COMMUNITY MANAGEMENT OF RURAL WATER SUPPLY SYSTEMS

Community Water Plus

Administrative Staff College of India, Hyderabad

Understanding the resource implications of the 'plus' in community management of rural water supply systems in India: the plus of additional professionally treated drinking water, Telangana & Andhra Pradesh

Srinivas Chary Vedala, Swapna Uddaraju and Shaili Jasthi

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Community Water *plus* is a 20 case study research project managed by Cranfield University, UK, on behalf of the Department of Foreign Affairs and Trade (DFAT) of the Australian Government

Executive summary

The water challenge in the past half-century has been mainly driven by development needs, most importantly concerned with the most immediate human health crisis related to reasonable and affordable access to drinking water. The State Governments responsible for water supply, supported by the Government of India through a number of programmes delivering both funding and management approaches for sustainability, particularly decentralised community management, have delivered impressive levels of access. However, the need to access the most immediately available water, usually groundwater accessed for 'single- village schemes', has led to the supply being vulnerable to chemical and biological contaminants. In Telangana and Andhra Pradesh, the widespread prevalence of fluoride is adversely affecting human health by causing dental and skeletal fluorosis. With a rapidly growing population and increasing demand for quality potable drinking water innovative solutions have been emerging to support to this new drinking water crisis

This situation provides a strong rationale for the role of professionally-managed community-owned/influenced decentralised drinking water delivery. Various players have emerged in the last two decades in both rural and urban areas. For the purpose of the case study we have studied the following organizations: ***Bala Vikasa***, the ***Naandi Foundation*** and the ***Safe Water Network***. These organizations have been chosen for documentation because of their pre-dominance of community involvement in their ongoing service delivery.

These three slightly different approaches to delivering potable drinking water support communities needs complementary to the ongoing support from the state water agencies: Rural Water Supply and Sanitation Department, Telangana and Department of Panchayat Raj and Rural Development, Andhra Pradesh, who have constructed the base level water service and have deliver varying degrees of ongoing support to communities.

Of the potable water facilitators, Bala Vikasa has a demand responsive approach whereas Naandi and SWN - MARI approach the communities where the source of drinking water is unsafe.

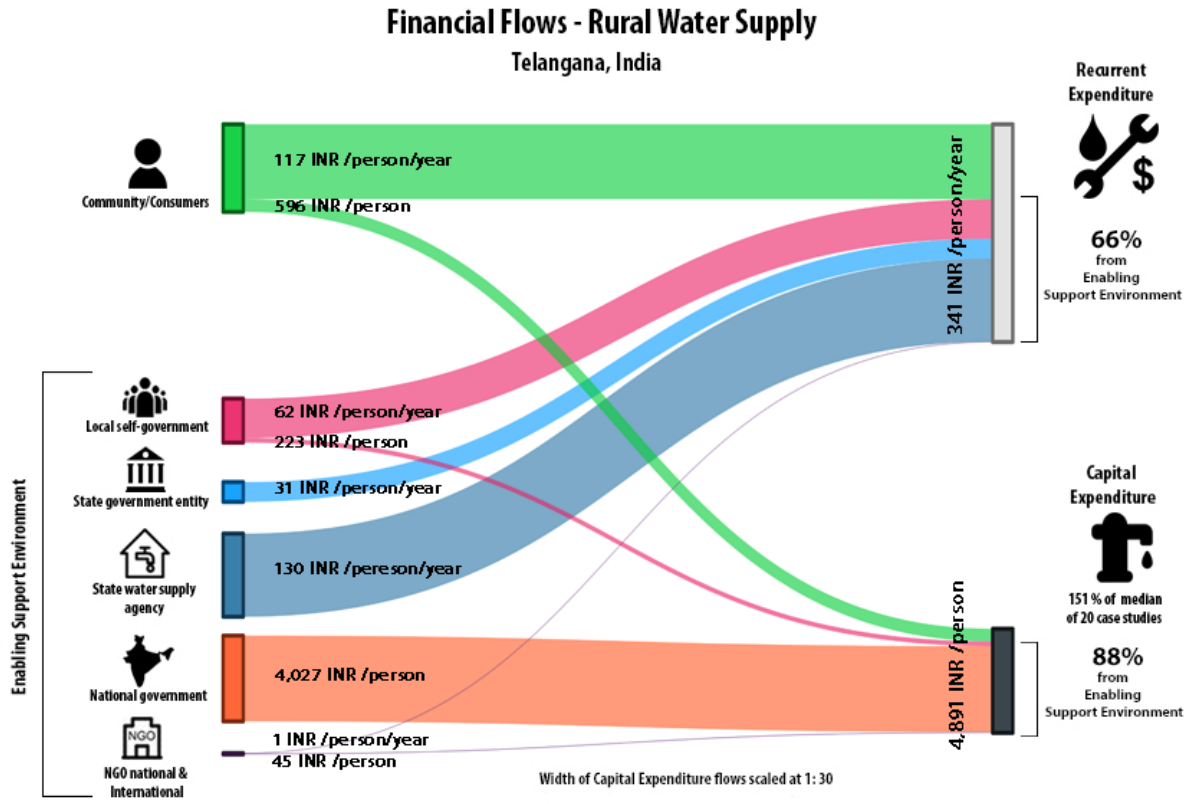
All three organisations use Reverse Osmosis Technology for purifying the water and the safe water is sold at the outlets in jerry cans/containers, some through automated systems, some through sales staff. The water committees though informal in their establishment in this context, have been trained capacitated to the extent where they can handle the administration, management, operation and maintenance. There are various tools that have been developed by the support entities to guide the water committees such as separate bank account, registry of operational information, book-keeping, addressing minor issues etc.,

The Summary Cost Table, below, shows the extent of support which is necessary for this combined approach, demonstrating the community's willingness to pay for the additional quality of potable drinking water in addition to their more marginal contributions to the conventional water supply. The extent to which communities will be able to manage their sophisticated treatment plants over time, particularly as membranes fail and NGOs press for full transfer of responsibility, is the outstanding question. At present the systems studied are delivering successful community management of water, both potable and conventional supply, but at a total cost over 50% higher than the median of the 20 case studies investigated during this research project.

Telangana Summary Cost Table - calculated as the average cost per person,for this particular case study for one village

Source of funds	Use of funds - implementation			Use of funds - annual recurrent					
	CapEx hardware	CapEx software	CAPEX TOTAL	OpEx labour & materials	OpEx power	OpEx bulk water	OpEx enabling support	CapManEx	RECURRENT EXPENDITURE TOTAL
Community/consumers	INR 596	-	INR 596	INR 63	INR 41	-	-	INR 14	INR 117
Local self-government	INR 223	-	INR 223	INR 40	INR 21	-	-	-	INR 62
	-	-	-	-	-	-	-	-	-
State government entity	-	-	-	-	INR 31	-	-	-	INR 31
State water supply agency	-	-	-	-	-	-	INR 13	INR 118	INR 130
National Government	INR 4,027	-	INR 4,027	-	-	-	-	-	-
NGO national & international	INR 21	INR 24	INR 45	-	-	-	-	INR 1	INR 1
International donor	-	-	-	-	-	-	-	-	-
TOTALS	INR 4,867	INR 24	INR 4,891	INR 103	INR 93	-	INR 13	INR 132	INR 341
Median of 20 case studies			INR 3,231						INR 207
'Plus' %age	88%	100%	88%	39%	56%	-	100%	90%	66%
Median of 20 case studies			95%						57%

The Financial Flow Diagram, below, has been developed as an advocacy and communication tool. It aims to assist policy-makers and programme developers to visualise the 'plus' resource implications necessary for sustainable community-managed rural water supply services.

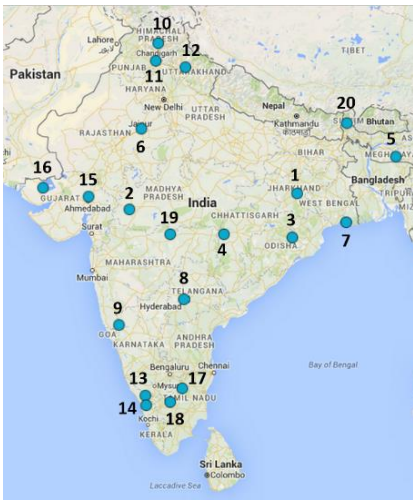


Acknowledgements

The authors would like to express gratitude to all the employees of Bala Vikasa, Naandi Community Water Service and Modern Architects for Rural India. Special thanks goes to Mr Shoury Reddy, Executive Director, Bala Vikasa, Ms Shivani Bongu, Business Development Head, Naandi Community Water Service and Mr NLN Reddy, MARI, for creating the enabling conditions to undertake the case study. Needless to mention, we appreciate the time and efforts put in by the plant/kiosk operators to help us in completing the study. We would also like to appreciate the Gram Panchayats/Water Committees of Pedapapaiahpalli, Koppur, Atkuru, Kodurupadu, Pathipaka and Gorikothapalli, and also extend our gratitude to the residents of the four villages. Dr Snehalatha Mekala, the CW+ national research, coordinator completed the fieldwork and expresses her thanks to staff of the Telangana Rural Water Supply and Sanitation Department for their additional information. However, the report remains partial in several respects due to the research team's challenge in meeting the significantly extended submission deadlines.

This overall research project has investigated twenty reportedly successful community-managed rural water supply programmes and approaches across India, from which we have subsequently developed understanding on the support needed to make community-management service provision successful and sustainable. The project has been implemented by a consortium of partners, including: the Administrative Staff College of India (ASCI), the Centre of Excellence for Change (CEC), Malaviya National Institute of Technology (MNIT), the Xavier Institute of Social Service (XISS) and IRC, The Netherlands with overall project coordination provided by Cranfield University, UK.

The research has been funded by the Australian Government through the Australian Development Awards Research Scheme, Australian Aid, Department of Foreign Affairs and Trade, under an award titled 'Community Management of Rural Water Supply Systems in India'. The views expressed in this report are those of the project and not necessarily those of the Australian Government. The Australian Government accepts no responsibility for any loss, damage or injury, resulting from reliance on any of the information or views contained in this report.



The twenty case studies

1	Jharkhand	11	Punjab
2	Madhya Pradesh	12	Uttarakhand
3	Odisha	13	Kerala (Kodur)
4	Chhattisgarh	14	Kerala (Nenmeni)
5	Meghalaya	15	Gujarat (Ghandinagar)
6	Rajasthan	16	Gujarat (Kutch)
7	West Bengal	17	Tamil Nadu (Morappur)
8	Telangana	18	Tamil Nadu (Kathirampatti)
9	Karnataka	19	Maharashtra
10	Himachal Pradesh	20	Sikkim

The twenty case studies are available also in four page summaries, both in Indian Rupees and in US Dollar (PPP) versions, accessible from the project website. A Policy Brief and a Research Brief There is also a synthesis report available, published by Earthscan, London.

Contents

1 Introduction

1.1 Background to the case study, the topic and the community water plus project

The water challenge in the past half-century has been mainly driven by development needs, most importantly concerned with the most immediate human health crisis related to reasonable and affordable access to drinking water. The State Governments responsible for water supply, supported by the Government of India through a number of programmes delivering both funding and management approaches for sustainability, particularly decentralised community management, have delivered impressive levels of access. However, the need to access the most immediately available water, usually groundwater accessed for 'single- village schemes', has led to the supply being vulnerable to chemical and biological contaminants. In Telangana and Andhra Pradesh, the widespread prevalence of fluoride is adversely affecting human health by causing dental and skeletal fluorosis. With a rapidly growing population and increasing demand for quality potable drinking water innovative solutions have been emerging to support to this new drinking water crisis.

The need for safe drinking water in rural areas of India, stemming from insufficient quality and quantity of safe drinking water, and the associated economic impact of unsafe water on communities, provides a strong rationale for the role of village level water treatment plants, usually with some form of Reverse Osmosis (RO) package treatment facility. The alternative, as demonstrated in this series of twenty case studies, can be seen in the multi-village approach of one District in Maharashtra utilizing a large, and expensive, reservoir and centralised conventional water treatment system or in Tamil Nadu's Hogenekkal project using a distant river off-take and privately managed bulk water treatment and delivery system.

Using relatively sophisticated discrete RO water treatment plants at village level as complementary parts of the existing 'community-managed' water supply system provides an important challenge to sustainable management. There is a need to manage the continuing, consumer-tariff supported, piped water supply to each home to meet the 25-50 litres per person per day bathing and cleaning and other household needs, along with the delivery of small volumes, 4-5 litre per person per day, of potable drinking water. The latter also requiring to be paid for from a separate, additional, perhaps combined overall, water tariff. And requiring a level of technical skill to ensure ongoing effective and efficient treatment of that drinking water, the source being either the existing water supply or an additional borewell.

This has led the writers of this case study to investigate the role of 'professionally-managed', 'community-owned' (at some level) decentralised drinking water deliver, complementary to the existing 'community-managed' conventional water supply. In the context of this present Community Water *plus* research this study therefore has to consider a double '*plus',* that is the *plus* support through the existing State organisations to the existing conventional water supply AND the *plus* support that communities need to ensure a partially separate ongoing potable drinking water supply.

Although this case therefore does not fit so well to the pattern of the other 19 case studies in this series, it represents an important investigation into what will become a key component of the challenge to the next generation of water managers – how to ensure potable drinking water as well as access close to the home. Will the solution tend towards centrally managed bulk water schemes which

can deliver both State guaranteed water resources and treatment? Or will the capabilities of local communities be up to the challenge of managing the quality of their drinking water through their own sophisticated treatment plants, with significant ongoing capital maintenance requirements, in the context of ever-declining groundwater resources? And what is the comparative cost of these two different approaches – to society as a whole as well as to individual communities? This case study investigates the different approaches currently being used in Telangana and Andhra Pradesh to manage village level potable water treatment facilities in the context of the overall water supply system.

Various players have emerged in the last two decades to facilitate, or deliver directly, potable drinking water in village. The actual count on the number of players currently operating in India is unknown, but it is estimated that there are already between 7,000–12,000 village-located Reverse Osmosis (RO) units across India, with tens of thousands more plants envisaged. For example: "In an attempt to ensure that villagers too could get pure drinking water the state government is contemplating to RO water purifier plants in all the over one lakh villages to cater quality drinking water at subsidized rates - Monday, 26 May 2014 | Biswajeet/PNS in Lucknow, Pioneer. Such plants are seen as the cost-effective solution to ensuring availability of potable drinking water.

The last decade has seen various established organizations moving into this village level treatment and supply sector, such as the Naandi Foundation and Water Health International (WHI). Most of the players focus on a range of water-quality challenges using various treatment technologies. Although the implementers have been present in India for quite some time, the challenges associated with providing sustainable services and with scale-up of operations have also persisted. In Telangana and Andhra Pradesh, the community 'safe water solutions' based organizations in these regions have been selected for this case study to understand the magnitude of the gap in supplying potable drinking water and at the same time to establish the pros and cons of a professionalized management of water service delivery. For the purpose of the case study it is proposed to study the following organizations (i***) Bala Vikasa*** (ii) ***Naandi Foundation*** and (iii) ***Safe Water Network.*** These organizations have been chosen for documentation because of their pre-dominance of community involvement in managing the village based potable drinking water plants.

Necessarily recognising that these organisations could be considered as adjuncts, or '*pluses'* to the existing '*plus'* (using the terminology of this research programme) of the two State's conventional Rural Water Supply and Sanitation Department, Telangana and Department of Panchayat Raj and Rural Development, Andhra Pradesh.

1.2 Overall objectives of the research and research questions

- To evaluate and review professionally managed community owned decentralised drinking water delivery which is the plus plus aspect for this case study, within the context of the conventional ongoing State supported approach.
- To assess the service levels at household level both for drinking and domestic use water from complementary and supplementary sources.
- To assess (establish) the costs required to deliver safe drinking water in a professionalised set-up.

1.2.1 Conceptual framework

This research seeks to obtain insight into the type, extent and style of supporting organisations that are required to ensure sustainable community managed water service delivery. It therefore by definition will focus on 'successful' cases of community management and support of rural water supplies, in order to be able to assess what support was provided and with what resource implications. Moreover, we are aware of the positive impact that studies of 'best performing' 'community management - plus' service providers, examples which will be of relevance to the sector as an addition to the research analysis.

Community Water *plus* (community management of rural water supply systems) is a research project that aims to gain insights into the type and level of support and professionalisation that is needed, and the resource implications of this 'plus' (in terms of money, staffing, and other factors), in order to achieve sustainable community management. To achieve this, the research investigates twenty case studies of 'successful' (as initially reported) community-managed rural water schemes across India where the range of States, and their varying socio-economic as well as hydrological conditions, gives a good sample of technologies and approaches which are of relevance to many lower-income countries. Ultimately, the hypothesis underpinning the research is that some level of external support is needed to deliver on-going high quality water services through a community management model. Key to this support is what this research labels the 'enabling support environment' (ESE) that fulfils both 'service authority and monitoring' functions, such as planning, coordination, regulation, monitoring and oversight, and 'direct support' functions, such as technical assistance and financial contributions (Lockwood and Smits, 2011).

The research focuses on the level of water service people receive so as to validate the degree of success found under the different programmes. The way in which the community are involved in delivering this service is considered through what the study terms the 'community service provider' (CSP), which is the entity that takes on the responsibility for everyday operation and minor maintenance of the water supply service. It is recognised that an effective CSP should reflect both the local community and the complexity of the water system, leading to divergent models of management and participation. However, firstly we investigate the form, function and resource implications of the ESE, along with an analysis of the strengths and weaknesses of this particular model. The study finishes with a detailed consideration of the total cost of providing water services, with a focus on the costs incurred by the ESE – whether directly or indirectly.

Figure 1.1 provides an overview of the different elements, whilst a detailed research methodology and explanation of the underlying has previously been published as part of the Community Water^{plus} project: "Understanding the resource implications of the 'plus' in community management of rural water supply systems in India: concepts and research methodology", Smits, S., Franceys, R., Mekala, S. and Hutchings P., 2015. Community Water Plus working paper. Cranfield University and IRC: The Netherlands; please see http://www.ircwash.org/projects/india-community-water-plus-project

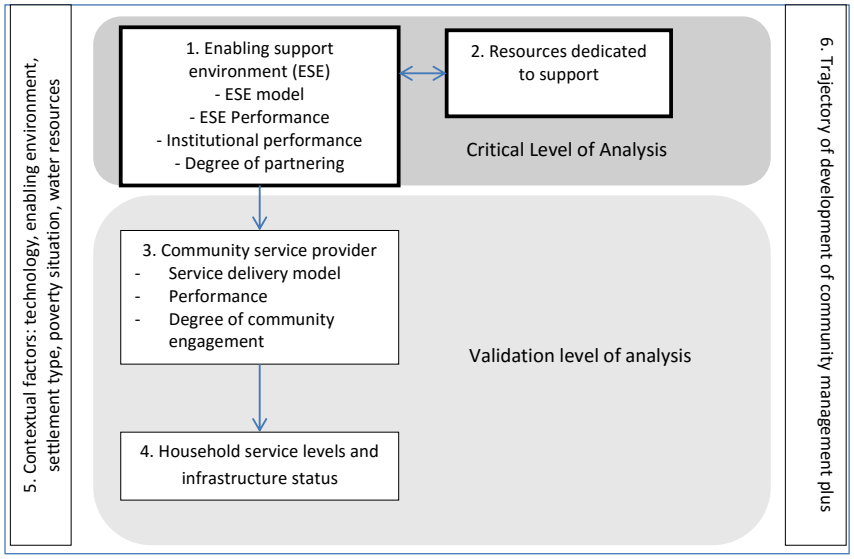


Figure 1 Elements of Research

1.3 Selection of unit of assessment for the study

A scoping study was done prior to finalization of the Enabling Support Entities (see Appendix). In that study, we found out that while objectives of the potable water organizations are similar, ownership, operating models, expenses and price vary among them. Some players have been operating for the past 20 years and some which have started in the recent times. These players fall broadly into three categories: public-private partnership, in which the venture is funded and operated through a collaboration between the government and a private sector company; community-managed systems, in which the community is an equal stakeholder; and private models, in which a private company or entrepreneur funds and owns a community managed system. These players through their operating models offer solutions which are community-centric, each with its own set of advantages and disadvantages. Social entrepreneurs and NGOs pioneering in decentralised drinking water delivery have emphasized creating frameworks that ensure reliability, affordability, sustainability and social inclusion for undeserved rural Indian communities. The players pursue solutions to help recover local operating expenses (OpEx) and build up surplus reserves for maintenance and reserves.

1.3.1 Case Study Selection

A scoping study was undertaken prior to finalization of the case study selection. For further information on the pilot/scoping study and the village selected please see the Appendices.

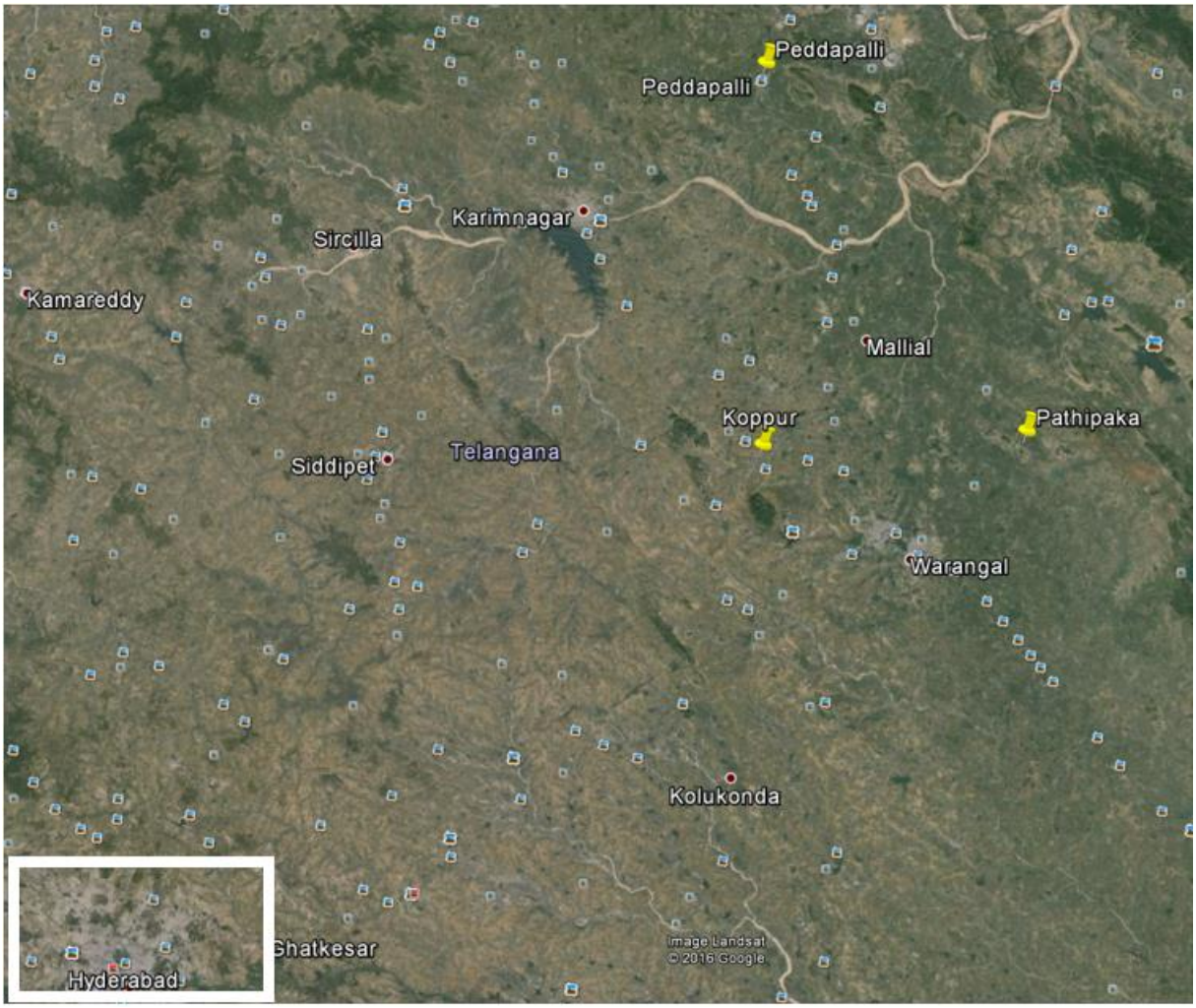


Figure 2 Village locations, relative to Hyderabad (courtesy Google Earth)

The enabling support entities are shortlisted based upon their geographic presence and the pre-dominance of community participation in service delivery of safe drinking water. The short-listed organizations' working models have been briefly described in the comparative table below.

Table 1

Service Areas	Pedapapaiahpalli and Koppur villages in Karimnagar District.	Atkuru and Kodurupadu villages in Krishna District.	Pathipaka and Gorikothapalli villages in Warangal District.
Base Load Water ESE	Telangana Rural Water Supply and Sanitation Department	Department of Panchayat Raj and Rural Development	Telangana Rural Water Supply and Sanitation Department
Potable Water ESE	Bala Vikasa	Naandi Foundation	SWN - MARI
Brand	బాల వికాస నీటి శుద్ధీకరణ పథకం Any Time Water (ATW)	iPure स्वच्छ जल स्वस्थ कल	iJal

Community Service Provider	2 water committees	2 water committees	2 water committees

Table 2 Comparison of the potable water enabling support organizations across the key factors

	Bala Vikasa	Naandi Foundation	Safe Water Network
Year Established	1997	1998	2009
No. of existing supply units*	520	405 (+35 handed over to community)	44
Location	Andhra Pradesh, Telangana	Andhra Pradesh, Telangana, Karnataka, Haryana and Punjab	Telangana, Uttar Pradesh
Economic model (PPP/CMS/ private)	Community Managed System (CMS)	Public Private Partnership (PPP)	Community Managed System (CMS)
Ownership of Kiosks	Community	Self for 5-10 years, then transfer to community	Community/ local entrepreneur
Management of Operations	Community	Self for 5-10 years, then transfer to community	Local community/ entrepreneur
Capacity (LPH^{+})	250-2,000	1,000	1,000
Capacity (People served)	800-3,200	-	5,000-8,000, depending upon power availability
Principal technology	RO	RO and UV	Six-stage treatment, w/ sand filter, activated carbon filter, micron filter, RO, UV and residual chlorine
Average CAPEX, INR	4,50,000	5,00,000 - 10,00,000	5,00,000 - 7,00,000
Average Monthly OPEX, INR	6,000 - 10,000	10,000	12,000- 15,000
Price of water per litre, INR	INR 0.1/litre (0.002)	INR 0.15/litre; charged monthly	INR 0.2-0.25 /litre(0.003-0.004)
Price of subscription	-	60 (1) per month (20L/ day limit)	Smart card flexible top-up

A few changes in the methodology of the research protocols have been made to suit to this case study. Each model was assessed at the Potable Water Enabling Support Entity and Community Service Provider levels. For this case study (i) Bala Vikasa (ii) Naandi Community Water Service and (iii)Safe Water Network-Modern Architects for Rural India are the independent support entities. At the household levels, two best performing villages with access to safe drinking water were evaluated as against the research protocol where three best practice villages and a control village are assessed. The household surveys were carried out with Rural Water Supply Systems water as Water Source 'A' and bottled water as Water Source 'B' because the assumption is Water source 'A'+'B' is the total consumption for the given household.

Data collection was conducted during February to June of 2015. Material from secondary sources such as annual reports, training manuals, organisation booklets, costing from the annual financial reports prepared by the water committees was collated. Additional information from the Telangana Rural Water Supply and Sanitation Department was collected in March 2016.

Table 3 Data Sources

Unit of Analysis	Data Sources
Base Water Enabling Support Environment	2 Key Informant Interviews
Potable Water Enabling Support Environment	8 Key Informant Interviews; 2 Focus Group Discussions Secondary Information: At the Potable Water ESE level, since the case study is evaluating three models, three support entities were assessed namely Bala Vikasa, Naandi and SWN- MARI.
Community Service Provider	6 Key Informant Interviews (1 in each village): Water committee members, operator and accountant. 1 Focus Group Discussion in each village (with water committee/Gram Panchayat) Secondary Information: For each ESE, two service providers were assessed. Totally, 6 service providers were evaluated to understand the three models of service delivery.
Households	30 Household Surveys (in each Village) For each ESE, household surveys were carried out in 2 best practicing villages. Hence, totally 180 household surveys were carried out.

All prices quoted are given in Indian Rupees (INR) and have been converted to 2014 prices.

1.4 Structure of the report

Chapter 1 introduces the project and takes us through the concepts and methodology opted for writing this report. The structure of the report follows the Community Water Plus three-tiered conceptual model for rural water supply. The second Chapter is focused on the Enabling Support Environment (ESE) level, for the base level water provision but primarily in this case for the Potable Water Enabling support which are both the organisations that provide support to Community Service Providers (CSPs) for the different types of supply. Following this, the third section focuses on community management through the water committees in each of six villages which are a sub-standing committee of Gram Panchayat. The fourth chapter looks at the resulting household water access and quality whilst the fifth chapter focuses on the financial data that is required to compute a figure for sustainable community management of both base level and potable drinking water service delivery.

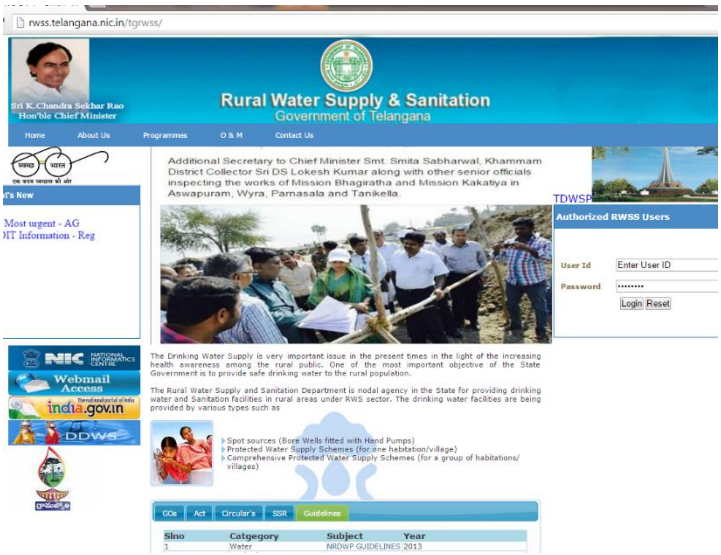
2 Enabling Support Environment Level

As explained in the methodology, both the conventional base level support to service delivery and the potable drinking water support, three models, have been studied to understand 'Professionally managed - community based' 'Decentralized Drinking Water Service Delivery'. Three models with predominance of community management have been chosen namely - Bala Vikasa, Naandi (Naandi Community Water Services) and Safe Water Network - Modern Architects for Rural India (SWN-MARI). In the following section all the three organisation's models are discussed simultaneously in detail.

2.1 Background and origin of the conventional ESE, and context in which it operates

The base level water supply operates as 'normal' through the State Rural Water Supply and Sanitation agency's construction, under the National Rural Drinking Water Programme's (previously Swajaldhara for some villages) approach, with management handed over to the Village Water and Sanitation Committee under the Panchayat Raj decentralisation.

For the purposes of this study we have not investigated the characteristics of the Department of Panchayat Raj and Rural Development, Andhra Pradesh or the Telangana Rural Water Supply and Sanitation Department, as these operate in a very similar manner to such departments across the country, as detailed in our other case studies. However, we have taken the costs of constructing, operating and maintaining systems similar to those found in our case study villages in order to determine the overall cost of supply base water and additionally treated potable drinking water to consumers. See subsequent chapter for that analysis.



2.2 Background and origin of the Potable Water ESE, and context in which it operates

Bala Vikasa is a non-profit organization founded in 1977 by Bala Theresa and André Gingras with the mission to support and strengthen the development process of India's poor communities, particularly in Andhra Pradesh and Telangana. Since its inception, and quoting its own publicity material, the organization has grown to be regarded as a model for non-for-profit organization – in India and internationally – because of its concrete results helping entire communities come out of poverty. Bala

Vikasa has no religious or political affiliation and values transparency and professionalism. Their approach is to help communities help themselves by providing rural villagers with the tools and resources they need to transform their lives. They also encourage Canadians to get involved with international issues as global citizens. In addition to community driven development programs, Bala Vikasa is ardently involved in building the capacities of development professionals, entrepreneurs and the corporate sector in best practices of sustainable development gleaned from over 38 years of field experience. Bala Vikasa works with local partnering organizations to enhance impact. Bala Vikasa has its head office and training centre in Warangal, India. All their activities follow a 360° Community Driven Development approach that encourages villagers to engage in their own development process and effect change on multiple levels: social, financial, environmental, physical and psychological. They emphasize the importance of a sense of unity, responsibility and leadership, and equal representation of men and women. Bala Vikasa initiated a community owned, operated and managed project (with technical support from Tata) during 2002-03 and facilitated a safe water revolution in Andhra Pradesh and Telangana.

N**aandi (Naandi Community Water Services)** which in Sanskrit means a new beginning, is one of the largest and fastest growing social sector organisations in India working to make poverty history. Naandi was founded on November 1, 1998 as a Public Charitable Trust. Born out of the idea of creating a professionally run organization managed by eminent business leaders as Trustees, Naandi was expected to serve as a new experiment in the socio-development sector of India. Namely, partnering with various state governments, corporate houses, international and national development organizations and showcasing large scale successful delivery of public services. Among the activities carried out for delivery of public services, safe drinking water is one their community driven programme. Their ideology revolves around building sustainable models within the social sector that deliver critical services efficiently and equitably to underserved communities. Currently, Naandi is demonstrating the value of creating new social entrepreneurs by setting up social businesses that are even more efficient and closer to community needs than traditional grant-funded activities. Thus, safe drinking water, support to elementary school going urban children, skilling for unemployed youth and agriculture marketing are the four ventures in existence over and above the free services of Naandi. In 2010, the safe drinking water initiative moved out of Naandi Foundation's 'programmes' silo and established itself as a social enterprise – the Naandi Community Water Services Ltd.

Safe Water Network - Modern Architects for Rural India (SWN-MARI) - Safe Water Network was co-founded in 2006 by the late actor and philanthropist Paul Newman, along with prominent civic and business leaders. In 2008 Safe Water Network established field offices in Accra, Ghana and New Delhi in India. A team of local water experts began laying the groundwork for an approach to developing the community capability to own and manage water purification plants. Modern Architects for Rural India (MARI) plays a vital role in Safe Water Network's ability to empower communities to develop the capabilities to own and manage water purification plants in India. MARI operates on the ground, with extensive local contacts with community leaders, the Gram Panchayats and other local and regional government authorities and ministries in the districts of Warangal and Karimnagar of Telangana. MARI has been working with SWN since 2008 and is a key partner in their current phase of expansion in Telangana to scale their local success. MARI is a non-governmental, non-profit organization, registered under the Society Act in 1988, engaged in implementing programs for the community development in the rural areas of Warangal district. The organization has won many awards from District Collector for

its services and contributions in rural development. MARI was established by a team of young professional social workers with an aim of investing professional knowledge and skills for meeting needs and concerns of disadvantaged communities and fulfilling their aspirations. For over two decades MARI has been intensively engaged in grassroots action pursuing the above objectives.

2.3 Potable Water enabling support environment description

Before assessing each support entity descriptor wise from the research protocol, a brief insight of how each entity operates in explained below.

2.3.1 Bala Vikasa

Background for the water programme:

High fluoride content in ground water in most of Andhra Pradesh and Telangana causes widespread dental and skeletal fluorosis. Mushrooming of commercial water plants even in the remotest villages in the target region indicates the severity of the situation. Water sold by companies is not accessible to 80% of the rural population, who cannot afford the high prices. In order to make safe water accessible to the poorest of the poor, Bala Vikasa initiated a community owned, operated and managed project during 2002-03 and facilitated a safe water revolution in Andhra Pradesh and Telangana. Today, Bala Vikasa stands not just as a pioneer but as a leading organization in the sector with effective models for project sustainability.

Objective for the water and sanitation programme:

Facilitate access to drinking water and family toilets in order to improve the health and living conditions of the rural poor of southern India.

Action taken under the water programme:

The programme allows for the construction of hand pump wells and the installation of water purification systems in villages requiring access to a source of drinking water or purified drinking water. The organisation supports the creation of local committees who play a key role in mobilizing villagers, planning, implementing and managing the projects. Communities as a whole are made aware of the importance of active participation, unity, local contribution and accountability of all partners.

Process:

A village must go through an application process to prove they are ready to acquire a purification system. Once accepted, Bala Vikasa conducts motivation meetings to ensure at least 80% of the community's participation. The Executive Director approves the construction of a Water Purification Plant (WPP) only after 80% of the community has agreed to own the plant. A Water Committee is formed of elected women and men who are trained in project planning, implementation and management. The community is required to provide a water source, a room for the purification system and cash contributions, which amounts to about 60% of the total project cost. Since the water purification systems are owned and run by the communities, the cost of upkeep is low. Long-term sustainability is ensured and the entire village is provided with safe and affordable drinking water at just INR 2-3 for 20 litres.

The construction of a purification system uses 'Reverse Osmosis' technology to remove excess fluoride and other unwanted impurities (such as chlorine, lead, and sodium) from the water. The newer water purification plants installed are fitted with delivery kiosks known as '**Any Time Water'** (ATW)

technology, which, through a system of prepaid cards, ensures access to water 24-7 and ensures transparency in record keeping/accounting processes. The Water Purification Program, according to the project sponsor, has visible health impacts on villagers within two months of installation, and empowers the village community, who feel tangible ownership of the project and its successes. Bala Vikasa encourages the Water Committees to take up other development activities in their villages.

The participatory approach of Bala Vikasa in identifying, developing, implementing, operating and maintaining the system fully meets each community's needs while encouraging and ensuring complete community participation. This approach created a strong feeling of pride and ownership for the project and a strong commitment to keep it functioning. The community contributes between 40-60% of the total cost.

Bala Vikasa criteria for selection of a village:

- Community source of water with excessive fluoride i.e. above 2PPM.
- Community's unity and participation mandatory.
- Project Committee must be elected to maintain and monitor the project.
- Community must mobilize the necessary local resources: water source, electric motor, pipeline, room to install the plant etc
- Local contributions: 20% of the machine cost must come from the beneficiaries.
- Elected committees must attend capacity building programmes.

Programme Activities

A. Community Motivation

Introducing Project and Mobilizing Resources: Motivation meetings are held in villages to explain the importance of purified water and introduce the project concept, as well as define the roles and responsibilities of Bala Vikasa and the community. Once 80% of the families in the village guarantee their interest and participation, a Water Committee is set up, and a plant operator appointed from the community. Resources such as the building, a water source and funds for the machine are mobilized by the community.

Street Plays, Posters & Songs: Educating people on the consumption of purified water is vital for the success of this project. Bala Vikasa provides this IEC by staging dramas acted out by a professional team of artists on the importance of drinking purified water, cleanliness, building unity, leadership etc. Posters and motivational songs were also used to create awareness and build community support for the project.

B. Capacity Building

Training Programmes: The committee members were oriented on project sustenance, roles and responsibilities, preparation of action plans, community asset mobilization etc. The accountants and machine operators were trained on the book keeping and technical aspects of handling machinery, respectively. In order to ensure sustainable results, the follow-up trainings also helped to build their leadership skills and improve their knowledge in maintaining the project with commitment and transparency. During the year 2014-15, 1063 individuals were exposed to 29 training programmes organized by Bala Vikasa for the committee members and the machine operators.

Exposure Visit for Committee Members: In order to gain more knowledge on the effective functioning of and proper implementation of RO technology and Any Time Water (ATW) systems, Bala Vikasa organized an exposure visit for the elected committee members and operators. In 2014-15, six exposure visits for 234 participants (182 men and 52 women) from 51 villages were organized. Seeing an existing Water Purification Plant in another village helped the members understand the ground realities of what is involved in such a project.

C. Monitoring

Monthly Committee Meetings and Annual General Body Meetings

Bala Vikasa continues to monitor the Water Purification Plant (WPP)s that have been set up over the years. A representative from Bala Vikasa regularly attends the monthly committee meetings at village level. Guidance on maintaining accounts, record writing and maintaining transparency in monitoring systems is provided to the committee members. Additionally, Bala Vikasa staff helps to facilitate each WPP community's Annual General Body Meeting, at which the project is reviewed, the committee is re-elected and accounts are presented. At the meetings, the villagers are encouraged to take up different development activities.

Impact of Water Purification Plants (Bala Vikasa evaluation):

- *"Access to potable water 24 hours a day at affordable prices, even for the poorest.*
- *Improved health and reduction in medical bills.*
- *Increased productivity and income through better health.*
- *Increased unity and solidarity among the community.*
- *Optimum utilization of community resources.*
- *Increased number of people acting as change agents.*
- *Increased ability to take up development initiatives taken up as a direct result of the success of the WPP initiative".*

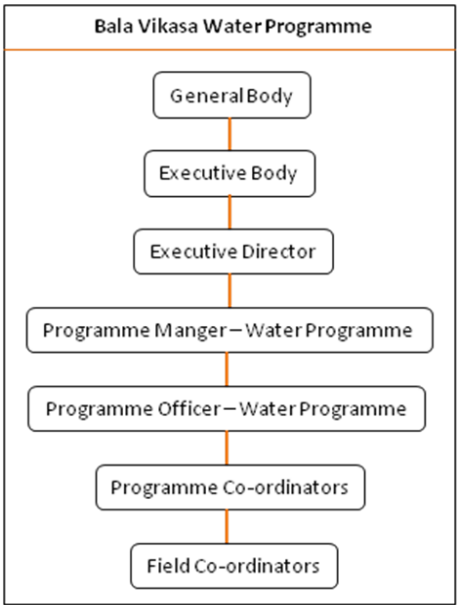


Figure 3 Bala Vikasa Organogram

"To date, with a team of 18 dedicated staff, Bala Vikasa has come a long way making clean drinking water accessible to 14 lakh rural population. During the financial year 2014-15, 70 Water Purification Plants were installed in 13 districts of Telangana and Andhra Pradesh. Overall, 650 water purification plants are supported by Bala Vikasa".

Starting with the bottom of the organogram, there are 6 field co-ordinators and 5 programme co-ordinators. They are all from Social-Science educational background. Their major role is to continuously monitor the water purification plants on a weekly basis under their jurisdiction. The field co-ordinators directly interact with water committees, operators and communities and support them in daily operation and maintenance issues. The field co-ordinators report to programme co-ordinators. The

programme manager and officer oversee all the plants operation and maintenance at the macro level and in turn the progress and updates are reported to the Executive Director.

2.3.2 Naandi (Naandi Community Water Services)

The researchers quote from "Naandi Community Water Services Summary pdf": "*The demand for a consistent and affordable service to purify drinking water at their doorsteps has been rising from communities ever since Naandi set up the first pilot water purification site in 2005 at Bomminampadu village, Krishna District, in Andhra Pradesh. Working with village bodies and the community to give them cleaned drinking water at a nominal user fee (between 10 to 20 paise per litre) became the design for a safe drinking water delivery model that is today being followed by a wave of small and micro entrepreneurs across the country as their own social business.*

Vision It is Naandi's vision that by 2020 everyone in rural India will be drinking safe water. This means approximately 50,000 villages will need to be reached every year.

Background for the water programme: According to the latest Millennium Development Goals review by the UN, out of the 35 Indian states, only 7 have achieved full coverage of providing a protected water source for their villages. Ground water in most cities and over 19,000 villages contains fluorides, nitrates, pesticides etc. beyond the permissible limits. Quality of drinking water thus continues to be a concern and this is reflected by the fact that about 21% of communicable diseases are water borne and 75% of water related deaths are that of children below five years (Naandi Foundation). In this context, Naandi Community Water Services has the visition to improve life and health of people and poor communities by giving access to healthy drinking water each and every day. Based upon the type of water source and the quality of water, appropriate treatment (Reverse Osmosis or other forms of membrane purification) is decided for the community and the Community Safe Water Systems are set up. The purified water is made available to all at INR 0.10-0.20 per litre, making it affordable to the poorest of the poor.

Action taken under the water programme: To deliver efficient water purification and delivery services that even the poorest could use meant a ramping up of operations and services that no amount of grant funding could fuel. It needed investors. And it needed investments that would allow upscaling to reach more villages in a shorter time. Inspired by Naandi's vision and convinced that the user-fee revenue model made business sense, Danone communities came forward as an investor. In 2010, the safe drinking water initiative moved out of Naandi Foundation's 'programmes' silo and established itself as a social enterprise – the Naandi Community Water Services Ltd."

Model Naandi selects the locations based on the need for safe drinking water for the installation of the plant. The plant capacity is decided based on the population and the anticipated demand. Naandi enters into agreement with the donor and the Panchayat and only then the plant is installed. A plant operator and a community organizer are recruited to run the plant and to spread awareness on safe drinking water. Water is treated and provided to the customers at the plant or is delivered to their homes in food grade HDPE cans. Consumer purchases monthly pre-paid card to cover water treatment charges.

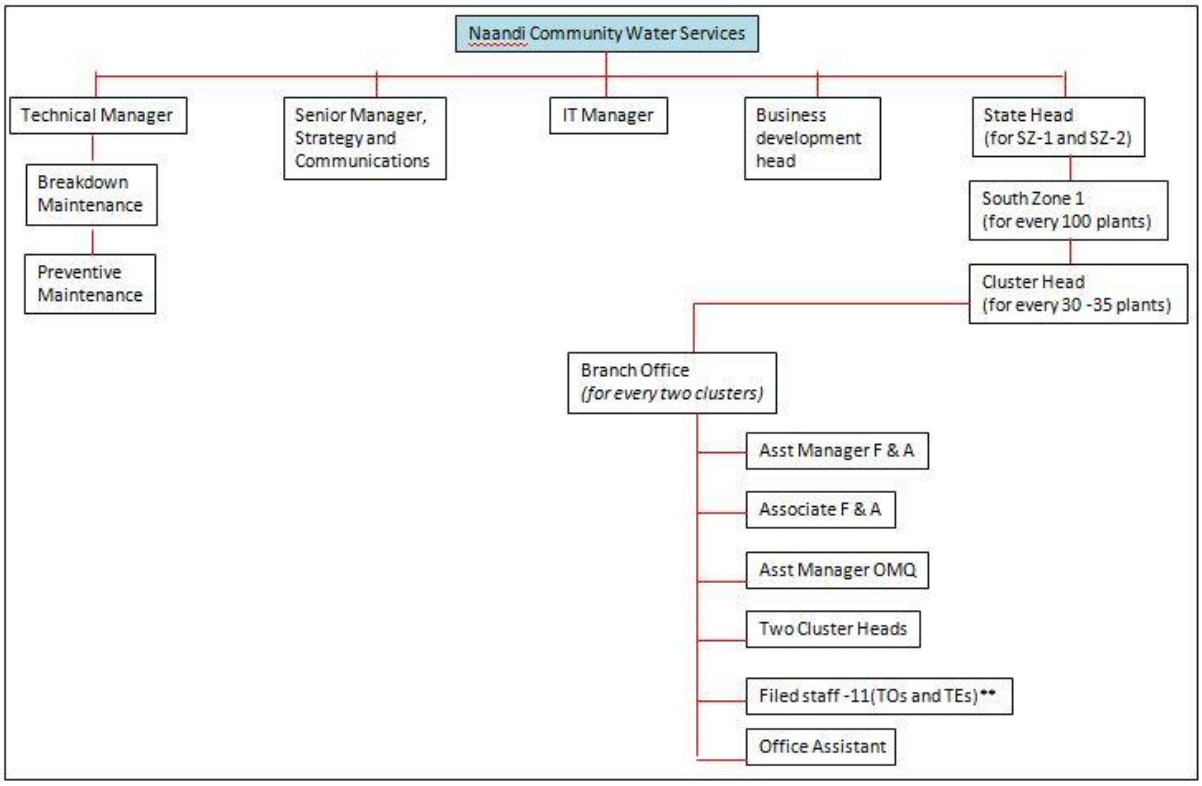


Figure 4 Naandi Organogram

Safe Water Network - Modern Architects for Rural India (SWN-MARI)

Background for the water programme: Established in June of 2014, India's newest state of over 35 million people, Telangan, is comprised of 10 districts, with Hyderabad as its capital. Approximately 75% of Telangana's surface water is contaminated by human, animal, agricultural and industrial waste, while its groundwater often contains high levels of fluoride and other contaminants. Water and sanitation-related illnesses account for 70-80% of disease in this area. During the three-month dry season beginning each March, water scarcity and drought are common; many women walk over an hour each day to find water that is ultimately still unsafe. MARI has been working with the Safe Water Network (SWN) since 2010 to tackle this issue through establishing safe drinking water stations (RO plants). 18 'iJal' units (i.e., four community based and 14 entrepreneurial models) were established in 2013-14 totalling the number of units to 35. These units are providing safe drinking water to communities including economically disadvantaged groups in these areas at affordable price.

Model Villages with 500 and above households (excluding hamlets) and having unsafe drinking water are identified. Village community or entrepreneur provides the place with building, bore well and motor, and electricity connection. Linkages with government and other institutions are established. Approval from the Gram Panchyat is necessary for establishing an 'iJal' station. Wall writings, cultural programs and village meetings are conducted for generating awareness before unit is established. Once machinery is installed, promotional campaign is conducted to enrol consumers. Management systems are established, including identification and training of operator, for running the unit. Operator is responsible for plant operations, sales and book keeping. After the unit is established, support is provided in sales promotion, quality control, financial management, book keeping, and repairs and maintenance. More than 80% of operators were trained and equipped on management

systems and technical aspects. While major repairs are attended by technical support team of Safe Water Network, operators are provided with skills to attend minor problems; and they support each other. The book keeping and reporting system is fairly standardised. The financial information is displayed in each plant for accountability and transparency.

Following table summarises the ESE descriptors across the three support entities.

Table 4 Summary descriptors of the potable water enabling support entities

Descriptor	Bala Vikasa	Naandi	SWN - MARI
1.1 Type of organisation	Non-governmental organisation	Social enterprise	Non-governmental organisation
1.2 Modality of support	Mixed model, whereby communities request support when needed, but where the support entity also provides support on a scheduled basis.		
1.3 Rural Population Served by PW ESE	14 lakh population	30 lakh population	1 lakh population
1.4 Number of Service Providers Served by PW ESE	605 plants in 3 states	408 plants in 5 states	45 stations in Telangana state
2.1.a Number of FTE staff dedicated to water	18	76	10

As potable water support entities Bala Vikasa, Naandi and SWN-MARI support the water committees with certain support activities. Te various activities supported can be inferred from the following table.

Table 5 Summary activities of the potable water enabling support entities

Descriptor	Bala Vikasa	Naandi	SWN - MARI
Monitoring and control (auditing)	Any Time Water technology to monitor the water usage and regular visits by filed co-ordinators and informal audit is done.	Regular visits by the filed co-ordinators to monitor and they inturn check the accounts maintained at the plant.	Remote monitoring technology - collecting data 24/7 and regular visits by filed co-ordinators and informal audit is done.
Water quality testing	Supported with an in-house testing laboratory	It is supported via an intermediary - Bhagvathi Ana Labs Limited	It is supported via an intermediary - Bhagvathi Ana Labs Limited.
Water resources management	Water resources management is not in-built in to this purification process. As such no independent steps have been taken by the support entities. That responsibility remains with the State Government as the primary enabling support entity		
Technical assistance	Supported by a private entrepreneur - Innovative aqua systems private limited	Supported by in-house technicians - Territorial experts who are skilled to lend technical assistance.	Innovative aqua systems private limited
Conflict management	Not part of the mandate but if and when conflicts happen, they are addressed by the field co-ordinators and water committee members.		

Support in identifying investment needs	As such community is informed about their contribution required for the investment. Usually the raw water source (borehole) is given by Gram Panchayat. The land for construction of room is donated in a few cases. And 6B category electricity connection is sanctioned via the Gram Panchayat.		
(Re) training of service provider	Operators are re-trained when a new technology is introduced.	Constant trainings are organised for all levels of staff.	Operators are re-trained when a new technology is introduced.
Information and communication activities	Field co-ordinators act as the medium for passing on information to water committees.	Territorial officers and territorial experts act as the medium for passing on information to water committees.	Field co-ordinators act as the medium for passing on information to water committees.
Fund mobilization	Fund mobilization is not a direct activity supported by the support entity. Only in a few cases to get the community funding in place before the inauguration, the support entity engages through motivation talks and IEC activities.		

2.4 Potable Water enabling support environment performance indicators

An assessment was made on the performance of the support entities in their respective entities in their respective roles, against a number of predefined scores as per the research protocol.

Table 6 Summary performance of the potable water enabling support entities

Degree of professionalization	**Bala Vikasa** The organisation has a clear articulated vision and mission to help communities to help themselves. The water purification program was initiated 12 years back. Hence they have required working methods and required support to the community is given through the field co-ordinators. Human resources are deployed in such a manner that there is healthy communication maintained from the community to the Executive Director.
	Naandi The organisation has a clear articulated vision and mission to eradicate poverty. Human resources are deployed to maintain communication from the operator to the cluster head. It is very clear across the various divisions in the head office to lend support to the water purification plants.
	SWN - MARI Safe Water Network India is a not-for-profit trust registered in 2009, and is committed toward developing and expanding sustainable, market-driven solutions aimed at delivering safe, affordable drinking water to the underserved in rural India to improve their health. Both SWN and MARI are highly professionalised entities coming together to provide safe drinking water.
Effectiveness	**Bala Vakasa** Bala Vikasa being a support entity, give a certain mandatory support they provide to the water committees. Except for conflict management, in the last one year they have offered monitoring, auditing, water quality testing, technical assistance, re-training of service provider and IEC activities etc., 76% of the water committees received support in some form or the other.
	Naandi Naandi being a support entity, they have certain mandatory support they provide to the water committees. Except for conflict management, in the last one year they

	have offered monitoring, auditing, water quality testing, technical assistance, re-training of service provider and IEC activities etc., 74% of the water committees received support in form or the other.
	SWN- MARI SWN-MARI being a support entity, give a certain mandatory support they provide to the water committees. Except for conflict management, in the last one year they have offered monitoring, auditing, water quality testing, technical assistance, re-training of service provider and IEC activities etc., 95% of the water committees received support in form or the other.
Efficiency	**Bala Vikasa** Under the Water purification program, there are 18 members staff. With 6 field co-ordinators and 5 programme co-ordinators and over looked by programme manager and officer, the support entity efficiency is good. Each field co-ordinator is given 10-15 plants to overlook as part of the daily activities.
	Naandi Since Naandi is more like an enterprise, they have 76 FTE staff under Naandi Community Water Services. Naandi is organised more in a professional set-up with various divisions such as H.R, Finance, Technical, Strategy &communications, Business development etc., The staff are further divided under state and zone wise which breaks down to cluster and territories. Since territories are assigned at the last level, the efficiency is standardised across plants.
	SWN- MARI With SWN providing the business strategy and technical assistance and MARI responsible for softer aspects, efficiency is achieved through field co-ordinators with assigned jurisdiction.
Frequency of support	**Bala Vikasa** Not every support visit is documented. But there is a clear mandate of support visits from the support entity. It depends at the stage at the stage of project cycle. During the installation there are more support visits for motivation and IEC activities and trainings. After installation, there are monthly support visits. Based on the performance of the water committee, the support visits gradually reduce.
	Naandi Support visits are facilitated by Territorial experts and officers. Since in Naandi model there is only operator at the water purification plants, the operators are supported with frequent visits by TO's and TE's.
	SWN- MARI Not every support visit is documented. But there is a clear mandate of support visits from the support entity. It depends at the stage at the stage of project cycle. During the installation there are more support visits for motivation and IEC activities and trainings. After installation, there are monthly support visits by the field co-ordinators.
Client Satisfaction	As such there is no evaluation carried out by any of the support entity to assess client satisfaction. Dropout in number of memberships remotely indicate the client satisfaction. Hence, all the three players ensure that they retain the same level of satisfaction among the users.

2.5 Potable water enabling support environment institutional assessment

Whereas the previous section looked into how the support entities perform in their roles, here the results are presented of an overall institutional assessment that considers the strengths of the organisations, in terms of: 1) organisational autonomy; 2) leadership; 3) community orientation; 4) organisational culture; 5) development and maintenance of staff; 6) technical capability; 7) management and administration; and 8) interactions with external institutions. Through a series of questions these areas were scored on a scale from 0 to 4.

Bala Vikasa institutional assessment: Bala Vikasa has a clear vision and has laid several goals. They source funds from various funders

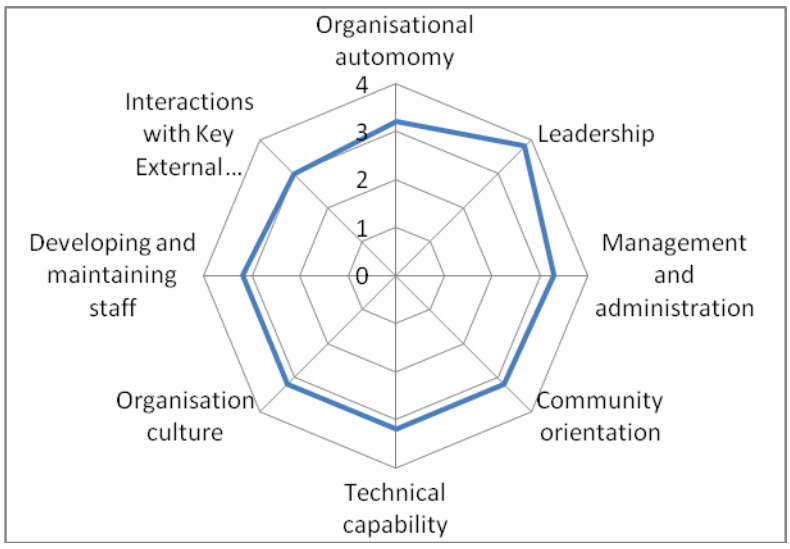


Figure 3 Subjective Performance Characteristics

2.6 Potable water enabling support environment partnering assessment

To conclude this chapter, an assessment was made on the types of partnering that are found between the support entities and water committees. This is done against an adapted model of six types of partnerships (Demirjian, 2002): Collaborative - The sharing of responsibility and authority through joint decision-making; Contributory - Partners pool resources or leverage new funds for implementation and maintenance of service; Operational - The sharing of working (division of labour) and co-ordinate operations; Consultative - To systematically obtain and share relevant information to improve service design, delivery, evaluation or adjustment; Transactional - This refers to the exchange of funds for services or products; Bureaucratic - This is the partnering to fulfil regulatory or normative expectations regarding the need for partners to work together; Note that these types of partnering do not imply any hierarchy. And a partnership may have elements of all these six types of partnering.

The partnering has been assessed for three phases in service delivery: 1) capital investment phase; 2) service delivery phase; and 3) capital maintenance phase. The service enhancement or expansion has not really happened in any of the water purifications plants. As such that indicator is not applicable in the case of water purification plants. So that was not assessed.

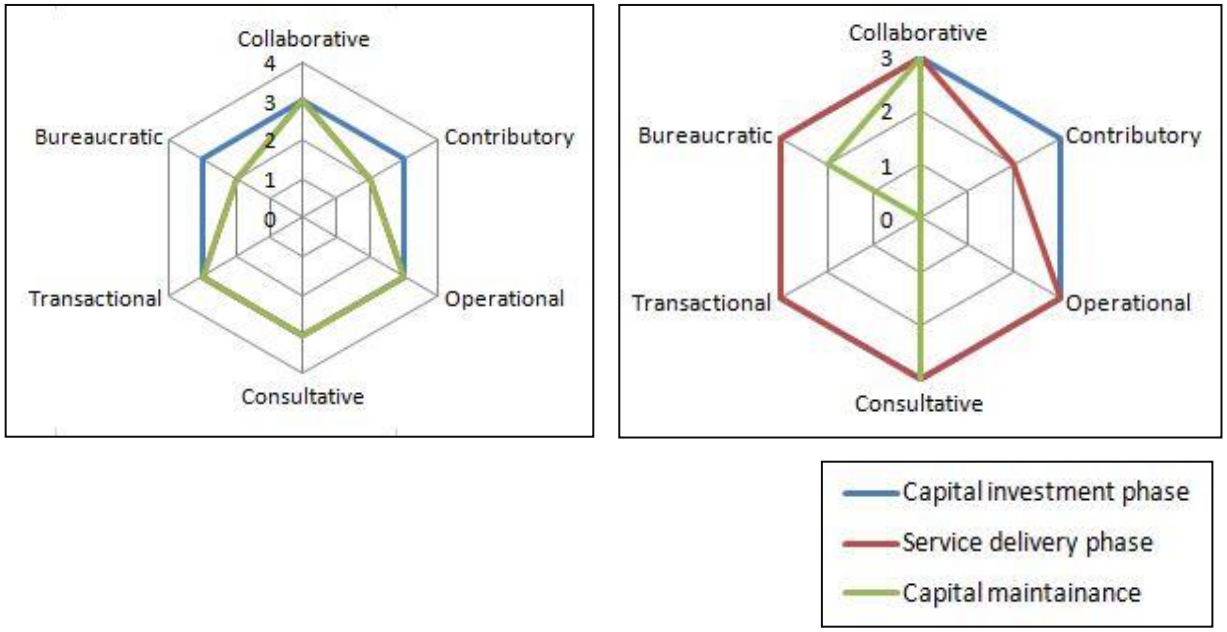


Figure 4 Type of partnering with water committees for Bala Vikasa and Naandi

- *Models of service delivery and technology:*
  - Bala Vikasa has a demand responsive approach towards installing water purification plants, where the villagers/comunity approach the support entity. After checking certain criteria such as fluoride levels, cash and kind contributions - IEC activities are taken up vis-a-vis creating a sense of ownership for the water purification plant among the community. The selected water committee is trained and handed over the responsibility of administration, management, operation and maintenance. The water committees performance is closely monitored by the field co-ordinators, where eventually the support entity support monitoring is come down to only attending the annual general body meeting. The income generated through the water sales and the expenditure for monthly maintenance, salaries is met and cash reserves are building which the water committees envision to use for CapManEx.
  - Naandi selects the locations based on the need for safe drinking water for the installation of the plant. The plant capacity is decided based on the population and the anticipated demand. Naandi enters into agreement with the donor and the Panchayat and only then the plant is installed. A plant operator and a community organizer are recruited to run the plant. Naandi operates along the model of user - free revenue model. Their experiment is to set-up social businesses that are even more efficient and closer to community needs than traditional grant-funded activities. Hence, operator deposits the monthly balance amount to the head office account. The support entity operating expenditure is met through the balance amounts generated at all the Naandi water purification plants. This factor increases their cost of delivery when compared to other players in the market.
  - Safe Water Network and Modern Architects for Rural India are two separate entities who have come together to establish water purification plants in the state of Telangana. Villages with 500 and above households (excluding hamlets) and having unsafe drinking water are

identified. Village community or entrepreneur provides the place with building, bore well and motor, and electricity connection. The software activities are carried out extensively by MARI team and SWN acts as the technical partner and donor. The water committees are handed over the responsibility of administration, management, operation and maintenance. While major repairs are attended by technical support team of Safe Water Network, operators are provided with skills to attend minor problems; and they support each other.

- Technology - Bala Vikasa, Naandi and SWN - MARI purify unsafe water through reverse osmosis process and the output safe water is sold to the consumers. The machinery is sourced from various private companies and installed at the plant room. As such there are technological differences in the three models.

- Bala Vikasa and SWN - MARI have installed Any Time Water machines to control wastage of water and to make water available beyond eight hours a day. This intervention happened over experience of delivering water at the plant. They are making efforts to use simple technology to simplify things.

- *Supporting organisations/ other actors*

  - Donors play a major role in all the three models, because funds are sought from them before installation of the plants.

  - Bala Vikasa and Naandi have their in-house social science experts who develop the training material towards software activities. In the case of SWN - MARI, MARI is the soft skill expert.

  - For technical support, Bala Vikasa sought private entrepreneurs who support the water committees through major repairs and annual maintenance checks. Naandi has in-house technical team at state and district level who look into the technical issues. Safe Water Network provides the technical skill and support for the '*iJal*' water stations.

- *Degree of professionalisation:*

  – Talking about professionalising, all the three players - Bala Vikasa, Naandi and SWN - MARI have followed the same path of selecting water committee members depending on the population and number of wards. The committee members were selected based on their relationship with the village but the operators were chosen based on their education qualification and reputation in the village.

  – The support entities have a mandate of capacity development and training for the governing body of the water committee. All the members of the governing body undergo 2-3 days of training approximately, however the operator is separately trained on technological aspects of the RO machinery. All the operators across the six villages have the capacity to address minor repairs.

  – The trajectory of professionalising -

    (i) The required skill and capacity is provided to the committee members and operator

(ii) The water committee takes responsibility for administration, management and operation and maintenance after the inauguration of the plant

(iii) The water committee is constantly supported by the monitoring visits of field coordinators from the respective support entities.

(iv) Gradually, the water committees are growing towards sustenance, by creating strong trained professionals to handle the delivery of safe drinking water.

- As observed in the field, operators play major role in the day-to-day activities. For instance, operator at Pathipaka is 55 years old and has chosen to be operator because of his free time. His commitment and performance in the role of operator is so inspiring that, the newly recruited operators at '*iJal*' stations (SWN-MARI) are brought here for motivation during the exposure visit.
- The other factors contributing towards professionalization are

  (i) Display of information and accountability mechanisms

  (ii) Water quality testing done regularly and display of the results for the community

  (iii) Operators salary is directly transferred to their respective bank accounts or are paid by cheque.

  (iv) Bank accounts are handles by the committees along with book - keeping and registry of operational information.

- All the above stated factors take a notch higher in terms of degree of professionalisation.

3 Community Service Providers

Until now the type and performance of the enabling support entities were discussed. This chapter assesses the performance of the community service providers. In this case, community service providers are the water committees that are nominated who are given the responsibility of administration, management, operation and maintenance. As indicated in the conceptual framework, the service provider assessment is above all a validation whether the support that has been provided indeed leads to well-performance community service providers.

3.1 Context

To study the purification plants under Bala Vikasa, Pedapapaiahpalli and Koppur water purification plants at the respective villages have been chosen. Pedapapaiahpalli and Koppur villages are located in Karimnagar District. Karimnagar District is a district in northern Telangana, India. To study the purification plants under Naandi, Atkuru and Kodurupadu water purifications plants at the respective villages have been chosen. Atkuru and Kodurupadu villages are located in Krishna District, which is located in the Coastal Andhra region of Andhra Pradesh. To study the purification plants under SWN-MARI, Pathipaka and Gorikothapalli water purifications plants at the respective villages have been chosen. Pathipaka and Gorikothapalli villages are located in Warangal District, which is located in the northern region of the state of Telangana, India. All the villages are concentrated rural settlements with paddy fields as the boundary of the villages.

Across all the villages chosen the fluoride content is really high which has made the water unfit for drinking and cooking.

Table 7 Village characteristics

Community	Pedapapaiah-palli	Koppur	Atkuru	Kodurupadu	Pathipaka	Gorikothapalli
Potable Water Model	**Bala Vikasa**		**Naandi**		**SWN-MARI**	
Block/ mandal	Huzurabad	Bheemdevarapalli	G.kondu ru	Bapulapadu	Shyampet	Regonda
District	Karimnagar	Karimnagar	Krishna	Krishna	Warangal	Warangal
Population	3,276	3,055	1,615	1,786	4,234	3,932
No of HHS	890	789	425	470	1,018	945
Population size	3.68	3.87	3.8	3.8	4.15	4.16
SC/ST population	736	1,161	342	304		624

Note: population relates to total population, not necessarily population served by RO plant

3.2 Community service provider descriptors

In each of the models, water committees are formed prior to inauguration of the plant. Upon receiving the required training and skill, the water committees are handed over the responsibility of maintaining the plant. In almost all the cases, the water committees have been nominated by the community and a resolution is passed with names of the water committee members. In Bala Vikasa, Naandi and SWN-MARI, the water committees are informal in institutional set-up. Even though informal, each member

of the water committee is given their roles and responsibilities in printed format and also in local language. Based on the skills acquired during the training and 'Information, Education and Communication' activities, the members are performing positively. There has been no election process followed as such.

Table 8 Summary descriptors of the community service providers

Community	Pedapapaiahpalli & Koppur	Atkuru & Kodurupadu	Pathipaka & Gorikothapalli
Potable Water Model	**Bala Vikasa**	**Naandi**	**SWN - MARI**
1. Type of organisation	Informal water committee Pedapapaiahpalli - formed in 2009 Koppur - formed in 2012	Informal water committee; both water committees in Atkuru and Kodurupadu were formed in 2010.	Informal water committee; both water committees in Pathipaka and Gorikothapalli were formed in 2011.
2. Members of governing body	Varies depending on population and no.of wards in the village V1 - 11 members (governing body) + 2 members (operator+ accountant) V2 - 6 members (governing body) + 1 operator	Naandi only engages one operator as a representation of the community V1 - 1 operator V2 - 2 operators	Varies depending on population and no.of wards in the village V1 - 10 V2 - 12members (governing body) + 1 operator
3.1 Coverage	Highly variable because it depends on the no.of users purchasing the water from the plant. V1 - 70% V2 - 48%	Highly variable because it depends on the no.of users purchasing the water from the plant. V1 - 35% V2 - 38%	Highly variable because it depends on the no.of users purchasing the water from the plant. V1 - 62% V2 - 70%
3.2 Coverage with HH connection	0% (Not applicable)	0% (Not applicable)	0% (Not applicable)
3.2 Coverage among SC/ST households	Data not available at a disaggregated level.	Data not available at a disaggregated level.	Data not available at a disaggregated level.
4.1 Tariff Structure	INR 3 per 20 litres water can	INR 4 per 20 litres water can	INR 4 per 20 litres water can

All the water committees have a operator appointed for daily book-keeping and operation of the water purification plant. The committee members take regular updates from the operator regarding the water can/bottle sales and other minor repairs. Since there is no activity like tariff collection for the ATW served villages, users come directly to the plant to recharge their cards. So operator is mostly available at the plant atleast during the operation hours.

3.2.1 Activity & Responsibility Matrix at community service provider level

To understand the activity and responsibility matrix at community service provider level, several activities were ranked with the following indicators:

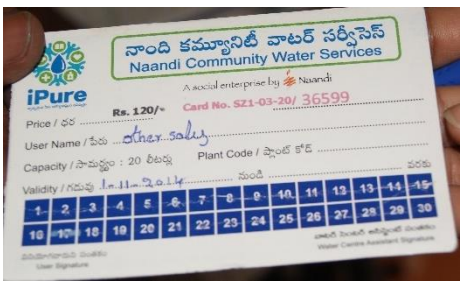
Responsible – the actor or entity that is responsible for the completion of a specific task.
Involved – those actors or entities who directly contribute to the completion of a specific task.
Interested – those actors or entities that are likely to be affected by a specific task.
Paying – those actors or entities that cover the costs of an activity, but do not carry it out directly

Photograph Focus Group Discussions with Pathipaka Water Committee & Peddapapayyapalli Water Committee

For running the water purification plants, there are activities and responsibilities shared by various actors such the support entity, service provider, committee members, donors, Gram Panchayat, technical private entrepreneur. At the community service provider level, there are certain activities the water committees are responsible, involved, interested or pay for. Activities such as monitoring service levels & water quality, operation and minor maintenance, capital maintenance and renewal, major repair, user charge collection and auditing. The water committees or specifically the operator is involved in user charge collection, where pre-paid cars system is followed.

Bala Vikasa In both the villages, the water committees are service providers for the community involve their major responsibility lies in monitoring service levels, water quality testing, operation, minor maintenance, addressing major repairs with the support of technical assistance from private entrepreneur and informal auditing. They are supposed to pay for few of the support activities such as water quality testing, major repairs, sand filters every month, membranes (whenever they are required), operator salary, electricity charges etc., The opearator is involved in user charge collection where the consumers come for monthly recharge cards.

Naandi In cases of Atkuru and Kodurupadu, there is no existence of water committees but it is the operator who is the entity for community service provider. The operator at the plant is responsible for day-to-day maintenance, water can sales, send samples for water quality testing, minor maintenance, addressing major repairs with the support of technical assistance from private entrepreneur and informal auditing. Every month the operator pays for the minor and/or major repairs and the remaining balance is deposited in the bank account of the head office. In



turn, head office pays for the salary (transferred directly in to the operator account), electricity charges, water quality testing. Since operator maintains records, informal auditing is carried out by the territorial officers every month.

SWN- MARI ***'iJal'*** plants under SWN - MARI have water committees who are responsible for monitoring service levels, water quality testing, operation, minor maintenance, addressing major repairs with the support of technical assistance from private entrepreneur and informal auditing. They are supposed to pay for few of the support activities such as water quality testing, major repairs, sand filters every month, membranes (whenever they are required), operator salary, electricity charges etc., The operator is involved in user charge collection where the consumers come for monthly recharge cards.

3.3 Community service provider indicators

The indicators below seek to assess the performance of the water committees in their functions of governance, financial administration and operation and maintenance.

Table 9 Summary performance indicators of the community service provider

Indicator	Bala Vikasa	Naandi	SWN - MARI
Governance			
1.1 Percentage of legal requirements for establishment of service provider complied with	Water committees establish themselves with a resolution and an active bank account. But they are not registered as a formal water committee.	Here the service provider is represented by the operator of the plant. He is recruited from the community.	Water committees establish themselves with a resolution and an active bank account. But they are not registered as a formal water committee.
1.2 Presence of statutes	Statutes are available on the governing of the water committee.	Statute available and applicable only for the operator of the plant.	The agreement clearly states the role of committee and operator.
1.3 Selection of the Board of the service provider	No elections. Members who are active and responsible are nominated.	Required personnel i-e the operator is selected based on education qualification and relationship with the village.	No elections. Members who are active and responsible are nominated.
1.4 Information sharing and accountability mechanisms	Annual general body meeting is conducted.	The gram sabha is used as the medium to share information with the panchayat and community.	Once a year, meeting is conducted.
1.5 Gender balance in the governing body of the CSP	Gender balance is not stressed upon but in both villages there are two female members.	Not applicable because there is no governing body. *No VWSC?*	Gender balance is not emphasised
1.6 Percentage of members of the water committee who have received formal training	All water committee members have received training for their roles and were coached in that before	Operators have received training for their roles	All water committee members have received training for their roles and were coached in that before

	inauguration of the plant.		inauguration of the plant.
Finance			
2.1 Financial balance of last year's revenue and expenditure	The balance of the last year was largely positive in both the villages.	The balance of the last year was largely positive in both the villages.	The balance of the last year was largely positive in both the villages.
2.2 Cash reserves	CSP has a separate bank account in the name of President and Secretary (Joint Account). The committees are aware they have to utilise cash reserves for replacing membranes and repairs & maintenance.	There is no separate bank account for the water plant. Operator maintains the cash book, day book and accounts. The cash reserves are used for repairs when required.	CSP has a separate bank account in the name of President and Secretary (Joint Account). The committees are aware they have to utilise cash reserves for replacing membranes and repairs & maintenance.
2.3 Book keeping	The committees maintain records and provide an annual account which is shared with the community. These are informally audited by field co-ordinators once a year.	The operator maintains records and provide an annual account which is shared with the community. These are informally audited by field co-ordinators once a year.	The committees maintain records and provide an annual account which is shared with the community. These are informally audited by field co-ordinators once a year.
2.4 Non-payment rate	Since the water is supplied from an ATW, there is nil non-payment rate as the model is pre-paid card system.	Water is made available through card sales. Every month they have to recharged.	Since the water is supplied from an ATW, there is nil non-payment rate as the model is pre-paid card system.
Technical performance			
3.1 Technical folder	There is a technical map at both the plants. Plant operators are trained in operation and minor maintenance.	There is a technical map at both the plants. Plant operators are trained in operation and minor maintenance.	There is a technical map at both the plants. Plant operators are trained in operation and minor maintenance.
3.2 Registry of operational information	Apart from financial records, the following records are maintained Minutes of Meeting Membership Registration List Vouchers Of Contracts	Apart from financial records, the following records are maintained Day book register Water distribution details User profile book	Apart from financial records, the following records are maintained Card recharge sales Plant technical track User profile book Consolidated daily sales General ledgers Voucher files

3.3 Response time to get repairs done	Minor repairs are taken care by the operator and these can be rectified within few hours. Major repairs are done by contracted technicians. Such repairs are addressed within 24 hours	Minor repairs are taken care by the operator and these can be rectified within few hours. Major repairs are done by contracted technicians. Such repairs are addressed within 24 hours	Minor repairs are taken care by the operator and these can be rectified within few hours. Major repairs are done by contracted technicians. Such repairs are addressed within 24 hours
3.4 Water metering	Not applicable as there are no household connections.	Not applicable as there are no household connections.	Not applicable as there are no household connections.
3.5 Water security measures	No water security measures have been taken up even with the waste/ reject water.	No water security measures have been taken up even with the waste/ reject water.	No water security measures have been taken up even with the waste/ reject water.
3.6 Water quality management *(for this case water quality testing is considered as water quality management. Based on the water quality, the membranes are replaced.)*	Every month, water sample is sent to ESE for testing. The results are posted to the village. Based on water quality results membranes are replaced.	Every month, water sample is sent to ESE for testing.	Water sample testing is done twice a year. Both the times raw water, product water and reject water are tested.

As can be seen in this table, in terms of governance the water committees are trained to the extent where they can run the operation and maintenance of the plant. All of them are set-up as informal water committees for the water purification plants. For constituting the water committee usually able and active members are nominated by the community. Usually tripartite agreements are signed between the donor, Potable Water ESE entity (Bala Vikasa/ Naandi/SWN- MARI) and water committee. These agreements also state the roles and responsibilities of the water committee. Across all the water committees, there is more participation of men than women.

Financial management for all the water committees in Bala Vikasa, Naandi and SWN-MARI models is structured and professionalised. Except for water plants under Naandi, there are no bank accounts for the water committees. For the same there are certain accounts that are maintained for transparency. In all the cases, there are building cash reserves which are primarily used for repairs, ongoing maintenance (such as sand filters & membranes) and salary. The water committees under Bala Vikasa and SWN-MARI have positive cash reserves. In case of Naandi, the operator deposits the money in the head-office bank account after the monthly expenditure. The non-payment rate is not applicable in all the three models because even if it ATW sales or card sales, a member has to recharge for access to water just like the case of mobile phones.

The technical performance is high except for water security measures. The water committees are provided with certain books for registry of operational information other than financial accounts to maintain transparency. Even the amount of treated water (in litres) is recorded. Water quality management is in-built in water purification plants which forms the basis. Since the operators are

trained to address minor repair issues, the water committees are not dependent on local plumbers or electricians. Major repairs are addressed by the technical team in the respective cases within 24 hours.

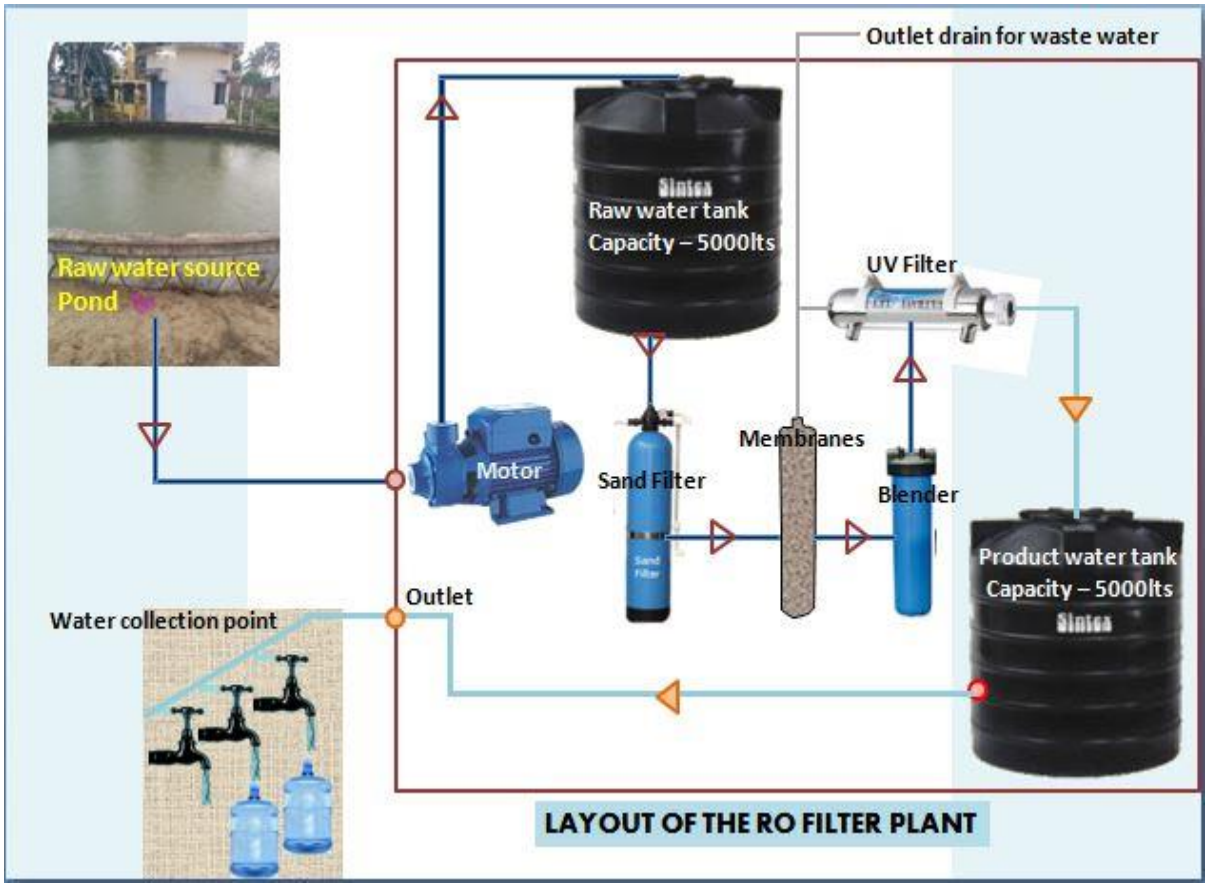


Figure 5 Overview of infrastructure being managed

Across all the water purifications plants in the three cases, the technology used primarily remains the same. The most common technology adopted by water purification plants in rural areas covered in this report is reverse osmosis (RO). The raw water source is mostly borehole or open well from which the water is pumped via motor to the raw water tank. From here the unsafe water goes through various stages of filtration. RO technology pushes water under pressure through a semi-permeable membrane to remove the bulk of contaminants, such as microorganisms, bacteria, viruses, particles, colloids, organics, and inorganic chemicals. It is one of the best available methods for treating brackish water, surface water, and groundwater. Water is treated and provided to the customers at the plant in food grade HDPE cans. Despite a few drawbacks, RO is the preferred technology for water purification in India because it is compact, modular, and relatively easy to operate, in addition to having the ability to remove a wide spectrum of contaminants reliably in a single process.

The components usually installed in RO water purification is intake water tank and treated water tank of 5,000 litres capacity, motorised pump, electricity panel, sand filters and membranes. Among all the components sand filters are changed monthly and membranes are changed depending on the water quality results (approximately every 2.5 to 3 years). Otherwise the life of RO purification plant is

considered twenty years. In Bala Vikasa plants stainless steel tanks are used whereas in Naandi and SWN-MARI plants Syntex plastic tanks are used for water storage.

Photograph Bala Vikasa RO unit, with stainless steel water tanks.

In both the Balavikasa RO units - Pedapapaiahpalli and Koppur ATW's have been installed in 2014. In order to provide easy 24-hour access of water to communities, an advanced technology called ATW (Any Time Water) was installed at the water purification plants. A prepaid card was supplied to all beneficiary families. With the use of ATW cards, villagers are able to fetch water at any time of the day/ night. This system also makes record keeping simple and transparent as information on water consumption is saved electronically. To combat the issue of rampant electricity shortage, Bala Vikasa introduced solar-powered batteries for the ATW machines, ensuring supply despite power cuts. Benefits of ATW include:

- Providing access to water 24/7 resulting in 10% increase in consumption than before.
- Technology has reduced operation costs, by reduced workload.
- Dispensing of exactly 20 liters eliminates wastage of water while filling water cans.
- Total transparency in revenue recording as water is supplied only when the card is charged with money.
- Allows effective monitoring of project data.

Photographs Naandi and SWN-MARI water purification plants

In conclusion, the water committees in Bala Vikasa, Naandi and SWN-MARI are functional, active and fulfilling their roles. Since the water committee members and operators are trained, they have taken up their roles and responsibilities with great vigour. There have been cases of non participation of water committee and a new water committee has been nominated again in Pathipaka. With the

building cash reserves over the years, the water committees are confident to cover the CapManEx without any support from the respective Potable Water ESE entities.

3.4 Community service provider participation assessment

A participation assessment for each of the CSP's has been consider for each stage of the service delivery cycle. This assessment enables us to understand to what extent the participation of the community is active, passive, interactive or functional. Analysing the participation indicators, throws light on the front and back end mechanisms of enabling support entity and extent of community participation during the entire process of implementation and for future sustainability.

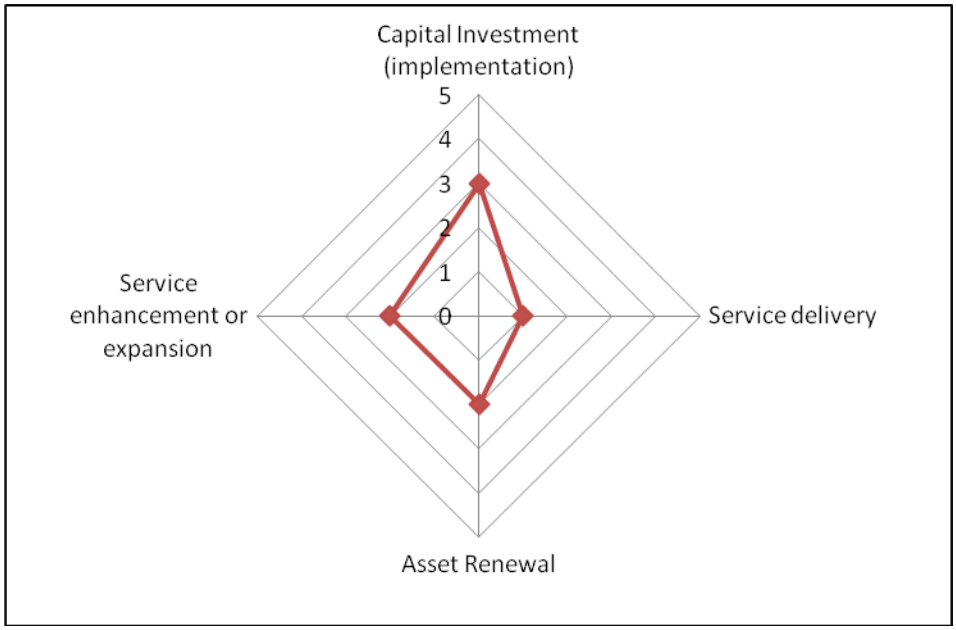


Figure 6 Community service provider participation assessment in Bala Vikasa model

Capital Investment There is a standard infrastructure plan for a RO plant. Bala Vikasa (BV) team discusses the implementation plan with the community. The community is provided with a way forward plan, and then fund mobilization (people's contribution of 10%) takes place. During the capital investment stage, the community also has to agree to provide raw water source, electricity connection and shed/ room to install the RO machinery. These are non-negotiables in the project. At the same time BV team also conducts IEC activities to form the water committee and to motivate community to take membership at the water purification plant.

Service Delivery The water committees that are nominated for each purification plant are handed over the responsibility of administration, management, operation and maintenance. The members of the water committee and operator are trained to take up this responsibility. After the inauguration of the plant, the water committee is responsible for the functioning of the plant. Only technical support is provided by the contracted company teamed with regular visits by filed co-ordinators to monitor the water committees.

Asset Renewal The main asset renewal in any purification plant is the replacement of membranes. The building cash reserves support the cost of replacing the membranes which is approximately done every

three years depending on water quality. In such cases, a joint decision is taken by the water committee and Bala Vikasa field co-ordinator.

Service Enhancement or Expansion As such this parameter is not applicable in case of purification plant. The ideal service expansion for the water committee is to attain 100% membership. Water committees constantly strive to retain the existing users and make efforts to motivate the non-users.

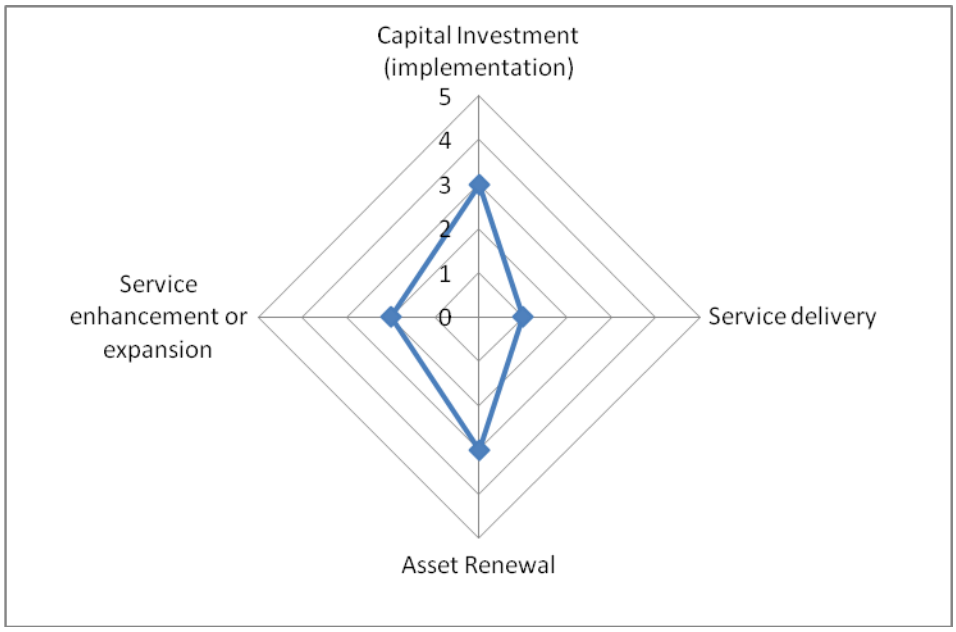


Figure 7 Community service provider participation assessment in Naandi model

Capital Investment There is a standard infrastructure plan for a RO plant. Bala Vikasa (BV) team discusses the implementation plan with the community. The community is provided with a way forward plan, and then fund mobilization (people's contribution of 10%) takes place. During the capital investment stage, the community also has to agree to provide raw water source, electricity connection and shed/ room to install the RO machinery. These are non-negotiables in the project. At the same time Naandi team also conducts IEC activities to form the water committee and to motivate community to take membership at the water purification plant.

Service Delivery The water committees that are nominated for each purification plant are handed over the responsibility of administration, management, operation and maintenance. In case of Naandi the water committee comprises of only the operator and in few cases a second person is employed to support the operator. The operator is trained thoroughly to take up this responsibility. After the inauguration of the plant, the operator is responsible for the functioning of the plant. Only technical support is provided by the contracted company teamed with regular visits by territorial officers and occasional visits by territorial experts if needed.

Asset Renewal As such the main asset renewal in any purification plant is the replacement of membranes. The building cash reserves support the cost of replacing the membranes which is approximately done every three years depending on water quality. In such cases, a joint decision is taken by the operator and territorial officer.

Service Enhancement or Expansion As such this parameter is not applicable in case of purification plant. The ideal service expansion for the water committee is to attain 100% membership. Water committees constantly strive to retain the existing users and make efforts to motivate the non-users.

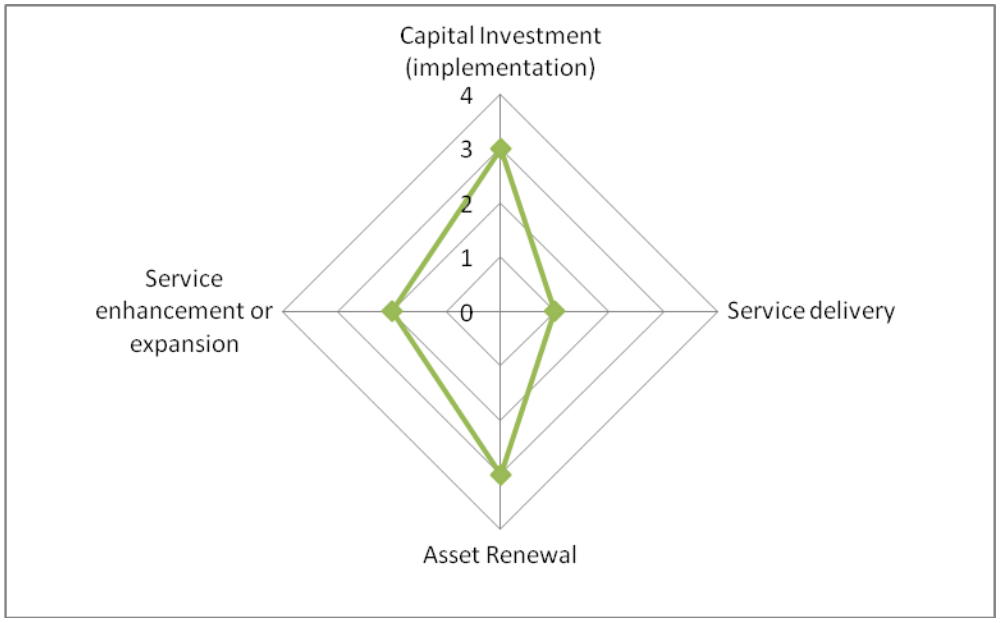


Figure Community service provider participation assessment in SWN - MARI model

Capital Investment There is a standard infrastructure plan for a RO plant. MARI (BV) team discusses the implementation plan with the community. The community is provided with a way forward plan, and then fund mobilization (people's contribution of 10%) takes place. During the capital investment stage, the community also has to agree to provide raw water source, electricity connection and shed/ room to install the RO machinery. These are non-negotiables in the project. At the same time MARI team also conducts IEC activities to form the water committee and to motivate community to take membership at the water purification plant.

Service Delivery The water committees that are nominated for each purification plant are handed over the responsibility of administration, management, operation and maintenance. The members of the water committee and operator are trained to take up this responsibility. After the inauguration of the plant, the water committee is responsible for the functioning of the plant. Only technical support is provided by the contracted company teamed with regular visits by filed co-ordinators to monitor the water committees.

Asset Renewal: As such the main asset renewal in any purification plant is the replacement of membranes. The building cash reserves support the cost of replacing the membranes which is approximately done every three years depending on water quality. In such cases, a joint decision is taken by the water committee and MARI field co-ordinator.

Service Enhancement or Expansion As such this parameter is not applicable in case of purification plant. The ideal service expansion for the water committee is to attain 100% membership. Water committees constantly strive to retain the existing users and make efforts to motivate the non-users.

3.5 Community Service Provider Costs

Community service provider costs are derived from the water committees cash books. Since all the water committees have registers maintained thoroughly.

Table 10 Summary Opex Direct Support costs

Community	Pedapapaiah-palli	Koppur	Atkuru	Kodurupadu	Pathipaka	Gorikothapalli
Potable Water Model	**Bala Vikasa**		**Naandi**		**SWN - MARI**	
Price per water can	INR 3	INR 3	INR 4	INR 4	INR 4	INR 4
Income	3,08196	1,07,005	2,60,676	2,00,055	2,22,769	1,37521
Labour cost						
Operator salary	72,000	36,000	44,358	73,135	48,000	48,000
Community service provider annually incurred costs on supply						
Electricity charges	28,559	21,572	57,805	45,388	52,464	53,266
Chemicals	6,950	11,000	-	-	4,750	5,500
Materials	1,200	3,800	-	-	2,620	2,500
Contracted on-going maintenance fees	12,796	2,500	16,079	10,270	14,660	8,241
Contracted repair or capital maintenance	7,220	5,000	-	-	-	-
Water quality testing	150	150	1,235	1,390	-	-

Opex direct support costs are paid from the income of the water committees. Water committees in Bala Viksa, Naandi and SWN-MARI models are able to meet the expenses including payments for power along with building cash reserves. Almost all the water committees have recruited one operator who is paid salary every month. Pedapapaiahpalli has one operator and accountant who are paid INR 3,000 each whereas Koppur water committee has just one operator who is also paid INR 3,000. At Atkuru plant there is one operator whereas at Kodurupadu plant there are two women operators, as they take turns owing to the erratic power supply. Under Naandi model, plant operators are covered under insurance.

4 Household Service Levels

How effective, at household water consumption level, is the 'successful' community management plus approach *'to verify the service level that users get'*

4.1 Coverage

Coverage for this case study is analysed in terms of penetration for each service delivery model. Naandi plants have the least coverage when compared to Bala Vikasa and SWN-MARI plants. Bala Vikasa and SWN-MARI plants have been able to penetrate among 70% of the population whereas Naandi plants have been able penetrate upto 35%.

Table 11 Summary coverage across the water the committees

Community	Pedapapaiahpalli	Koppur	Atkuru	Kodurupadu	Pathipaka	Gorikothapalli
Model	**Bala Vikasa**		**Naandi**		**SWN - MARI**	
Population	3,276	3,055	1,615	1,786	4,234	3,932
Population served by water committee	2,300	1,470	565	679	2,625	2,752
Coverage (%)	70%	48%	35%	38%	62%	70%

4.2 Quantity, Accessibility, Quality, Continuity, Reliability

Other than the water accessed from the regular VWSC/RWSS water supply, household purchase drinking water from the water purification plants. Hence bottled water is considered as Water Source 'B'. Across all the plants, the water cans are a standard of 20 litre capacity. The water collection point is at the plant, so all the consumers either walk/ cycle/ ride by two-wheeler to collect water when needed. At all the plants there are fixed timings for water collection.

Photographs Collection point at Atkuru - Naani plant

Woman fetching water 10l can

Table 12 Pedapapaiahpalli & Koppur with Bala Vikasa households survey service levels

Water Source A	Service levels for best practice village (n=60)				
	Quantity	Quality	Continuity	Accessibilty	Reliability
High	65%	23%	7%	90%	
Improved	0%	0%			
Basic	10%	47%	82%		
Sub-standard	13%	30%			
No service	12%	N/A		3%	

Water Source B	Service levels for best practice village (n=49)				
	Quantity	Quality	Continuity	Accessibilty	Reliability
High	0%	100%	N/A	55%	N/A
Improved	0%	0%	N/A	18%	N/A
Basic	0%	0%	N/A	22%	N/A
Sub-standard	0%	0%	N/A	2%	N/A
No service	100%	0%	N/A	2%	N/A

Table 13 Atkuru & Kodurupadu with Naandi households survey service levels

Water Source A	Service levels for best practice village (n=60)				
	Quantity	Quality	Continuity	Accessibilty	Reliability
High	25%	17%	3%	17%	17%
Improved	8%	0%	0%	17%	17%
Basic	50%	83%	88%	50%	67%
Sub-standard	17%	0%	8%	17%	0%
No service	0%	0%	0%	0%	0%

Water Source B	Service levels for best practice village (n=58)				
	Quantity	Quality	Continuity	Accessibilty	Reliability
High	0%	100%	N/A	52%	N/A
Improved	0%	0%	N/A	26%	N/A
Basic	0%	0%	N/A	22%	N/A
Sub-standard	0%	0%	N/A	0%	N/A
No service	100%	0%	N/A	0%	N/A

5 Enabling Support Environment Costing

5.1 Capital costs

In water purification plants, the support entity is installing the RO machinery which is the CapEx hardware cost and IEC activities is the CapEx software cost. At the capital investment stage, community contribution is (i) raw water source, (ii) electricity connection and (iii) shed/ room for installation of machinery. During implementation stage, there are extensive visits from enabling support entity for motivation and IEC activities. During the implementation stage, 90 staff days are spent at field level to bring the community together.

Table 14 Costing table of capital expenditure for software

Community	Pedapapaiah-palli	Koppur	Atkuru	Kodurupadu	Pathipaka	Gorikothapalli
Model	**Bala Vikasa**		**Naandi**		**SWN - MARI**	
Number of households supported	639	380		180	705	654
Total population supported	2300	1470	565	679	2,625	2,752

Number of staff days involved in supporting	90	90	90	90
Average salaries for this level of staff (INR)	37,972	3,33,333		
Total estimated direct staff cost for implementation (INR)	34,17,480	3,00,00,000		
Travel and subsistence costs (INR)	1,20,000	80,000		
Any information materials and supplies costs (INR)	18,600	60,000		
Total estimated CAPEX Direct Support costs	35,56,080	3,01,40,000		

The capital expenditure varies from each village. The CapEx hardware figure represents only machinery cost from the enabling support entity. All the RO plants are 1000 LPH capacity.

Table 15 Capital Expenditure - Hardware

Community	**Pedapapaiah-palli**	**Koppur**	**Atkuru**	**Kodurupadu**	**Pathipaka**	**Gorikothapalli**
Model	**Bala Vikasa**		**Naandi**		**SWN - MARI**	
Total Estimated Capex Hardware	INR 4,50,000	INR 3,50,000	INR 5,00,000	INR 5,25,000	INR 5,50,000	INR 5,05,026

For the Base Level Water capital expenditure we have investigated any reported capital costs (see Appendix) and we have also used estimates based upon the 2014 costs kindly shared by the government department: Cost of a Single Village scheme of 60m3 capacity in Visakhapatnum district, Andhra Pradesh - water source (90 typical metre depth): INR 0.61 lakh; Pumpsets: INR 2.23 lakh; Pump House: INR 1.17 lakh; Pumping Main: INR 2.17 lakh; Overhead Service Reservoir (OHSR): INR 19.30 lakh (construction of standalone OHSRs: 120m3-INR 40 lakh; 90m3-INR 30 lakh; 60 m3- INR 21 lakh; 40m3 – INR 19 lakh; 20m3- 12 lakh); Distribution Network: INR 16.06 lakh; Distribution and Bulk Flow Meter: INR 0.35 lakh; Labour: INR 0.42 lakh; Contingencies: INR 3.20 lakh; Total INR 58.60 lakh

5.2 Recurrent costs & revenue – Opex, hardware & software

There are as such no recurrent or operational expenditure hardware costs after the installation of the RO machinery for the enabling support entity. After installation, water committees pay for sand filters, repairs or annual maintenance which has been covered earlier. For OpEx software costs, activities such as (re) training of operator and support visits by field co-ordinators are taken into consideration.

For running the base level water system we have estimated power costs based upon the declared power tariff and assumed borewell depth checked against metered power bills for the one VWSC who maintained that information plus likely staffing costs as also determined from the field visits (see Appendix).

The total costs, based on State support, NGO support and Gram Panchayat (Local self-government) support, along with community contributions are summarised below on an annual per person basis.

Table 16 Summary Cost Table (INR)

Telangana Summary Cost Table - calculated as the average cost per person,for this particular case study for one village

Source of funds	Use of funds - implementation			Use of funds - annual recurrent					
	CapEx hardware	CapEx software	CAPEX TOTAL	OpEx labour & materials	OpEx power	OpEx bulk water	OpEx enabling support	CapManEx	RECURRENT EXPENDITURE TOTAL
Community/consumers	INR 596	-	INR 596	INR 63	INR 41	-	-	INR 14	INR 117
Local self-government	INR 223	-	INR 223	INR 40	INR 21	-	-	-	INR 62
	-	-	-	-	-	-	-	-	-
State government entity	-	-	-	-	INR 31	-	-	-	INR 31
State water supply agency	-	-	-	-	-	-	INR 13	INR 118	INR 130
National Government	INR 4,027	-	INR 4,027	-	-	-	-	-	-
NGO national & international	INR 21	INR 24	INR 45	-	-	-	-	INR 1	INR 1
International donor	-	-	-	-	-	-	-	-	-
TOTALS	INR 4,867	INR 24	INR 4,891	INR 103	INR 93	-	INR 13	INR 132	INR 341
Median of 20 case studies			INR 3,231						INR 207
'Plus' %age	88%	100%	88%	39%	56%	-	100%	90%	66%
Median of 20 case studies			95%						57%

Table 17 Summary Cost Table (PPP USD$)

Telangana Summary Cost Table - calculated as the average cost per person,for this particular case study for one village

Source of funds	Use of funds - implementation			Use of funds - annual recurrent					
	CapEx hardware	CapEx software	CAPEX TOTAL	OpEx labour & materials	OpEx power	OpEx bulk water	OpEx enabling support	CapManEx	RECURRENT EXPENDITURE TOTAL
Community/consumers	$ 33.96	-	$ 33.96	$ 3.59	$ 2.32	-	-	$ 0.78	$ 6.69
Local self-government	$ 12.72	-	$ 12.72	$ 2.29	$ 1.22	-	-	-	$ 3.51
	-	-	-	-	-	-	-	-	-
State government entity	-	-	-	-	$ 1.77	-	-	-	$ 1.77
State water supply agency	-	-	-	-	-	-	$ 0.73	$ 6.70	$ 7.42
National Government	$ 229.56	-	$ 229.56	-	-	-	-	-	-
NGO national & international	$ 1.17	$ 1.38	$ 2.55	-	-	-	-	$ 0.04	$ 0.04
International donor	-	-	-	-	-	-	-	-	-
TOTALS	$ 277.41	$ 1.38	$ 278.79	$ 5.88	$ 5.31	-	$ 0.73	$ 7.52	$ 19.44
Median of 20 case studies			$ 184.16						$ 11.78
'Plus' %age	88%	100%	88%	39%	56%	-	100%	90%	66%
Median of 20 case studies			95%						57%

The INR Indian Rupee conversion to the USD United States Dollar has been undertaken at the mid 2014 exchange rate of INR60/USD$ with a Purchasing Power Parity (PPP) multiplier of 3.42 applied in order to give the best interpretation of India costs in global terms (http://data.worldbank.org/indicator/PA.NUS.PRVT.PP).

6 Conclusions

The need to access the most immediately available water, usually groundwater accessed for 'single-village schemes', has led to the supply being vulnerable to chemical and biological contaminants. In Telangana and Andhra Pradesh, the widespread prevalence of fluoride is adversely affecting human health by causing dental and skeletal fluorosis. With a rapidly growing population and increasing demand for quality potable drinking water innovative solutions have been emerging to support to this new drinking water crisis

This situation provides a strong rationale for the role of professionally-managed community-owned/influenced decentralised drinking water delivery. Various players have emerged in the last two decades in both rural and urban areas. This study has looked at the approaches used by ***Bala Vikasa***, the ***Naandi Foundation*** and the ***Safe Water Network***. These organizations have been chosen for documentation because of their pre-dominance of community involvement in their ongoing service delivery.

These three slightly different approaches to delivering potable drinking water support communities needs complementary to the ongoing support from the state water agencies: Rural Water Supply and Sanitation Department, Telangana and Department of Panchayat Raj and Rural Development, Andhra Pradesh, who have constructed the base level water service and have deliver varying degrees of ongoing support to communities.The water committees though informal in their establishment in this context, have been trained capacitated to the extent where they can handle the administration, management, operation and maintenance. There are various tools that have been developed by the support entities to guide the water committees such as separate bank account, registry of operational information, book-keeping, addressing minor issues etc.,

The Summary Cost Tables, above, show the extent of support which is necessary for this combined approach, demonstrating the community's willingness to pay for the additional quality of potable drinking water in addition to their more marginal contributions to the conventional water supply. The extent to which communities will be able to manage their sophisticated treatment plants over time, particularly as membranes fail and NGOs press for full transfer of responsibility, is the outstanding question. At present the systems studied are delivering successful community management of water, both potable and conventional supply, but at a total cost over 50% higher than the median of the 20 case studies investigated during this research project.

7 References

http://www.dailypioneer.com/state-editions/lucknow/state-government-is-contemplating-to-ro-water-purifier-plants-in-all-the-over-one-lakh-villages-to-cater-quality-drinking-water.html

Appendix – Village information and costs

7.1.1 Peddapapaiahpalli

Peddapalli is a Village in Huzurabad Mandal, Karimnagar District of Telangana State, India. It is located 47km East from District headquarters at Karimnagar. Total population is 3,400, made up of 890 households. The village accesses Drinking Water from wells and other water from a multi-village scheme with one filter bed for water treatment for the 14-15 villages on the government scheme with water distribution from overhead tanks, reportedly once in four days' supply when surveyed: 'There was no advantage as the system wasn't satisfactory'. The quality was believed to be good but the quantity insufficient (due to the single filter bed) with only one tap in the village. Women used to fill in one/two pots every day. Major failure was in pumping. No ownership, led to failure. Maintenance also not there. Gram Panchayat water came from well and borewell – but the water could not be used for drinking

The NGO Bala Vikasa was approached who said that they would give some money, requiring the people to contribute the balance. The community came to know about Bala Vikasa through its other programmes, newspapers advertisements.

Of the 890 households, there are 604 Members – 95% Coverage, up from the opening membership of 500 who each made a 300 INR Contribution (now 400 INR, payable by instalments). The RO plant cost INR 90,000. The community's contribution was the machinery cost+tiles and the building cost, INR 4 lakhs for minor repairs and renovation), using the Gram Panchayat 's building. The community received the INR 25,000 'incentive' back.

There are 14 bores and 3 wells in village with a new borewell for the RO plant, now two years old, fitted with a single phase meter and given 6B Category for power charges based upon a letter given from Gram Panchayat.
Management Committee: Formed in 2009; 10 members – 2 of which are women + 1 Operator +1 Accountant +Sarpanch; Election – nomination; BV- Machinery selection, training, etc; No legal statutes; No relationship between GP and committee; Sarpanch is chair; GP will provide water; Separate bank accounts – Joint account on the names of President and Secretary; President – Overall matters, Secretary –Financial , meetings; Every month 5th meeting at 8.00 AM; Meeting minutes maintained.

Information was accessed by the community through Gram Sabha, Annual Day and Notice Board. Complaints redressal was delivered through any Individual being able to approach any member. It was reported that the Water Committee doesn't make an effort to formally know of its services. It only responds when a complaint is raised.

Repairs took a maximum of 24 days for major problems. Mechanics came from Bala Vikasa with their costs paid by the committee. Vouchers are recorded. Minor repairs are taken of care by the local operator or by a local mechanic charging INR 50.

Water quality testing cost INR 100 per test. 1 litre required. Results sent via post. Records maintained.

For new equipment, the ideas come from Bala Vikasa through their awareness campaigns/meetings, street play and posters as part of IEC Activities.

Costs and revenue: Operator + Accountant: INR 3,000 and INR 3,000 per month; Electricity: INR 2,000-3,500 per month of which RO treatment cost is around INR 1,000. Rest is pumping cost from bore; Every month change in filters – INR 300/pair; Chemicals, 5 Kgs every 4 months: INR 1,550

The only capital maintenance in the two years of operation (apart from the change in filters) was renewal of the Sand filters.

Revenue: a 20 Litre Can is charged at INR 3 with total contribution by consumers through the 'Any Time Water' Kiosk INR 35,000

7.1.2 Koppur

Koppur is small village located in Bheemadevarpalle Mandal of Karimnagar district, Telangana with total 789 families residing. The Koppur village has population of 3055 of which 1523 are males while 1532 are females as per Population Census 2011. In Koppur village population of children with age 0-6 is 299 which makes up 9.79 % of total population of village. Average Sex Ratio of Koppur village is 1006 which is higher than Andhra Pradesh state average of 993. Child Sex Ratio for the Koppur as per census is 942, higher than Andhra Pradesh average of 939.

Koppur village has lower literacy rate compared to Andhra Pradesh. In 2011, literacy rate of Koppur village was 54.28 % compared to 67.02 % of Andhra Pradesh. In Koppur Male literacy stands at 64.50 % while female literacy rate was 44.20 %. Schedule Caste (SC) constitutes 15.97 % while Schedule Tribe (ST) were 0.79 % of total population in Koppur village.

In Koppur village out of total population, 1550 were engaged in work activities. 82.97 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 17.03 % were involved in Marginal activity providing livelihood for less than 6 months. Of 1550 workers engaged in Main Work, 239 were cultivators (owner or co-owner) while 636 were Agricultural labourer.

Particulars	Total	Male	Female
Total No. of Houses	789	-	-
Population	3,055	1,523	1,532
Child (0-6)	299	154	145
Schedule Caste	488	268	220
Schedule Tribe	24	11	13
Literacy	54.28 %	64.50 %	44.20 %
Total Workers	1,550	759	791
Main Worker	1,286	0	0
Marginal Worker	264	0	0

Infrastructure: 1 bore – 5-6 yrs; 1 well – 25 yrs; 1 motor pump – 10 HP – 1 year, 7.5 HP – 25 years; Electricity Panel – 25 yrs; Chlorine – Buy from Warangal - Pump Operator; No tanks- valve system – 1 valve - 20 HHs; Public Standposts – 4-5 (dry) – from bore only; ATW – works on Battery and Solar Panel – INR 7500 for installation (took 1 year ago) – People contribution which is 20 %. Rest 80% is donor's cost

Prior Situation: Bores going dry; RMP doctors – Evidence in reduction of Thyroid, diarrhoea and all water borne diseases; Groundwater reduction. Panchayat water once in 10-15 days or 20 days sometimes; BalaVikasa was working in a neighbouring village- Husnabad plus, Bala Vikasa used to give ads in newspapers. Hence, villagers approached BV. BV – cycle followed, members were approached. August 2012 – plant established INR 70,000 member contribution from 320 members. – Initial membership cost INR 200 (before and now); Now- Actual members – 380 Members- HHs; Approximately 3000 population in 1400 HHs; Actual members – 380 Members- HHs

Committee: Sarpanch – Chair; 5 members: 3 Male and 2 Female – nominated representatives; Operator –INR 2000/Month; Plumber/electrician – on need basis – minimum INR 300 – vouchers are recorded; Technicians from the Bala Vikasa or concerned with equipment – usually once a year.

Expenditure: 2 times - membrane cleaning (INR. 3000/unit); 2 times change in sand filter (INR. 3000/unit); Electricity bill – 2000 INR per month; Bore – INR 1500-2000 per month; Electricity connection taken on the name of the plant under the category 6B; Plant Collection – Monthly - Winter- INR 8000 Summer: 10-12000; SCs – 450 people (voters) 250-300 HHs; BPL HHs – 2% of HHs; INR 3/20 Lts – equal across all sections of the society; Roles and Responsibilities; TDS testing - everyday by operator

Training: All members trained – Machinery O&M; Meetings – conducted every month; Meetings are recorded – registers maintained; Information Communication – Announcements, Notice Board; Problems discussed –informally – monthly meeting, everyone knows that the committee is meeting every month. People can use this platform to share their problems; Customer Satisfaction – informally discussed; Small repairs can be handled by the operator; Transportation costs to BV are also recorded; Technicians come immediately or max in a day

In this case, service expansion means an increase in the number of memberships in the village. Before the construction phase, Bala Vikasa ensures that there is at least 90% membership. It is the responsibility of CSP's to ensure 90% coverage. About the enhancement, the infrastructure is constructed keeping in the view the no. of members at present and by taking future assumptions. In case, the quantity of water needs to be increased, then both the parties make a joint decision.

Visit to Pathipaka Village: MARI-Safe Water Network Model

- There are 1190 families in total in this village, but the RO is served to only 600 families. There are five distribution points. The shop keepers take the cans from the water filter office and place in their shops for the people to carry
- The village has politically divided hence it was given to the Reddy caste group which is functioning already and they had ready money available to invest in the initial stages.

Capital Investment Costs: Year of Installation: 2012

Type of Investment	Year	Amount (INR)	Remarks
RO plant (Pentair water India)	29/6/2011	3,91,666	Given by SWN/MARI
UV (Ace Hygiene Product)	30/5/2013&29/6/2012	15,839	--do--
HP Pump & Raw water Pump	26/12/2012	1,41,980	--do--
RMS panel (Mark &space tele)	4/7/2011	1,03,065	--do--
Water Meter(Zenner) aquamet)	10/9/2011	4,434	--do--
Battery and other accessories	16/7/2011&21/7/2011	5,903	--do--
Total cost of the plant		**6,62,887**	**--do--**
Subsidised cost of cans		1,22,960	--do--
Total cost including cans		**7,85,847**	**--do--**
Community contribution for storage and room creation. The Reddy sangam also contributed for renovation of the room for water filter	Utilised for creating storage tank, in the beginning panchayat had given the water connection but the source got dried hence the community invested again at a later date (reflected in capital maintenance)	1,15,000	INR 1000 per household and 115 families contributed the initial amount. And these members are given free INR 20 recharge every time when they

Operational Expenditure:

Type of Investment	Amount (INR)	Remarks
Operator costs	3,000(fixed) + 1,000 (as incentive based on the sales and it may vary)	
Electricity Bill	4,000-5,000	In Summer it will be more and it is based on the sales also (more sales more bill)

Chemicals/membranes	2,000-4,000 (once two/three months)	
Repairs/ other miscelaneous	100	
Repayment of loan taken from the farmer group	8,000	To dig a new borewell they have taken loan from the Reddy Sangam

Capital maintenance Costs:

Type of Investment	Amount (INR)	Remarks
Membrane cost	10,000	
Replacing the spare part of the machine		Do not know the costs as SWN has replaced it
Drilling new bore well as source was dry	60,000	Taken loan from the Reddy sangma

Administrative/ Direct Support costs at MARI level:

MARI-SWN PROJECT (FC PROJECT) **Grants Received and Project Expendiutre incurred during the Period 01.04.2011- 31.03.2012**				
RECEIPTS	**Amount**		**Payments (INR)**	**Amount (INR)**
To Grants amount Received from Safe Water Network*	3,83,909.00		By Project Expenditure	2,22,006.00
			Includes salaries as under:	
			Coordinator INR 24,000	
			Asst. Project Coordinator INR 77,000	
			Field Executive INR 7,493	
Total	**3,83,909.00**		**Total**	**2,22,006.00**
Total Number of Projects Executed in 2012 by MARI				**9**
Per Plant cost = INR 222006/9				**24,667**
Pre mobilisation costs (meetings in the village before installation, committee formation and inauguration of the plant etc..)				**25,000**
Total expenditure before Installation (including some visits for monitoring)				**48,667**

There is direct support costs at the ESE (safe water Network also (eg: technical support in the initial stage, travel costs of Delhi staff to monitor the field level activities etc..)

Details and Costs of Other Sources(Panchayat/RWSS) in the Village Pathipaka

Water tariff – INR 40/month and Karobars (local Panchayat workers) collect the tariff from the households. About 70-80 percent pay regularly and the remaining pay in once in two/three months; There is dedicated power supply for 24 hours for pumping water, however the household get only 30-45 min of water supply and sometimes on alternative days; Electricity bill is not given to Panchayats on a monthly basis. This Panchayat received the bill of INR 5 Lakh at once and so far they could pay only INR 1 lakh …Further there is no separate bill for water pumping; VWSC is non-functional and present on the paper; There are 1,190 households and 4761 is the population; Panchayat received INR 5,00,00 under Gramjyothi scheme (new programme after Telangana state formation) released for the first time under 14th finance commission; Water quality never tested and very disorganised functioning

Capital Costs:

Type of Infrastructure	Year of Establishment	Costs	Remarks
Open wells (3)	1988	Current estimation is INR 2,00,000-3,00,000	Based on the real expenditure in the next village
Borewell (1)	2007	70,000	
OHSR -1 1,20,000 lts	19-06-1988	Since the DPR is not available. The current costs were considered. It would cost around INR 58,000-60,000 (given the current SSR)	This OHSR is in dilapidated condition, looks the life span of the OHSR is completed, however they still used it.
OHSR- 2 90,000 lts	2007	Would cost around 50,00,000 – 55,00,000	current estimated amount and includes pumping main, motor costs, pipeline distribution network, labor etc
Motors – 7.5 HP			For each one Hp it costs about INR 12,000
Hand Pumps	36# 20 functional - 16 non-functional; Out		

	of them 4 HPs were drilled recently and each Hp costed around INR 60,000		
Direct Pumping			17 houses are supplied directly from source
Public taps	3		
HH taps	590		
Water Tariif	INR 40/month/house		
Gate Valves	18		

Administrative or Direct Support Cost of ESE

Type of investment	**Salary amount per month**	**Remarks**
Work Inspectors (2)	INR 18,000	Responsible for 55 habitations
Assistant Executive Engineer (1)	INR 44,000	Responsible for 55 habitations
Deputy Executive Engineer (1)	INR 60,000	Responsible for 180 habitations
Executive Engineer (1)	INR 75,000	Responsible for 240 habitations

Operational Costs:

Type of investment	**Amount**	**Remarks**
Water Pump operators (2)	INR 4,000 each = 8000 per month	
Assistant to help water pump operators (1)	INR 2500	
Repairs to the pipeline	On an average INR 2000-3000	Since the pipe line laid out in 1988 is a cement pipeline, it has become very old and they keep getting repairs. They have given request to the RWSS for

		new scheme. Now they are expecting the water grid will solve all the problems.
Electricity Bills		

Visit to Peddapapaiahpally Village in Hujurabad mandal: Implemented by Bala Vikasa

Implemented in the year 2009. Bala Vikasa first introduced silt application program in the village, later community approached Bala Vikasa when they started facing the difficulty of drinking water; Bala Vikasa insisted on 50% of community mobilisation as a minimum requirement; There are 800 households and 500 households came forward and contributed Rs300 from each family to pool upto INR 1,50,000. Out of that amount they had to deposit Rs 90000 to Bala Vikasa. Out of this amount Bala Vikasa paid back INR 30,000 as an incentive for good performance; Gram Panchayat gave the plot, room and water connection (RWSS); GP has made an agreement with water committee to provide the above mentioned infrastructure; Water committee is constituted with 12 members and there are 4 women and 8 men in the committee; Initially GP gave the source and overhead storage structure of 2000 lts capacity and there was direct tap connection to fill the Overhead tank in initial days); After the ATW , the water committee does not have the clear idea about how many litres sold each day etc. They just take the meter reading towards the end of the month and take a calculation of the total. Committee does not have the detailed reports of the annual records etc as Bala Vikasa maintains them. But after Bala Vikasa withdrew the committee just maintain the monthly records. The water committee has a savings of upto INR 5,00,000 in fixed deposits.For future technical and other support Bala Vikasa formed an apex committee combining all the water committees from the villages but so far it is non-functional. If there are any issues with maintenance or repair of machines they directly call the supplier or sometimes they also depend on Bala Vikasa. So far they have not entered into AMC this year. Small repairs are taken care by the operator. They save both in post office and also in bank.

Each family is entitled for two cans a day but they can get a special unlimited recharge for special occasions. Out of their savings water committee has given a loan of INR 2,000,00 for construction of a new well for supplying domestic water to the village. Out of which INR 1,70,000 is already paid and another INR 30,000 is to be paid to the Panchayat. There is an agreement regarding this loan with water committee

Of late there is huge water scarcity and number of water points that get drilled are failing so households are buying water which is supplied from agricultural wells at the rate of INR 500 for 4,000 litre tank; 20-30 HHs are buying on an average; The reject water from the RO is also collected in a tank and used for the domestic use.

Capital Investment Costs : **Year of Installation: 2009**

Operational Expenditure:

Type of Investment	Amount	Remarks
Operator costs	INR 3000	
Accountant	INR 3000	
Electricity Bill**	INR 1200-1800	In Summer it will be more and winters it is less. Water Committee negotiated with panchayat and taken a subsidised connection unlike in Pathipaka village, hence less electricity bill.
Chemicals/filters	INR 300- 500 per month	
Recharge to ATW and Repairs/ other miscelaneous	INR 500	
Monthly donation to Balavikasa	INR 500	

****Since this village has a electricity sub-station the power supply is for 24 hours. The water filter system runs for minimum 6 hours and maximum 12- 14 hours.**

Capital maintenance Costs:

Type of Investment	Amount	Remarks
New Borewell (Source) creation in the year 2016	INR 70,000	
Construction of Underground storage tank and GLSR with four taps for public to domestic use and Cement tank for reject water	INR 1,00,000	
ATW machine	INR 35,000	
Given loan to the GP	INR 1,70,000	
Membrane cost in the year 2015	INR 60,000	Approached Bala Vikasa for technical support

Details and Costs of Other Sources(Panchayat/RWSS) in the Village Peddapapayyapally

- 833 households and a population of 3250
- 580 household connections are there
- Earlier they had a CPWS scheme but since the summer storage tank is dry the water supply to the tanks is not there.

- Currently they are supplying water through direct pumping. The connected all the wells and a borewell to the pipeline and providing water directly.
- Water tariff is INR 20 per month and around 90% of the families pay the tariff

Capital Costs:

Type of Infrastructure	Year of Establishment	Costs	Remarks
Open wells (3)			
Borewell(1)			
OHSR -1 60000	1990	INR 5200000-5800000	Based on the current SSRs
OHSR- 2 40000 lts	2013	INR 4500000-4800000	--do--
Motors – 7.5 HP (3) Motor- 5 HP (1) Motor – 10 HP (1) **Total 5 motors**	Vary from year 1990 to 2013 based on the need	INR 6,25,320	One way of calculating current cost as per the Standard Schedule of rates is each HP has a unit cost of INR 12,5000. We can arrive at the cost based on the total HPs
Hand Pumps (31) Old 15 New 12 Reapir 4		INR 60000 is the cost of one hand pump including the pipes, drilling cost, handle, platform etc..	Borewells are drilled upto 300 ft as there is no water but the hand pumps are fitted at 100 ft…so it is becoming difficult to pull the water up with human hands hence the one HP motors are used
Direct Pumping	From one openwell with motors		They also hired an agricultural well for supplying water and Govt pays INR 6000 per month to the owner of the

Public taps	o		
HH taps	580		
Water Tariif	INR 20/month/house and there is a deposit of INR 1,000 for initial connection		

Administrative or Direct support Cost of ESE

Type of investment	**Salary amount per month**	**Remarks**
Assistant Executive Engineer (1)	INR 44,000	Responsible for 29 habitations
Deputy Executive Engineer (1)	INR 60,000	Responsible for 150 habitations
Executive Engineer (1)	INR 75,000	Responsible for 230 habitations

Operational Costs:

Type of investment	**Amount**	**Remarks**
Water Pump operators (2)	INR 2700 each = 5400 per month	
Assistant to help water pump operators (1)	INR 500	
Repairs to the pipeline	On an average INR 2000-3000 But in Summer season the repairs are very high and expenditure goes upto INR 10000-15000	Since there is direct pumping, pipes burst and leakage are very common and they have to regularly repair the pipelines. Watergrid activities are progressing well in these villages
Electricity Bills**		
Chemicals	INR 3000 per year	Earlier Govt used to supply but now panchayat pays for it

Hand pump repairs	INR 500-1000	More in summer and also there is shortage of mechanics
Tank cleaning	INR 200	

***** Panchayat received a pending electricity bill of** INR **30,000,00 and so far they have paid only one lakh rupees)**

The electricity charges for Peddapapaiahpally for the month of Feb 2016: Meter 1: INR 8334; Meter 2: INR 9942; Meter 3: INR 10953; Meter 4: INR 7787: Total INR **37016** but out of this INR 21083 are special charges. so the actual bill is INR 15933.... So monthly electricity bill should be around INR 15000-16000 per month

Capital maintenance costs (expansion/ new source creation and new hand Pump creation)

Type of investment	**Amount**	**Remarks**
New Well creation as source	INR 1,70,000	Water committee gave the loan
New 7.5 HP motor	INR 93000	
6 hand Pumps are drilled @ INR 60000 each (the actual value is not calculated yet)	INR 360000	
Ou of the 6 HPs two HPs are fitted with 1 HP motors @ 12,500 each	INR 25000	

8 Appendix The challenge of RO plants

8.1 Minister gives nod at special meeting; plants not providing clean drinking water

http://www.thehindu.com/news/national/karnataka/dc-set-to-takeover-all-ro-plants-in-raichur/article8532637.ece?utm_source=RSS_Feed&utm_medium=RSS&utm_campaign=RSS_Syndication

NATIONAL » KARNATAKA

Updated: April 28, 2016 18:01 IST

RAICHUR, April 28, 2016

DC set to take-over all RO plants in Raichur

Accepting the proposal made by Raichur Deputy Commissioner S. Sasikanth Senthil, Minister for Rural Development and Panchayat Raj H.K. Patil today gave a free hand to the officer to take over all the Reverse Osmosis (RO) plants established in rural areas by private agencies. He was presiding over a special meeting of cabinet sub-committee on drought at the Zilla Panchayat conference hall here on Thursday.

When Zilla Panchayat CEO Kurma Rao submitted to the meeting that three private agencies that bagged contracts for establishing and maintaining 231 water purification plants in the district had failed to provide clean drinking water to people, Mr. Senthil opined that the only and lasting solution was taking over the plants from the private agencies and running them under the Panchayat Raj Engineering Department.

“I completely agree with your suggestion. You have a pro-people approach. The government’s noble initiative to provide safe and clean drinking water is spoiled by these private agencies. Take over all the plants into your hand and run it for couple of months before handing them over to the panchayats concerned. Also, take stringent criminal and civil action against all the three delinquent agencies for breaching the terms of agreement,” the Minister told Mr. Senthil.

“We will take over all the plants from private agencies within a week and run them under PRED for two months before handing them over to gram panchayats . If any technical problem develops in the plants after handing over to gram panchayats, the PRED engineers will fix them,” Mr. Senthil said.

The Minister also directed the DC and CEO not to close water purification plants operational in those villages whose water sources were contaminated with high level of arsenic. “There are reports that water purification plants are being shifted from the villages where there is no demand. But, don’t shift or close them in arsenic-affected villages even though the demand for water is less,” he said.

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9 Appendix –Case Study Pilot Investigation

Draft research design for evaluation of professionally managed community owned decentralised drinking water delivery

Srinivas Chary Vedala, Swapna Uddaraju and Shaili Jasthi, ASCI, January 2015

The need for safe drinking water in rural areas of India, stemming from insufficient quality and quantity of safe drinking water and the associated economic impact of unsafe water on communities, provides a strong rationale for the role of professionalised managed community owned decentralised drinking water delivery. Various players have emerged in the last two decades; the actual count on the number of players currently operating in India is unknown, but it is estimated that there are between 7,000–12,000 units across India. The last decade has seen various established organizations moving into this sector, such as Naandi Foundation and Water Health International (WHI). Most of the players focus on a range of water-quality challenges using various treatment technologies. Although the implementers have been present in India for quite some time, the challenges associated with providing sustainable services and with scale-up of operations have also persisted. Since geographically the next case study is intended to be taken up in Telangana and Andhra Pradesh, the community safe water solutions based organizations have been selected based on the operational areas. For the purpose of the study it is proposed to study the following organizations (i) Bala Vikasa (ii) Healthpoint Services (iii) Naandi Foundation (iv) Safe Water Network and (v) WaterHealth International.

9.1 Introduction

While objectives of the above organizations are similar, ownership, operating models, expenses and price vary among them. Some players have been operating since 20 years and some which have started in the recent times. These players fall broadly into three categories: public-private partnership, in which the venture is funded and operated through a collaboration between the government and a private sector company; community-managed systems, in which the community is an equal stakeholder; and private models, in which a private company or entrepreneur funds and owns a community managed system. These players through their operating models offer solutions centered on communities, each with its own set of advantages and disadvantages. Social entrepreneurs and NGOs pioneering in decentralised drinking water delivery, have emphasized creating frameworks that ensure reliability, affordability, sustainability and social inclusion for undeserved rural Indian communities. The players pursue solutions to help recover local operating expenses (OpEx) and build up surplus reserves for maintenance and reserves. In this context it is helpful to look at the basic information of each of the players.

9.2 Organization Summaries:

Bala Vikasa Social Service Society is a not-for-profit, non-governmental organization providing a range of community development services (including safe drinking water) in Warangal and Telangana. The organization's objective is to provide capacity-building programs to improve the lives of the poor. The approach is based on consumer demand and local ownership, with plants operated and managed by village water committees. To date, Bala Vikasa has established more than 520 reverse osmosis water systems, providing access for roughly 190,000 people. As a majority of capital costs are provided as grants, each water system is only required to generate revenue sufficient to meet its ongoing OPEX.

This enables Bala Vikasa to set a lower price for water (INR 2, or US$0.03, per 20L) than other players that seek capital recovery.

Healthpoint Services India is a for-profit social enterprise established to provide a broad basket of healthcare-related benefits to rural communities. Offerings initially included not only safe water, but also a range of technology-enabled primary healthcare services (telemedicine, pharmacy, and basic diagnostic services). The health-related services were subsequently spun off into a separate NGO. Healthpoint Services currently operates in 140 villages in Punjab and 30 villages in Andhra Pradesh, and charges INR 80 (US$1.30) per household per month for safe water provision. Healthpoint Services now plans to expand its reach in the states of Haryana, Himachal Pradesh, Uttar Pradesh, and Karnataka.

Naandi Foundation is a nonprofit organization that has established a public-private partnership model for the installation and management of water plants. In 2008, it launched Naandi Community Water Services, a private entity, to focus on access to safe drinking water through the provision of inexpensive services. They currently provide safe wateraccess for nearly 400,000 households across the states of Andhra Pradesh, Telangana, Karnataka, Haryana, and Punjab through 405 Community Safe Water Centers. Naandi deploys one of two technologies (reverse osmosis or ultraviolet purification), depending on the local water challenge. Some 30 m liters of water are distributed each month at a price of INR 3–4 (US$0.05–0.06) per 20L. Naandi seeks to build acceptance of the idea of paying for water by clearly positioning itself as a provider of water purification services rather than as a provider of water. Going forward, the organization's priorities include streamlining the staff training process and identifying suitable technology for real-time tracking of water quality and operational data.

Safe Water Network develops market-based solutions that provide safe, affordable water to rural communities. Its field implementation initiatives form the basis for research and innovation to systematically address the challenges to local sustainability. In India, Safe Water Network has 44 "iJal Stations" in the states of Telangana and Uttar Pradesh that provide reverse osmosis-treated water to fluoride-affected communities at a price of INR 4 (US$0.06) per 20L, and include a remote monitoring system that uploads key operational and sales metrics to an online database every 15 minutes. Stations cover community-level OPEX and in many cases have accumulated reserves to support maintenance and capital replacement costs. Over the next three to five years, Safe Water Network's objective is to establish a knowledge hub to capture lessons from the sector and demonstrate a viable model for technical servicing through an independent, for-profit Field Services Entity.

WaterHealth International (WHI) is a for-profit company with offices in India, Bangladesh, Ghana, Nigeria, Liberia, and the Philippines. Its objective is to establish a lasting solution for underserved communities by providing water treated to WHO standards. The Indian affiliate, WaterHealth India, has established approximately 500 water treatment plants across the states of Gujarat, Andhra Pradesh, and Karnataka using a build-operate-transfer model, under which WHI owns the plant for the first 10–15 years of operation before transferring ownership to the community. Each plant uses a proprietary reverse osmosis and/or ultraviolet treatment system (UV Waterworks™) to address a range of mineral and microbial contaminants. Consumers buy water in 20L containers for INR 6 (US$0.10). WHI has also launched a packaged water brand, Dr. Water, available for INR 35–40 (US$0.6)/20L at outlets in Secunderabad, to cross-subsidize their business in proven communities. Going forward, WHI is prioritizing expansion into urban slums.

The table below compares the community water solutions across key factors.

Table A1: Comparison of the organizations across the key factors

	Bala Vikasa	Healthpoint Services	Naandi Foundation	Safe Water Network	WHI
Year Established	1997	2009	1998	2009	1996
No. of existing supply units*	520	170	405 (+35 handed over to community)	44	500(2012)
Location	AP, Telangana	Punjab, A.P	A.P, Telangana, Karnataka, Haryana and Punjab	Telangana, Uttar Pradesh	A.P, Telanagana, Gujarat, Karnataka, T.N, Punjab, Maharashtra
Economic model (PPP/CMS/ private)	CMS	Private	PPP	CMS	PPP
Ownership of Kiosks	Community	Self	Self for 5-10 years, then transfer to community	Community/ local entrepreneur	Self for 10-5 years, then transfer to community
Management of Operations	Community	Self	Self for 5-10 years, then transfer to community	Local community/ entrepreneur	Self for 10-5 years, then transfer to community
Capacity (LPH+)	250-2,000	N/A	1,000	1,000	1,000-2,000
Capacity (People served)	800-3,200	1,600-2,400	-	5,000-8,000, depending upon power availability	-
Principal technology	RO	Contaminant-specific: RO(mainly), ultrafiltration and UV, de-flouridation, iron removal	RO and UV	Six-stage treatment, w/ sand filter, activated carbon filter, micron filter, RO, UV and residual chlorine	RO and patented UV technology

*Self reported. **PPP- Public Private Partnership, CMS- Community Managed Solution + LPH- Liters per hour

9.3 Objectives

- To evaluate and review professionally managed community owned decentralised drinking water delivery which is the plus aspect for this case study.

- To assess the service levels at household level vis-s-vis the complementary sources and supplementary sources.
- To establish the cost for safe drinking water when delivered in a professionalised set-up.

9.4 Research methodology

Since there are multiple operational models available, a certain set of research protocols need to developed independently for the above objectives. The following are proposed activities:

9.5 Institutional arrangement

Mapping of different models:

- In cases where the O&M is done by the player themselves, the enabling environment and service provider stand to be the same.
- In cases where the O&M is done by the community, the enabling environment will be the player/ organization and the service provider would be the community.

9.6 Service Levels

- For each player, the service levels need to be calculated in terms of quantity, reliability.
- In case of each player, one village with a sample of 30 households would be surveyed.

9.7 Other guidelines

- Water quality testing - Samples from both RO and RWSS need to be tested to be assessed further from the health impact point of view.
- Indicators such as 'willingness to pay' and 'ability to pay' need to be incorporated in the data protocols. This can be looked at the penetration of each player in their areas of operation. The same indicators can lay the trajectories in terms of equity and affordability.
- These organizations have developed the operational models with certain profit margin in mind. Hence, the water tariff paid by the user reflects all the costs coming from the top of the pyramid. This indicator stands unique for this case study as against conventional government schemes water tariff never includes the recovery cost.
- The role of the community, service provider needs to understood thoroughly in terms of who plays the role of regulator, who is responsible for setting tariff rates which can be done through FGD's.