2012-13</td>
</tr>
<tr>
<td>5</td>
<td>Access to Spare Parts</td>
<td>Spare parts are stored at the WTP site and in the agency’s office.</td>
</tr>
<tr>
<td>6</td>
<td>Complaint Redressal</td>
<td>Villagers have direct contact with senior staff of the agency and also regular informal meetings at the village level.</td>
</tr>
</tbody>
</table>
Resolving Drinking Water Problems through Community Efforts

Naini-Poundar Village, Rudraprayag District, Uttarakhand
The key factors contributing to the success of the Naini-Poundar Water Supply Scheme are active community participation, an effective and knowledgeable local leadership, transparency in the functioning of local institutions, and capacity building and training of key stakeholders.

Background
With an increasing population, degrading health of watersheds and impacts of climate change, ensuring rural water security is now emerging as one of the biggest challenges to sustainable development. Though the Himalayas are a source of countless perennial rivers, the mountain people, who depend mostly on spring water, have started facing drinking water scarcity with alarming frequency. New strategies, which are ecologically sound and cost effective, need to be actively demonstrated and up-scaled. Traditionally, water supply or harnessing schemes have received higher priority but, with the drying up of water sources, these schemes are faltering and there is a felt need for reviving water sources using an integrated approach. One such water supply scheme is the Naini-Poundar Water Supply Scheme implemented in Uttarakhand under the World Bank-assisted URWSSP. Under this, the water supply scheme is integrated with the catchment area conservation and management programme, the household and village environmental sanitation programme, solid waste management, promotion of health and hygiene awareness and safe disposal of waste water. The Naini-Poundar Water Supply Scheme was commissioned in December 2011. Since then, the scheme has been managed by the UWSSC in a sustainable manner. This case study documents the process adopted in implementing a demand-based community-managed sustainable water supply project.

Distinct Features of Naini-Pounder
GP Naini-Poundar, block Augustmuni in Rudraprayag, has a population of 796 comprising 132 households, which are scattered in five habitations. The village is situated en-route to famous temples Sidhpeeth Goddess Ma Sheetla Devi and Lord Basu Kedar. It is located 60 km from the district headquarters Rudraprayag at an altitude of 1,750 m above the mean sea level. The temperature varies between 20° centigrade (C) and 35°C (during summer) and between -5°C to 5°C (during winter). The village is surrounded by dense oak forests. Most villagers are employed in the service sector while a few are dependent on agriculture for subsistence. The literacy rate of the village is quite high at 85 per cent.

Description of the Water Supply Scheme
The villagers were dependent on the Naini-Poundar Water Supply Scheme constructed by the Uttarakhand Peyjal Nigam in 1984. However, the water supply scheme had outlived its technical age by 1999. Further, the water source for the scheme was located in another habitation which resulted in frequent disruptions by residents of this habitation. It also showed a diminishing trend of water discharge. Thus, there was an acute shortage of water in the village and villagers had to depend on water tankers provided by the Uttarakhand Jal Sansthan, which were inadequate for fulfilling the drinking water needs of the villagers.

All these reasons led the community to switch over to a demand-responsive approach to improve their water supply system. The community, through a GP resolution, requested URWSSP’s local district implementation unit to improve water supply and sanitation services. The village was selected under the project during 2008-09.
Processes Followed

Pre-feasibility
The pre-feasibility study found that Naini-Poundar village was experiencing acute shortage of drinking water and the community was willing to contribute towards partial capital costs and 100 per cent O&M responsibility costs.

Planning and implementation phase
A Planning Phase Agreement was entered into with the SO, Shri Raj Rajeshwari Bal Evam Mahila Kalyan Samiti, Rudraprayag, which deployed its personnel to disseminate the project’s principles and procedures leading to community mobilisation and preparing villagers for implementing the water supply scheme. A UWSSC comprising eight members was constituted to manage and execute the water supply scheme. The UWSSC gave due importance to the inclusion of women representatives as members. One of the main problems in implementing a sustainable water supply project in the village was the lack of an appropriate source of water within the village’s limits. Finally, because of the combined efforts of all the project stakeholders, SO, UWSSC and the district implementation agency, the community obtained a no objection certification from the nearest GP in Uchola to tap Uchola Gadhera as a water source. Various technical options were discussed in community-wide and ‘Agree-to-do’ meetings. Discussions on technical options included those on gravity, pumping, rainwater harvesting and reorganising the existing scheme. Finally, a gravity-based scheme from Uchola Gadhera was unanimously approved by the community.

The availability of discharge in Uchola Gadhera was found to be around 200 LPM throughout the year which was sufficient to meet the water demands of the village. For the long-term sustainability of the source, various catchment area conservation measures were planned. The planning phase resulted in the preparation of a DPR amounting to ₹35.6 lakh. Later, the project was implemented through an implementation phase quadruple agreement starting on 30 August 2010. The water supply infrastructure for the scheme comprises a spring collecting chamber, one reservoir of 30 kl capacity, a 8,665 m supply network, a 3,445 m distribution network, 17 PSPs, a 1,000 hectare plantation, two recharge pits and four RR dry stone check dams. The scheme was commissioned on 2 December 2011.

O&M phase
For the first few months after the scheme was commissioned, the district level project functionaries built the capacity of UWSSC and PRI members in routine O&M of the scheme and accounts and financial management. In this phase, the emphasis was
on hand holding UWSSC and GP members. Capacity building activities for O&M were completed in April 2012. Since then the scheme is being operated and maintained by UWSSC under the guidance of the GP.

**Evidence of Performance**
The scheme is running satisfactorily and is meeting its recurring costs without external support from the government since April 2012. At times, DPMU officials provide support/guidance to the GP to ensure smooth functioning and/or operation of the scheme.

Every family/beneficiary in the village follows UWSSC’s rules/regulations. The active participation and contribution of a woman as a UWSSC member and her participation in community meetings has become a regular feature. UWSSC also resolves disputes at the village level and involves the villagers in contributing to the scheme’s operations. The beneficiaries contribute ₹10 per month per family as user charges to UWSSC’s O&M account. UWSSC has been able to generate surplus funds to the tune of ₹35,000 after meeting all its O&M expenses. Transparency in UWSSC’s functioning has contributed to the successful running of the scheme. This is reflected by the fact that community-wide meetings are organised regularly to share income and expenditure details with the villagers.

**Success Factors**
The key factors contributing to the success of the Naini-Poundar Water Supply Scheme are active community participation, an effective and knowledgeable local leadership, transparency in the functioning of local institutions, and capacity building and training carried out under the project.

The SO did an excellent job by devoting sufficient time for interaction with community members and explaining the nuances of the proposed demand-driven approach to them and actively involving them in all the phases of the scheme cycle. The success in community participation led to the formation of an effective and knowledgeable UWSSC that was trained to efficiently and effectively handle disputes, material procurement, financial transactions and record/ book keeping.

Ever since the scheme was commissioned in December 2011, the UWSSC has been able to collect O&M costs from all the village households regularly. Further, public disclosures of all the activities, including financial transactions, has contributed to the UWSSC gaining the confidence of the community and also ensured the continued participation of community members and a sense of community ownership in the scheme.

**Conclusions**
Right from the initial stages of the project, the community was empowered to participate in the scheme source and design selection. Moreover, community members were made aware of the fact that the facility provided was their own and its maintenance was essentially their concern. The demand by and participation of the community have remained key elements that have influenced its willingness to assume financial responsibility for the system. The scheme has also proved that a community can show interest and enthusiasm in shouldering responsibilities, including in procurement and financial management activities, when its members are properly empowered.

For additional information on the scheme, contact: Mr. P.S. Matura, Environment Specialist and Mr. L.P. Nautiyal, Manager (Accounts), District Project Management Unit, Swajal Project, Badrinath National Highway, opp. Guru Ram Rai School, Himalaya Darshan Hotel, Tilani, Rudraprayag - 246171, e-mail: dpmu_rudra@rediffmail.com; Phone No. 01364-233492.
Reinventing Community Water Management: From State Ownership to Professional Community Management

Nenmeni Rural Water Supply Scheme, Wayanad District, Kerala

OPERATION AND MAINTENANCE – THE BERU DIFFERENTIATORS

The Beru Water Supply scheme in Ranchi District of Jharkhand state has been in existence since 1988. However, the water service provided to the community has been poor resulting in inadequate supplies, unreliable services, illegal connections and non-payment of water charges. Since 2010, the water supply services to the Beru Panchayat has considerably improved culminating in Mr. Rakesh Bhagat, the President of the VWSC being recognized for his role by the Government of Jharkhand at the State Foundation Day on November 14, 2012. The key differentiators for the improved services are the following:

• Community Empowerment: The 2010 elections to the Panchayat Raj Institutions came as a boon to the Beru community as it gave them an opportunity to empower itself and elect persons from within the community who were desirous of taking leadership in rectifying a dysfunctional village water supply scheme;

• Stakeholder Consultation and Involvement: The Village Water and Sanitation Committee (VWSC) formed soon after the elections discussed threadbare all the issues surrounding the water services with the consumers and with the local office of the Drinking Water and Sanitation Department, Government of Jharkhand and arrived at solutions to solve the problems. Additionally, the President of the VWSC initiated individual correspondence with the households that enabled the VWSC to develop the rapport necessary to implement the innovative measures agreed upon for improving the water services;

• Transparency in Governance: Since its inception, the VWSC has been very transparent in its working. For example, Mr... Rakesh Bhagat, President of the VWSC has written letters to each individual consumer regarding the importance of water bill payments (including the overdue amounts) and providing them with a definite time line for making such payments. Additionally, he has shared the VWSC balance sheet with the consumers resulting in the community understanding the linkage between prompt payments and guaranteed water services. Further, any cash incentive provided by the Government for the VWSC’s achievements has been set aside to take up additional measures to further improve the services;

• Prompt Maintenance Services: The Beru Gram Panchayat has developed an excellent working relationship with the Drinking Water and Sanitation Department which has resulted in the VWSC carrying out prompt maintenance work without unduly disrupting the water supply services. For example, two incidents of pump break down resulted in repairs being attended to promptly within two working days. And, such quick responses helped the VWSC gain confidence of the community in its ability to provide the services. In addition, the VWSC has increased the supply hours from two to four hours per day resulting in increased reliability of the water services;

• Strong Leadership: The key aspect that has considerably contributed to the improvement of water services is the focused and systematic approach towards achieving a goal, a hallmark of strong leadership.
**Background**

In 1999, the Government of Kerala took a policy decision to transfer existing single-village water supply schemes that were operated by the KWA to the GPs. Subsequent efforts by KWA to transfer single-village schemes did not yield the desired results as the poor conditions of a majority of the schemes did not enthuse the GPs to take them over. However, when the state government implemented the World Bank-funded Jalanidhi project in 2005, the takeover/transfer of ownership of single-village schemes was made mandatory for participation. Under the Jalanidhi project, the GPs assess the existing conditions of single-village KWA schemes with the help of a team from an SO and a rehabilitation plan is implemented. In a number of cases, the GPs have, after rehabilitating the schemes and improving their efficiency, handed them over to user communities for O&M.

One such scheme is the Nenmeni Rural Water Supply Scheme (NRWSS) (Figure 13.1) located in the Nenmeni GP in Wayanad district in Kerala. It was established in 1998 and, until 2007, was operated by KWA; however, the supply was irregular and quality of water poor. In 2007, the scheme was transferred to the Scheme Level Executive Committee (SLEC) registered under the name Nenmeni Shudhajala Vitarana Samiti (NSVS). The scheme sources water from the

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**The scheme offers many insights into how a government-managed RWSS can be successfully transferred to user-communities and high levels of sustainability achieved in the process.**
Noolpuzha, a perennial river originating in Tamil Nadu, which flows through the Nenmeni and Noolpuzha GPs in Kerala before joining Kabini River, a tributary of Kaveri River. Since 2007, water services have improved considerably and NSVS has been generating surplus revenues. Moreover, NSVS has developed expertise in managing rural water supply services and has won the confidence of all the stakeholders in the region. Recognising this, the Nenmeni GP recently transferred the O&M of additional schemes to the NSVS.

NRWSS was implemented in phases. During Phase I (1993-2005), when the scheme was operated by KWA, the water supply was irregular and water quality poor. During the second phase (2005-07), staff members were temporarily recruited by KWA who operated the scheme under the overall supervision of the GP. With lack of accountability in this phase, the GP struggled to manage and operate the scheme and also to maintain supply. The scheme gradually developed several technical snags: the infiltration gallery did not function, the filter system at the water intake point was clogged and became ineffective, turbidity at the source and tap points was high, and the water supply was erratic. Payment to the

Kerala State Electricity Board was highly irregular and, by 2007, there were outstanding dues of ₹32.35 lakh. The GP negotiated with the state government and accepted the offer of a one-time settlement of ₹27 lakh to clear the dues. The scheme was then transferred to NSVS.

Later, during the third phase (2007-09), the rehabilitation of NRWSS was carried out at a cost of ₹50 lakh under the guidance of Shreyas, a SO selected for the project.

Under the rehabilitation package, 25 km of additional distribution network was laid, the infiltration gallery and intake points were thoroughly overhauled, a stand-by pump was installed and a silver-ionisation system commissioned to purify raw water. During this phase, NSVS faced additional challenges involving the poor condition of pipes installed by KWA that required immediate. NSVS incurred additional expenditure to replace these pipes. Further, the SLEC undertook a study on the number of connections and found that there were 389 domestic connections and 257 PSPs. The scheme's scope was expanded by providing private household connections to 338 new domestic
Taking on New Challenges | A Compendium of Good Practices in Rural Water Supply Schemes

Consumers, thus making a total of 727 household consumers at the end of the rehabilitation period. While all consumers were required to become members of NSVS, only the new consumers were required to pay the connection fee. Since 2009, NRWSS is being completely managed by NSVS under the overall supervision of the GP.

The institutional arrangement for managing NRWSS is provided in Figure 13.2.

The area-wise consumers meet once every three years. They elect representatives to the Scheme Level General Body and air their opinions on the functioning of the scheme. Each area general body elects five representatives each to the Scheme Level General Body which elects a nine member SLEC, with one representation for each area. Democratic representation has been ensured by the reorganisation of the Scheme Level General Body, which is based on area-wise consumer household groups.

The NSVS distributes water in 18 of the 22 wards in Nenmeni GP. The distribution area falls under two revenue villages in the GP: Cheeral and Nenmeni. Water from Nenmeni RWSS is supplied to the entire stretch of Cheeral village and partially in Nenmeni village. Cheeral village is treated as zone one and Nenmeni village as zone two for water distribution. The distribution time is from 6 am to 2 pm, alternating between zone one and two. At present, there are over 1,470 private household connections that are served by NSVS. While all private household connections are metered, the PSPs are not. Each consumer pays a NSVS membership fee of ₹35 and an additional ₹1,500 as connection charges. In order to ensure inclusivity of all sections of the community, NSVS charges below the poverty
line (BPL) households ₹750 per connection which is further reduced to ₹300 per connection for Scheduled Caste and Scheduled Tribe households. The cost of labour and material for the connection from the main distribution line to the household is borne by the consumer. NSVS also allows prospective households to contribute their labour to cover part of the cost for the connection from the main distribution line to their households. Each household pays a minimum tariff of ₹50 per month.

NSVS supplies water free of charge to a Primary Health Centre, an old age home, the GP office and five houses which have only elderly people aged 70 years+ at home. Additionally, NRWSS provides need-based PSPs at the instance of the GP. The GP periodically conducts a review of the necessity of PSPs and currently there are 71 PSPs under the scheme. The GP pays a minimum annual payment of ₹3,750 per PSP. The prevailing tariff structure is provided in Table 13.1.

<table>
<thead>
<tr>
<th>TABLE 13.1: TARIFF STRUCTURE AT THE NENMENI RWSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumption Level / Month</td>
</tr>
<tr>
<td>---------------------------</td>
</tr>
<tr>
<td>0-10,000 litres</td>
</tr>
<tr>
<td>10,001-15,000 litres</td>
</tr>
<tr>
<td>15,001-20,000 litres</td>
</tr>
<tr>
<td>20,001-25,000 litres</td>
</tr>
<tr>
<td>25,000+ litres</td>
</tr>
<tr>
<td>PSP</td>
</tr>
</tbody>
</table>

The process of collecting O&M charges for monthly water consumption at the consumer level begins with the meter reader visiting member households. He/she reads the meter, prepares the demand notice and presents it to the household. The demand notice is partially pre-filled with details of previous consumption data. The consumer has four options for paying the O&M charges: on-the-spot payment to the meter reader; at any of the four local collection centres; at the computer training centre run by NSVS; or at the central office. NSVS issues a receipt to the consumer upon receipt of payment.

NSVS has 14 paid employees who report to the President of the SLEC, comprising three pump operators, one water meter reader, three plumbers, one valve operator, three accountants and one computer instructor. The salaries and benefits of all the employees are charged to NSVS’s account.

NRWSS uses customised computer software to manage information relating to the payment of water cess and expenditure incurred by the scheme. The software was developed in-house by the NSVS Secretary with support from professionals. A backup parallel book of accounts is also maintained for added data security. The scheme’s accounts are audited by a chartered accountant for every financial year after the NRWSS took over and a copy of the audited statement is provided to the office of the Registrar of Charitable Societies. Details of income and expenditure under NRWSS’s O&M is provided in Table 13.2.

<table>
<thead>
<tr>
<th>TABLE 13.2: INCOME AND EXPENDITURE UNDER O&amp;M IN NENMENI RWSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td>2012-13</td>
</tr>
<tr>
<td>2011-12</td>
</tr>
<tr>
<td>2010-11</td>
</tr>
</tbody>
</table>
Success Factors

The process of complaint redressal involves recording both written and telephonic complaints and resolving them in the shortest possible time. On an average, NSVS receives eight to nine complaints every day. However, on the whole, consumers are satisfied with the services provided by NSVS. This is reflected by the fact that a consumer is keen to secure a second connection for another house that he is building in the village. Consumers also speak highly of NSVS officials who visit the households regularly to assess the satisfaction levels of water supply services. In fact, the excellent rapport that NSVS officials have with the households is a major contributory factor in the success of the scheme.

NSVS maintains an excellent functional relationship with the GP. Another key achievement is that NSVS has remained apolitical, including during its elections. Moreover, the excellent and stable leadership, right from the planning stage, has enabled NSVS to develop and implement a sustainable vision for the scheme. Further, NSVS exhibits a high degree of ‘community professionalism’ as seen by its initiatives in developing systems and procedures based on its practical experience. The expertise developed by NSVS in managing the RWSS has gained the trust of the GP which has handed over the O&M of additional RWSSs to NSVS.

The O&M expenses of NSVS for the period 2010-13 show an overall positive financial balance. NSVS has managed the surplus revenue in an exemplary manner by creating assets such as its own office where facilities have been provided for storing spare parts, paying bills, storing documents, work space for employees and for regular office meetings. Additionally, NSVS has started a computer centre in the village where it provides internet and facsimile services to the villagers. A facility for paying water bills is also made available at the computer centre.

These achievements have been possible because of the excellent institutional arrangement in which all the stakeholders have performed their roles in a professional and effective manner. Hence, NRWSS offers many insights into how a government-managed RWSS can be successfully transferred to user-communities and high levels of sustainability achieved in the process.

For additional information on the scheme, contact: Mr. Biju KC, Secretary, NRWSS at nenmenictc@gmail.com and +91 974 415 5510.
O&M Initiatives for Sustainability: 24x7 Water Supplies and Computerised Billing for Rural Households

Punjab
The provision of a 24x7 metered water supply system service in RWSSs in Punjab has ensured sustainability due to the service provider’s ability to provide good quality water supply at a convenient time to consumers, ensuring inclusiveness and equity in water supply and fairness in pricing.

Background
In Punjab, in the last decade, the O&M of RWSSs has been transferred to GPs. In turn, the GPs have either built in-house capacity or hired the services of the private sector to carry out day-to-day operations of the water supply schemes. The service standards vary with a resulting impact on revenue collections and, thereby, on the sustainability of the schemes. In progressive states such as Punjab, villagers’ expectations from RWSSs have veered towards demanding high service standards including provision of round-the-clock water supply and ensuring equity in supply. Recognising this, the Government of Punjab’s vision and long-term rural water supply strategy aim at covering all villages in the state with 100 per cent water supply with higher service standards and individual service connections to most households as well as providing modern underground waste water collection and disposal systems. The main objectives of the Government of Punjab’s programme are:

- Coverage of all not covered and partially covered villages to reach at least a fully covered status
- Ensuring sustainability of water supply services
- Initiating measures to improve village level environmental sanitation.

This is being done through the implementation of a 24x7 water supply service to cover all the rural households.

24x7 Metered Water Supply
The Government of Punjab implemented a pilot 24x7 metered water supply service in 225 households of village Singhpura, district Mohali, at a cost of ₹2.80 lakh in 2010. This experience showed that an intermittent service can be converted to a 24x7 water supply service with minor additions such as installation of a liquid-level controller in the overhead service reservoir and meters in every household and by employing an effective revenue management system. The investments on the modifications can be offset by the resultant benefits of reducing non-revenue water.

By May 2013, 15 villages in Punjab had round-the-clock (24x7) metered water supply. These villages are Singhpura, Sitabgarh, Bhajauli, Dau Majra, Jeouli and Fatehgarh in Mohali district, Chitmal, Paprala, Rasulpur, Railon Khurd, Abhiana Kalan, Abhiana Khurd in Ropar district, Dedran, Manhera Jattan in Fatehgarh Sahib district and Jatiwal in Patiala district. More Gram Panchayat Water Supply Committees (GPWSCs) are coming forward to implement 24x7 water supply services with metered connections. With a 24x7 water supply, illegal connections have become redundant, the chances of water contamination have reduced and households at the tail end of the system are also getting their fair share of water.

Procedure Adopted for Implementing the 24x7 Water Supply Service
The Department of Water Supply and Sanitation (DWSS), Punjab, has come up with a clear procedure for implementing the 24x7 service and ensuring its success. This includes:

- Making people aware and sensitising them about the scheme
- Generating participatory rural appraisals
- Forming GPWSCs
- Providing capacity building training
- Training on project concepts
- Role of GPWSC/GP/opinion leaders during the
Taking on New Challenges | A Compendium of Good Practices in Rural Water Supply Schemes

pre-planning and planning phases
• Training on quality aspects in the implementation phase
• Training on O&M aspects to pump operators/technicians/officials handling the accounts and billing during the post-implementation phase.

Advantages of the 24x7 Water Supply Service
The advantages of 24x7 metered water supply services over intermittent water supply are that they:
• Prevent ingress of contaminants from the ground to the distribution system;
• Reduce health risks;
• Service providers can practice efficient supply and demand management;
• Improve customer satisfaction;
• Minimise complaints about inadequate supply of drinking water; and
• Reduce water wastage as continuous supply prevents households from storing water and throwing it out at the start of fresh supply.

Metering and Billing
All 24x7 water connections are metered. Monthly meter readings are taken by the operator (and the cashier) in the presence of the consumer. The consumer signs off on the register about the correctness of the meter reading. Collection of water bills is done jointly by the pump operator and cashier. In case of problems with the meter during use, an average bill of the previous three months’ use is charged. GPWSC supplies new water meters in lieu of faulty meters. The charges for the new meter are borne by the consumer. If a consumer is found guilty of misusing the water, his/her water connection is disconnected and it is reconnected only after reconnection charges are paid. Metered connections have not only helped in reducing the amount of water used by households, but also benefited the poor as they generally used less water than more prosperous households. Under the flat rate method, both prosperous and poor households pay the same amount regardless of the quantity of water they consume. Additionally, the meters result in reductions in non-revenue water. They also check the misuse of water by advantage groups. The meters also bring about professionalism in the working of GPWSCs.

24x7 Water Supply System is Financially Sustainable
The 24x7 metered water supply system in villages has become sustainable as 100 per cent of the households have obtained individual water connections. The GPWSC has made adequate arrangements to keep records of meter readings, raise water bills as per consumption of water, collect water bills by the due date, and impose penalty if they are paid after the due date, charge against non-functional water meters on previous average consumption basis and repair defective meters quickly. Statistical details of the initially commissioned 11 villages covered under 24x7 metered water supply schemes indicating their month of commissioning, number of households, number of individual household connections, monthly tariff and generation of surplus revenue are given in Table 14.1.

Table 14.1 indicates that all 11 villages with 24x7 metered water supply services are financially sustainable. One reason for this is that DWSS has allowed water tariffs to be determined by VWSCs to recover the system's O&M costs in full. Volumetric charges cover the salaries of the operator and cashier, electricity charges for pumping water, as well as for minor repairs and maintenance. Committees are authorised to revise their water tariffs depending on their actual expenditures. About 90 per cent of the consumers are paying their water bills regularly, while the others are being persuaded to do so. Some villages now have sizable savings in their O&M accounts—varying from ₹35,000 to ₹10 lakh. Savings have been re-invested to extend distribution networks, procure standby pumps and diesel generators, or to landscape water works.

Sustainability of any water supply scheme depends on the service provider’s ability to provide good quality water supply at a convenient time to consumers, ensuring inclusiveness and equity in water supply and fairness in pricing. The provision of
a 24x7 metered water supply system service does all this and more. It provides an incentive for resource conservation as it encourages consumers to close the tap when they do not want water. The 24x7 service provides a sense of equity among the consumers as the households do not store water (for non-supply period needs) and those located at a higher elevation do not suffer as lower elevation consumers close their taps as soon as their requirements are fulfilled. Additionally, the metered water supply system provides an opportunity to charge as per volume of water consumed, unlike in un-metered flat rates, where the quantity consumed is not the criterion. Moreover, the villagers get safe water at their doorsteps round the clock and are encouraged to pay water bills regularly. More importantly, GPWSC remains alive to the necessity of properly maintaining the O&M accounts.

Inputs from Chief Engineer cum Programme Director, State Programme Management Cell, Mohali, Punjab and Superintending Engineer cum DPD, DWSS Circle, Chandigarh.
Mainstreaming Information and Communication Technology in Rural Water Supply
A Good Governance Initiative, Punjab
Taking on New Challenges | A Compendium of Good Practices in Rural Water Supply Schemes

Background

GPs in Punjab have been at the forefront of taking responsibility for O&M of RWSSs for the last decade or so. Over the years, the GPs have been able to develop capabilities to effectively address not only technical but also managerial, social, financial and institutional issues to provide reliable water services to the population. However, there have been instances of poor service delivery which have been a result of certain other limiting factors at the GP level. These include, but are not limited to, the GP’s ability to carry out repairs within a short period, schedule the supply period that is convenient to the community, and become accessible to the consumers at all time.

The Government of Punjab recognised these factors and initiated two important good governance initiatives at the state level: the Shikayat Nivaran Kendra (an online web-enabled centralised complaint redressal system) and tele-calling (a proactive feedback mechanism and computerised billing system). The Secretary, DWSS, Government of Punjab, reviews the progress on these initiatives on a regular basis. This enables the administration to initiate remedial measures to address common problems to avoid their recurrence in the future.

Web-enabled Centralised Complaint Redressal Mechanism

In November 2009, a Shikayat Nivaran Kendra (SNK) was established where rural consumers could call a 24x7 toll free number (1-800-180-2468), register their complaints online, track progress and request services. This system of complaint redressal is based on the latest information technology and operates efficiently on a 24x7 basis. Every official is now connected to the online system through telephone, e-mail and SMS and can monitor complaints directly. The time that should normally be taken to address some typical complaints is spelt out and if a complaint is not rectified within this period, it is forwarded to a senior officer. Complaints are not closed until the customer is satisfied. The water supply service providers now make every effort to provide water supply service to consumers with minimum breakdowns and also enable them to respond and take corrective measures.

Why SNKs?

Since a large number of RWSSs are operated in remote areas in Punjab, the DWSS was finding it difficult to monitor their day-to-day working including staff performance, time taken to rectify defects, the quality of water supplied and adherence to supply schedules. Additionally, the villagers were facing problems in accessing GP offices to register complaints and ensure that the complaints were attended to on a regular basis. This situation resulted in villagers losing confidence in the GP’s ability to provide water supply services. Hence a, complaint redressal system, the SNK, was established with the following objectives:

- To improve the quality of service delivery system
- Achieve best results with optimum inputs from man, machine and material while utilising the latest e-governance methods and techniques
- To enhance efficiency and financial sustainability of the operations of the water supply system by reaching out to beneficiaries

Using technology, the Punjab government has started two good governance initiatives—an online web-enabled centralised complaint redressal system and a proactive feedback mechanism and computerised billing system—to enhance water supply services
transparency. The initial cost of ₹ 5.78 lakh for hardware and application software was met from funds available under the National Rural Drinking Water Programme (NRDWP). The monthly recurring costs on O&M and updation of software as well as generation of reports as per DWSS’ requirements are being met from the annual non-plan budget of the department.

The government is making efforts to encourage all stakeholders to use the system. Publicity such as advertisements in the print media, scroll strips on television channels, wall paintings of the toll free number at prominent places in villages by using cut stencils, inserting advertisement in quarterly news magazines (approximately 23,000 copies being circulated in various villages) was initiated to popularise the complaint redressal system and thereby improve the delivery of services.

**The Complaint Redressal Process**

The complaint redressal process is shown in Figure 15.1.

![FIGURE 15.1: THE COMPLAINT REDRESSAL PROCESS](image)

<table>
<thead>
<tr>
<th>Comp. Code</th>
<th>Complaint Description</th>
<th>Maximum number of days allowed for redressal of complaints</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Failure of water supply due to electrical or mechanical fault in the machinery</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>Failure of water supply due to absence of operator</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Failure of water supply due to large scale leakages in pipes</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>Failure of water supply due to bad quality of water</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>Failure of water supply in some specific area, may be due to uneven topography or some other reasons</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>Others types of complaints may be due to non-laying of a distribution system or insufficient discharge of source</td>
<td>Redressal time may differ according to situation</td>
</tr>
</tbody>
</table>
The system is designed in such a way that monitoring is possible up to the highest level in the department, that is, by the Secretary of the department. As a result, complaints are being redressed on time to the satisfaction of the complainants, which has helped in restoring people’s confidence in the system. Interestingly, out of the 28,615 complaints (received till 6 June 2013) relating to the supply of drinking water in RWSSs, 28,407 have been attended to to the satisfaction of the complainants since SNK’s inception (16 December 2009).

Impact on Service Delivery Mechanisms
After the SNK was commissioned, DWSS’ service delivery has benefited from:

- Time bound delivery of services
- Check on non-performance/absenteeism among lower ranks of employees in remote villages
- Higher O&M standards
- Assessment of its performance on a daily basis
- Availability of clean water leading to good health with huge social sector benefits
- Public satisfaction due to efficiency in service delivery/prompt complaint redressal resulting in increased faith in the working of the government department
- Reduction in closure/downtime days of water supply schemes.

Tele-calling
DWSS adopted a new demand-driven methodology of project implementation, where the community is the ultimate stakeholder and owner of the scheme. After the commissioning of the project, the water supply was handed over to the GPWSC for O&M. GPWSC is constituted by the Gram Sabha of the village under the supervision of the GP. DWSS is responsible for building the capacity of GPWSC members to ensure that the committee is able to run the water supply scheme successfully.

In order to provide efficient water supply, regular hand holding by DWSS is required. It was noticed that, after the scheme was commissioned, there were many micro-level issues which cropped up in its day-to-day running. It was important to identify these problem areas and resolve them quickly to sustain the water supply system. But due to limited staff, it was not possible to visit the water supply schemes regularly. To resolve this problem it was decided to telephonically call GPWSC’s Chairman/Secretary or the other key persons on the committee to ascertain the actual situation. This experiment was started on a pilot basis in Ludhiana district and has now been implemented in all 22 districts in the state. The District Programme Management Cells, established in each district, are responsible for tele-calling five GPWSCs daily, thus reaching out to more than 2,500 GPWSCs per month in the state to seek feedback.

Methodology
Figure 15.2 depicts the methodology devised to collect feedback from stakeholders.

A pre-defined questionnaire is used to collect feedback from GPWSC. Table 15.2 presents the feedback performa that is used while calling the stakeholders. This has been devised keeping in view the need to know the status of issues related to transparency and the institutional, technical and financial sustainability of the water supply scheme.
An in-house tele-calling MIS software module was devised in MS Access software to capture the data and generate reports. Tele-calling formats received from the calling officer are fed into the computer by the data entry operator. This system ensures that reports are generated for managerial interventions and tracking of calls. It acts as a handy tool for devising a suitable mechanism for solving problems. The following key reports have been generated on the basis of inputs received during tele-calling:

- List of villages where the O&M accounts have not been opened
- List of villages where the silver ionisation plant (SIP) is not functional
- List of villages in which supply has been commissioned but it is not yet functional
- Number of leakages in the villages on a monthly basis
- Transactions not carried out through the bank;
- Status of private water connections commissioned under International Development Assistance and Sector wide Approach
- Block-wise abstract of total number of connections and
- New additions to private connections as per tele-calling.

### Impact of Tele-calling Feedback Methodology

The benefits which have accrued after starting the calling feedback performa include:

- The department is able to make timely interventions after identifying the grey areas in the functioning of the scheme
- Technical difficulties, such as leakages, SIP not working and low pressure, have been rectified
- It boosts the confidence of the stakeholder community and it feels confident of the scheme
- It gives third party feedback on the running of the scheme
- Institutional weaknesses such as non-opening of bank account for O&M expenditure and non-deployment of adequate staff by GPWSC have been identified and rectified

Tele-calling has proved to be extremely successful: it has helped in boosting the confidence of GPWSCs as they feel that the department is interested and is always available to support them in the successful O&M of schemes.
DWSS had been following manual billing since its inception and observed that, in certain instances, there was discontinuity in the billing process which led to non/late receipt of bills by consumers resulting in huge arrears in revenue. Manual billing itself is a cumbersome process starting with the meter reader collecting data on a consumer’s previous meter reading and payment status. After the meters have been read and the revenue collected, the receipt details are sent to the billing section to prepare a ledger for records of each consumer. This cycle repeats itself every month. Further, the water billing system is complex, repetitive and has voluminous data, which can be handled better through computerisation. Computerisation overcomes many of the defects of the manual system; it is faster and allows an effective control of the system. It also helps in decision making and the output formats can be tailored to suit quick retrieval of information that is necessary for decision making.

DWSS decided to shift to computerised billing in 2010. The department outsourced the generation of computerised water bills to the Department of Electronics and Accreditation of Computer Courses (DOEACC), Chandigarh, under the Ministry of Communication and Information Technology, GoI. The water bills and ledgers are generated bi-monthly through an application developed by DOEACC. This has streamlined the billing process. The department has adopted computerisation of billing of water supply in all districts in the state and, presently, 4 lakh consumers are getting computerised bills. This has resulted in an increase in revenue from user charges (Table 15.3).

Issuing water bills on a regular basis means regular reminders to consumers on timely payment of dues. This process has also helped in reducing pending dues/arrears to a large extent. The results of computerised billing are extremely encouraging.

**Conclusions**

In a majority of the cases, the O&M of RWSSs is the responsibility of the GP and/or a service provider appointed by the GP. Generally, once the O&M of the scheme is transferred to the GP, the state level agencies do not monitor its performance. This leads to deterioration in performance as the capacity of the GPs to monitor all aspects of the performance of the service provider is limited. Moreover, in certain cases, the GPs do not have the capacity to implement higher-level technical/institutional interventions to ensure the sustainability of the schemes. In this regard, the good governance initiative undertaken up by the Government of Punjab through SNKs, tele-calling and computerised billing shows the state agency’s willingness to monitor the GP and/or service provider on a day-to-day basis and also to handhold the GPs in improving water supply service delivery in the villages.

**Table 15.3: District-Wise Increase in Revenue (As in June 2011)**

<table>
<thead>
<tr>
<th>No.</th>
<th>Name of District</th>
<th>% Increase in Revenue</th>
<th>Time Since Computerised Billing Implemented</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ferozepur</td>
<td>50%</td>
<td>3 months</td>
</tr>
<tr>
<td>2</td>
<td>Mohali</td>
<td>127%</td>
<td>12 months</td>
</tr>
<tr>
<td>3</td>
<td>Mansa</td>
<td>63%</td>
<td>3 months</td>
</tr>
<tr>
<td>4</td>
<td>SBS Nagar</td>
<td>79%</td>
<td>4 months</td>
</tr>
<tr>
<td>5</td>
<td>Hoshiarpur</td>
<td>50%</td>
<td>3 months</td>
</tr>
<tr>
<td>6</td>
<td>Ropar</td>
<td>11%</td>
<td>3 months</td>
</tr>
<tr>
<td>7</td>
<td>Barnala</td>
<td>14%</td>
<td>3 months</td>
</tr>
</tbody>
</table>

Inputs from: Principal Secretary, Department of Water Supply and Sanitation, Government of Punjab; Chief Engineer cum Programme Director, State Programme Management Cell, Mohali, Punjab; and Superintending Engineer cum DPD, DWSS Circle, Chandigarh.
Implementing a Demand-based Community-managed Sustainable Rural Water Supply Scheme

Rawalsera Water Supply Scheme, Uttarakhand
**Background**

Provision of piped drinking water supply to all residents in a mountainous region poses tremendous challenges even though brooks, streams and rivers that originate from these mountains are a lifeline for a majority of the population living downstream. The steep terrain of the hill slopes offers little scope for water storage, and provides limited space for laying pipelines and, because of tourist inflow, a floating population creates high seasonal demand. Most importantly, water supply projects implemented in such challenging circumstances result in high capital costs that the local community cannot afford.

Rawalsera located in Almora district in Uttarakhand is one such village that faced these challenges.

The hilly Himalayan region where the project is located is blessed with adequately high rainfall but an overwhelmingly high proportion of this is restricted to the monsoon season. This results in paucity of water during non-monsoon months and, together with high rates of surface runoff, leads to heavy land degradation and erosion. Hence, Rawalsera decided to implement the Swajal Project under a demand-response approach in 1997. The project was completed in 2000. Since 2000, the Rawalsera water supply project has been managed by the VWSC in a sustainable manner. This case study documents the process adopted by the Rawalsera village community to implement a demand-based community managed sustainable water supply project during the last 13 years.

**Participatory Rural Appraisal**

A major challenge faced by the project implementing agency was to ensure that the various stakeholders, especially communities, understood the participatory demand-driven process. The limiting factors for the participation of the community included:

- Poor credibility
- Lack of self-confidence
- Resistance to change
- Fear of the financial consequences which a new project would bring
- Lack of experience in dealing with institutions
- Weak capacity for problem solving and planning methodologies.
- The project authorities had a poor perception of community problems and lack of knowledge about how to integrate social and technical aspects

The participatory rural appraisal process was used to help the local community gain an understanding of the planning, implementation and O&M phases of the project so that they could identify and prioritise local development needs and develop long-term action plans.

**Planning, Design and Implementation**

Following confirmation from the village community that it would participate in the project, a project cycle comprising detailed planning, implementation and O&M was followed. Each scheme cycle included four phases: pre-planning, planning, implementation and O&M. During the pre-planning phase, the SO was identified and baseline data were collected. The NGO, PGDF Ranikhet, was engaged as the SO for community mobilisation in the planning and implementation phases. In the planning phase...
included mobilisation of the community, formation of the VWSC, collection of the community’s contribution and preparation of a DPR. The VWSC, comprising nine members was constituted in 1998; it included three women and three Scheduled Caste and Scheduled Tribe members. The project technology selected was an infiltration well about 25 feet deep which is much deeper than the naulas of four to six feet, which implies interception of subterranean water termed as soil body and permits harvesting of larger volumes of water on a continuing basis. At the same time, it prevents contamination of drinking water sources through waste generated on the ground level. The infiltration well was fitted with a 10 HP submersible pump to lift water to an overhead storage tank. More specifically, the infiltration well acted as a protected intake structure for drinking water systems. During the implementation phase, the village community in association with VWSC and the NGO, executed the water supply scheme. During this phase, all the funds were handled by the VWSC and NGO, including purchase of materials. The NGO was responsible for capacity building of the community during all phases of the scheme cycle.

**Scheme Performance**

Over the last 13 years, the VWSC’s performance has been impressive. It has taken innovative steps for not only improving water service delivery but also initiated measures to improve sustainability. The highlights of the VWSC performance are:

- It has been catering to the increased demand for drinking water corresponding to an increase in population and in the number of households
- Since the date of commissioning of the water supply scheme, villagers have been getting safe potable drinking water at the rate of 40 lpcd
- GP Rawalsera received the Nirmal Gram Puraskar from the GoI in 2005-06
- The VWSC meets once a month to address problems and discuss implementing strategies to ensure the sustainability of the scheme
- The VWSC has designed a tariff structure giving due weightage to equity, affordability and willingness to pay. A monthly tariff of ₹70 for domestic users and ₹110 for non-domestic users has been fixed
- Originally, the water supply scheme was designed only for PSPs with no provision for private water connections. Later, the VWSC decided to construct/install a 1,000 litre storage tank in each household to ensure equity in water distribution and abandoned all PSPs. Thus, all the households have private water connections. The performance of the scheme as compared to the baseline year of 2000 is provided in Table 16.1.

### TABLE 16.1: SCHEME’S PERFORMANCE IN COMPARISON TO BASELINE YEAR

<table>
<thead>
<tr>
<th>Parameter</th>
<th>2000</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of households</td>
<td>59</td>
<td>71</td>
</tr>
<tr>
<td>Design population</td>
<td>439</td>
<td>631</td>
</tr>
<tr>
<td>Scheme cost</td>
<td>₹8.27 lakh</td>
<td>0</td>
</tr>
<tr>
<td>Community contribution in cash</td>
<td>₹8,272</td>
<td></td>
</tr>
<tr>
<td>Community contribution in labour</td>
<td>₹53,441</td>
<td>0</td>
</tr>
<tr>
<td>Stand post users</td>
<td>40</td>
<td>0</td>
</tr>
<tr>
<td>Domestic private connection users</td>
<td>0</td>
<td>78</td>
</tr>
<tr>
<td>Non-domestic private connection users</td>
<td>0</td>
<td>16</td>
</tr>
</tbody>
</table>

**Finance and Accounting Practices**

- The present status of book keeping and maintaining proper and updated records is quite satisfactory. All basic records are regularly and properly maintained by a trained VWSC treasurer
- Financial records are updated and maintained in proper order. Annual statements of income and expenditure are prepared and shared during a Gram Sabha meeting

The annual income and expenditure statements for the last four years are shown in Table 16.2.

As per this income and expenditure statement, it is encouraging to note that, every year, the average
revenue exceeded the average expenditure leading to positive financial balances accumulating in the account. Thus, the financial health of the Rawalsera Water Supply Scheme seems quite satisfactory and the scheme is financially viable. Additionally, the VWSC sets aside a portion of the surplus funds to meet unexpected expenditures. Moreover, the VWSC regularly pays its electricity dues unlike in supply-driven water supply schemes wherein budgetary support is provided by the state government for payment of electricity bills. More importantly, the VWSC invests in assets such as its own office including a well-equipped meeting hall and makes provisions for computerised data management.

Success Factors
A number of innovative measures were adopted since the early stages of the project to ensure its success:

- A NGO was involved as a link between the beneficiary community and the implementing agency. Acting as a catalyst, the NGO assisted in motivating and mobilising the community
- The capacity building of the community to fulfil its envisaged roles and responsibilities in all phases of the project was facilitated by the NGO through IEC activities
- A menu of technical options was presented to the community by the project authorities for it to choose the one which suited the affordability and convenience of O&M
- Complete transparency in the functioning of all the agencies throughout the project cycle ensured community acceptance of the project
- Partial capital cost sharing (either in cash or kind including labour or both) and 100 per cent responsibility of O&M by the community created a sense of ownership for the project among community members and
- An innovative measure – ‘Insurance Coverage’ – of the water supply scheme's assets after the construction phase, initially for three years from the date of commissioning, largely contributed to self-sufficiency in O&M of the scheme without further government intervention.

Conclusions
It is encouraging to see that a RWSS has been managed in a sustainable manner for the last 13 years by a motivated community. In fact, it is remarkable that the community’s motivation has been sustained for such a long time. The success story of this village demonstrates that the alternative delivery system – community management vis-à-vis the present top-down government system – is not only desirable but also feasible in the rural water supply and sanitation sector, provided there is demand by and the participation of the community in the entire project cycle.

For additional information on the scheme, contact: Mr. Kapil Lall (IFS), Director, Project Management Unit, Uttarakhand Rural Water Supply & Sanitation Project, Mussoorie Diversion Road, Makkawala, Dehradun. Contact No. 0135-2733455, 0135-2733380; Email- pmu_uttaranchal@rediffmail.com
A Model for Implementing Water Supply and Water Conservation Projects
Sanoor Gram Panchayat, Karkala Taluka, Udupi District, Karnataka
The Sanoor Swajaladhara Yojana clearly shows that it is possible to implement a sustainable water supply scheme by undertaking innovative measures that do not call for huge investments but require a motivated local leadership and complete cooperation.

Background
On a drive across the Mangalore-Solapura Highway (NH 13) amidst the greenery of the Western Ghats one comes across the small village of Sanoor that shot to international fame after the GP bagged the Google Gram Panchayat Puraskar presented by Google.org in 2010. This award was presented for the Panchayat’s extraordinary performance in local governance and work in areas such as education, health, water supply, basic infrastructural facilities, power facilities and resource conservation.

Contrary to the general trend of poor water service delivery in rural areas, Sanoor Gram Panchayat has achieved a milestone as it has carried out excellent work in the area of water supply under its own Sanoor Swajaladhara Yojana (Table 17.1). Until 2005, water supply services to Sanoor village in Udupi district in Karnataka were provided through 125 public water taps. Even this minimum water service was not available during the summer months as the wells dried up. Residents recall that a decade ago there was no access to pure drinking water despite plenty of water.

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Sanoor Swajaladhara Yojana</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year of Implementation</td>
<td>2005</td>
</tr>
</tbody>
</table>
| Project Cost and Contribution | Total cost: ₹9.60 lakh  
Central Government: ₹8.64 lakh  
Community: ₹0.96 lakh |
| Drinking water source | Bore well with 4” water source and accompanying recharge system |
| Coverage | Population: 6,328  
Households: 1328 |
| Connections | Total household connections: 680  
Total institutional connections: two government higher primary schools, five lower primary schools, one high school and PU college, six child care centres and one primary health centre. |
| Infrastructure | Pumping system: 6 HP pump, pump shed and transformer, two overhead tanks and six minor irrigation tanks  
Length of distribution network: 3,000 m of PVC and GI material |
| Tariff Structure | Consumption Slab | Residential Consumers | Commercial Consumers |
| | Up to 10 kl per month | ₹40 per month | ₹80 per month |
| | 10–20 kl per month | ₹20 for every 1 kl above 10 kl | ₹40 for every 1 kl above 10 kl |
| | 20–30 kl per month | ₹40 for every 1 kl above 20 kl | ₹80 for every 1 kl above 20 kl |
| | > 30 kl per month | ₹80 for every 1 kl above 30 kl | ₹160 for every 1 kl above 30 kl |
| Finance | Connection Fees: ₹2,000 |
| O&M | Gram Panchayat is the VWSC  
Number of staff: Eight including four pump operators, one valveman, two meter readers and one accountant |
sources in the region. The 6,000 villagers had to depend on public water taps. In 2003, the GP, under the leadership of the then President Mr. Narasimha Kamath, resolved to renovate old natural lakes and recharge dying bore wells and mud-filled open wells and use them to improve the water supply, including provision of individual water connections. Towards this, it was decided to request an initial contribution of ₹1,000 per household; ₹1,61,000 was collected for executing the scheme. Initially, it was decided to implement the drinking water scheme in collaboration with the Nitte Education Trust and source the water from the surface water source located about 20 km from the village and ensure long-term sustainability of the scheme. However, delays on the part of the Nitte Education Trust in implementing the project forced the GP to look for alternatives to realise their objective of ensuring improved water services to the villagers. Hence, in 2005, the GP launched a pilot initiative at Kamalakshanagar to upgrade an unreliable public tap drinking water system to a system that guaranteed 10,000 litres per month but which required the households to take individual metered connections.

Prior to the launch of the pilot project, the GP held extensive discussions with women of the households on the economic advantages of piped water connections, after which a majority of the Kamalakshanagar households decided to participate in the scheme. Further, to ensure inclusiveness of all sections of the community, the GP introduced special features to make the connection charges affordable for the households (Table 17.2).

<table>
<thead>
<tr>
<th>Category</th>
<th>Connection Charges</th>
<th>Meter Charges</th>
<th>Special Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Affordable Class</td>
<td>₹2,000</td>
<td>₹900</td>
<td>Nil</td>
</tr>
<tr>
<td>Less Privileged Class</td>
<td>₹2,000</td>
<td>₹900</td>
<td>₹500 down-payment and ₹1,500 in ₹100 instalments; however had to incur the ₹900 meter charges</td>
</tr>
<tr>
<td>Social Justice</td>
<td>₹2,000</td>
<td>₹900</td>
<td>₹500 down-payment, ₹1,500 connection charges and ₹900 meter charges to be reimbursed from the Scheduled Caste/Tribe Development Fund</td>
</tr>
</tbody>
</table>
However, a few households were reluctant to pay both the connection fee and the monthly tariff of ₹50 (at the time of launch) for consumption of the first 10,000 litres. These households had to be persuaded to join the scheme. Finally, 40 households participated in the scheme. After the success of the pilot project, a number of additional households in the village came forward to request for individual metered connections. Currently, 51 per cent of the village households have been provided with metered connections. Additionally, educational institutions and the primary health centre are provided with free but metered connections.

A majority of RWSSs experience their most serious problems with O&M and its cost recovery. However, the Sanoor GP has directed its efforts towards resolving major constraints that prevent any water supply project from achieving sustainability. Firstly, a minimum of 10,000 litres per month per household is assured. This amounts to a consumption of 55 lpcd which meets the World Health Organisation (WHO) recommended minimum consumption levels for a healthy individual. By committing to WHO standards as a measure of its service, the GP has instilled a sense of pride among the households opting for the scheme. In fact, community participation has been one of the hallmarks of the scheme wherein a number of people in the village, including those who already had access to water, came forward to pay for new connections.

Secondly, encouraged by the response to the new water supply scheme, the Sanoor GP initiated renovation of village ponds – Bakimarugathu, Gurubettu, Bavadaguthu and Berkermaine – during 2007-12 under various programmes of the state and central governments. The renovation consisted of desilting the ponds and constructing embankments. Simultaneously, the Earmadka, Matadabailu and Bavadabettu Canal Barrage works were also carried out. Additionally, natural lakes–Chikkabettu Kere, Halakekere, Dendabettukere and Krushi Honda–were desilted during the same period under GoK’s Western Ghats Development Programme. Further, the GP was aided by the NGO, Sri Kshehta Dharmasthala Rural Development Organisation, which helped in the construction of 10,000 small ‘farmer ponds’ on the slopes of the hills for storing rain water. All these water conservation works ensured that the water table across all wells within the GP rose and the GP insulated itself from water shortage during the summer months. In fact, in the summer of 2013, while all the surrounding villages were supplied water by tankers, the Sanoor GP provided piped water supply to its residents.

Thirdly, 100 per cent metering for household connections was ensured. This led to a perception among the participating households that they paid for water they used, resulting in prompt payment of water bills. As water began to flow into every home, income started to flow into the Panchayat accounts (Table 17.3). The GP has been maintaining a separate water register since 2009.

<table>
<thead>
<tr>
<th>Year</th>
<th>Annual Income</th>
<th>Annual Expenditure</th>
<th>Surplus</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012-13</td>
<td>₹668,553</td>
<td>₹610,472</td>
<td>₹58,081</td>
</tr>
<tr>
<td>2011-12</td>
<td>₹717,967</td>
<td>₹700,158</td>
<td>₹17,809</td>
</tr>
<tr>
<td>2010-11</td>
<td>₹608,794</td>
<td>₹596,140</td>
<td>₹12,654</td>
</tr>
<tr>
<td>2009-10</td>
<td>₹555,809</td>
<td>₹483,721</td>
<td>₹72,088</td>
</tr>
</tbody>
</table>

As shown in Table 17.3, Sanoor GP has consistently had surplus revenues over the last four financial years. Increased income levels have helped the GP to make prompt payments for electricity charges to the Mangalore Electricity Supply Company Limited. In appreciation, GoK provided a 25 per cent power subsidy to the village. Additionally, as recognition of the competency of the GP in implementing innovative schemes, GoK provided an additional support of ₹40,000 to the GP. Hence, Sanoor succeeded in receiving funds for its initiatives, while its neighbouring GPs were waiting for grants from the government.

In 2007, Sanoor GP reclaimed the ownership of an 8.6 acre natural lake in village Matada Kerewhich, till then, was being used by certain villagers for irrigating
their agricultural land; portions had been encroached upon. Later, the GP carried out desilting work through the Shram Dhan programme and converted the lake into a tourist hot spot where boating facilities have been provided. Presently, the GP earns approximately ₹60,000 annually from fishery activities that are contracted out and ₹15,000 annually from the boating contractor.

Further, as part of the Google Gram Panchayat Puraskar, Sanoor GP was awarded ₹5 lakh. The GP reiterated its commitment to upgrading its water facilities by utilising the award money to improve water services in areas such as Indiranagar, Denda Bettu, Kujumaru Gudde and Kadebettu. Mr. Kamath admits that “…though the Google Gram Panchayat Puraskar is given to Gram Panchayats for the best performance across six different fields, we got the award for the supply of clean drinking water to our villagers.”

The Sanoor GP is not one to rest on its laurels. Hence, in 2011, it has advocated the concept of rainwater harvesting and announced concessions in house tax and water bills to those who implemented rainwater harvesting. Firstly, the GP has made rainwater harvesting mandatory for all those who obtain fresh licenses to build houses or commercial buildings. Secondly, the 728 households that do not depend on water from the GP and implement rainwater harvesting in their buildings are given a 10 per cent concession in annual house/building tax. Thirdly, the 600 households that depend on water supplied by the GP are given a 15 per cent concession in their annual water bills. In line with its own recommendations, the GP has implemented of rainwater harvesting in the extended portion of its building and in schools, anganwadi centres and public health centres.

Bucking inflationary trends, in 2011, Sanoor GP reduced the water tariff by 20 per cent for the first slab (households consuming up to 10,000 litres per month and increasing the slab rates for higher consumption). The revised tariff levels reduced the

GP’s income levels. However, this move enabled it to reduce its electricity charges and ensure that water was not wasted. The GP generated a surplus of ₹58,081 despite a reduction in water tariff. Presently, the GP is in the process of introducing an SMS Alert System for bill payments as a consumer service initiative.

Conclusions

The Sanoor Swajaladhara Yojana has clearly shown that it is possible to implement a sustainable water supply scheme by implementing innovative measures that do not call for huge investments but require a motivated local leadership and complete cooperation from the community and encouraging support from the government. Mr. Narasimha Kamath, the brain behind the internationally acclaimed water scheme, says, “All members of the Panchayat and people of the village supported me in this cause irrespective of political and caste differences.” Excellent team work by the Sanoor GP is also reflected in the professional approach it uses to conduct GP meetings wherein all the members wear a uniform and carry identity cards, irrespective of their party affiliations. It is no surprise that the residents decided to name the road leading to the Sanoor GP office as Anna Hazare Marg recognising the commitment shown by the local leadership towards achieving development in the region.

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