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Safe drinking water for rural populations in India: An effective service delivery model by Naandi Foundation

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Abstract. This article analyses how Naandi Foundation has evolved a community-based model in which a water treatment plant is set up in a village after testing the available source of water for nature of contamination. Using appropriate treatment technology, this plant (which is designed to cover the entire village population) is operational for 5 to 8 hours every day and residents of the village are mobilised to collect their daily household's need of drinking water from here at a nominal user-fee of Rs 4 (USD 0.08) for 20 litres. The model engages the water bureaucracy, political representatives and local self government in rollout of safe water services in a village. This new service delivery design, which combines public, private and community contributions for provision of safe drinking water at a very low at a nominal user fee, at the same time exploring modalities of access to this water by the poorest of the village has been the innovative feature of Naandi's strategy.

Keywords. access to water, rural India, Social Business, community engagement, innovative public-private partnerships

1. The context

Water deprivation of the poorest is a widely recognised phenomenon all over the world. It is estimated that over one billion people across the world do not have access to safe, clean drinking water¹, although as a basic human need it is an integral constituent of the right to life. Reducing this number by half by 2015 is one of the United Nations' Millennium Development Goals – which India has committed to achieve.

The health burden of poor water quality is enormous. It is estimated that around 37.7 million Indians are affected by waterborne diseases annually, 1.5 million children are estimated to die of diarrhoea alone and 73 million working days are lost due to waterborne disease each year.² The resulting economic burden is estimated at \$600 million a year. The nature of contamination of drinking water in India varies from region to region - bacteriological contamination being more common in regions where

open defecation is the norm. Chemical contamination being more common in regions where there has been high use of fertilizers and pesticides in agriculture over the past few decades.

There is clearly an urgent need to take steps to protect our poorer populations from unnecessary health risks, medical expenditures and morbidity caused by consumption of unsafe water. It has been estimated for instance that improved quality of water supply reduces diarrhoeal morbidity by between 6% to 25%, if severe outcomes are included. Hygiene interventions including hygiene education and promotion of hand washing can lead to reduction of diarrhoea cases by upto 45%. Improvements in drinking water quality through household water treatment such as chlorination at a point of use, can lead to a reduction of diarrhoeal episodes by between 35% and 39%. And an integrated approach of providing water, sanitation and hygiene reduces the number of deaths caused by diarrhoeal diseases by an average of 65%.³

¹ WHO/UNICEF, 2006

² http://www.smaataqua.com/ourbusiness_communitywater-centers.html

³ http://www.who.int/water_sanitation_health/publications/facts2004/en/

2. In India - state as primary provider of drinking water

The provision of clean drinking water has been given priority in the Constitution of India, with Article 47 conferring the duty of providing clean drinking water and improving public health standards to the State. Both Union and State Governments have been extending policy, technological and financial support for implementing rural water supply schemes. By the 10th Five Year Plan (2002-07), an estimated total of Rs.1,105 billion had been spent on providing drinking water. Yet, at around the same time 2.17 lakh habitations had water quality problems and did not have a safe drinking water source. Data available with the Department of Drinking Water Supply shows that of the 1.42 million rural habitations in the country, 1.27 million are fully covered (FC), 0.13 million are partially covered (PC) and 15,917 are not covered (NC).⁴ However, coverage refers to installed capacity, and not average actual supply over a sustained period or the quality of water being supplied which is the most essential part.

While accessing drinking water continues to be a problem, assuring that it is safe is a challenge by itself. Water quality problems are caused by pollution and over-exploitation. The rapid pace of industrialisation and greater emphasis on agricultural growth combined with financial and technological constraints and non-enforcement of laws have led to generation of large quantities of untreated waste water. Huge public expenditure did not necessarily lead to significant improvement in provision of safe water. Given that 170 million Indians still do not have access to safe water, the scale and sustainability of the delivering safe drinking water needed urgent attention.

By the early 1990s, with economic liberalisation unfolding in India, reforms involving commercialization of water services and private sector participation - along with cost recovery and profit maximisation implications - were being proposed as a way improve access for all sectors of the population and reduce the burden on government of delivering efficient services. But this opening up of the sector did not have popular results.⁵ Typically, the twin challenges of equity and managerial (technological and financial) efficiency were difficult to balance. Either cost of water was higher than comfortable, or the quality of the water was still not as good as it needed to be. This led to policy discussions around drinking water being dominated by the debate on privatization versus state ownership. But does this have to be the choice? Can it not be a discussion on rational policy approaches for securing clean water for the poor in which some combination of public and private sector involvement is considered?

3. The Naandi Model

It is well known that ideal delivery of any basic service is defined by accountability balanced between different groups of stakeholders - policy-makers, owners, financiers, customers

⁴ <http://planningcommission.gov.in/reports/genrep/wtrسانی.pdf>

⁵ Naandi Foundation Annual Report 2007-2008 - Jasveen Jairath - Safe Drinking Water for All

and regulators. Results are best if the roles of policy maker and financier are played by different agencies, as also with the roles of owner and regulator. In the case of the rural water supply in India, the composition of these stakeholders has been as follows:

- *Policy makers:* The central government, with senior bureaucrats drafting policies based on a study of similar services across the world and seeking approval of the same from relevant Minister
- *Owners:* the local village government or the Gram Panchayat is the default owner as this is the only easily identifiable arm of the government at the village level
- *Financiers:* The central government, with a percentage share from the state governments
- *Customers:* Rural poor
- *Regulators:* the state government

The government has been playing the role of 4 out of 5 of the stakeholders in some capacity or other - this concentration of multiple roles in the government has resulted in a scenario lacking in accountability and drive for excellence. There is no push for improving quality of service where state is both owner and regulator. Being policy-maker and financier results in no motivation for evolving cost-effective models and so on. The separation of policy and regulation from functions such as ownership, financing and implementation would help to deliver better quality of services. This understanding, along with a close study of day to day challenges in existing systems of water service delivery form the foundation of Naandi Foundations' strategy.

4. Key features of Naandi's strategy

- I. **Engage all stakeholders in a manner that addresses their interests** - The model focuses on networking among stakeholders for getting them to buy into the idea and develop a stake in the proposed institutional model to provide safe and affordable drinking water on a sustainable basis. As part of this Naandi focuses on building bridges with the state sector - state government, concerned govt departments, political representatives, local communities in conjunction with appropriate technology partners.
- II. **The local government - Gram Panchayat - as the key owner of water** for the village - the 73rd amendment to the Constitution of India in 1992 brought in, for the first time in the country, devolution of powers to Gram Panchayats (Village Self Government) and the subject of drinking water (management, operations and maintenance) was brought under the mandate of these local bodies. Seeing this as the best opportunity to have a locally governed water system, the Naandi model works with the Gram Panchayat as the key custodian of the system.

- III. Keep focus on the **necessity, importance and urgency of safe drinking water for all** in all operations and communications
- IV. High level of **transparency in institutional structure for operations and maintenance, costing and expenditures**
- V. Strong **technical support** for repairs and maintenance, so that water does not stop flowing even for half a day

5. Steps taken by Naandi to set up a Community Drinking Water System

1. The process begins with Naandi initiating a dialogue with concerned state officials and leading political representatives of the region to motivate their interest and create their stake in the proposed drinking water schemes. Because of the current scenario of poor services in drinking water supply system, Naandi's proposal usually finds broad acceptance. These interactions provide an opportunity to emphasise the fact that Naandi's role is organise and manage *only* the treatment of the water and its access by user community - water is a public good and Naandi has no intent of appropriating it. Any misconceptions about possible private appropriation of a common good are thus preempted. Forms of collaboration range from financial support for capital investment from the state governments to facilitation of cost sharing. A non-government initiative thus becomes integrated with the constitutionally mandated structures of public governance which in turn lends an element of legitimacy to the Naandi intervention through its recognition and acceptance as a constituent of a public programme. At the same time, Naandi also scouts for potential donors willing to give grants for setting up and/or running community water systems.
2. Identification of locations for setting up the water systems is done in consultation with state level actors. While the process of technical commissioning of the drinking water facility is underway, local communities are mobilised and sensitised to the hazards of drinking contaminated water and to the prospect of a new water system in the village. Simultaneously, commitments from Gram Panchayats are obtained about their contribution towards running of the project. Typically – allocation of Gram Panchayat land is obtained to construct the building for housing the treatment plant based on the criteria of centralized location, proximity to a raw water source, away from overhead electric wires, close to a transformer, channel for outflow of reject water etc. Care is taken to conduct village meetings for public decision making in order to avoid any undue bias in the decision making. The institutional structure for operation and maintenance of the water system is explained in a public meeting, including role of the community and financial break-up of the project and the logic of a user fee.
3. The capacity of the water treatment plant, its design option and total estimated costs are decided on the basis of a detailed technical feasibility of grounding a treatment plant known as *Primary Information Report (PIR)*. Water samples collected from random points are tested for the nature of contamination to gauge severity and nature of the problem prior to site selection within the village and choice of technological option is made. A number of technology providers (RO and UV being the technologies most commonly used) are empanelled and the most suitable one is selected - depending on the nature of water contamination and other factors. UV technology for example can handle pathogens, bacteria and mechanical impurities – but is unable to deal with TDS normally found in ground water. This also constrains switching to ground water source for supplying raw water to such plants in case surface water dries up during peak summer.
4. Each of the plants are owned by constitutionally mandated local authorities – Gram Panchayats. The land, building, plant, electricity connection & raw water source as a composite unit retain their legal status as common village property beyond any corporate control. Each Gram Panchayat is required to pass a resolution committing their support on a long-term basis prior to installation of the plant. Naandi then takes up construction work, installs the treatment machinery, sets up technological, financial and institutional management systems of treating raw water from a nearby source and making it available to the community for a nominal user fee.
5. The process of installing the system is then commenced upon - 60 days being the maximum time needed for this. Naandi handles managing ,monitoring, financial matters of collection and accounts maintenance. It maintains this through its local offices, field coordinators who have about 6-8 villages under them and village staff of operators and Safe Water Promoters (SWPs). Necessary trainings are provided for various functions as part of induction programmes of these staff. Entire responsibility for timely provision for recurring costs for replacement of parts such as RO membranes, filters, water softeners, payment of staff, organisation of substitutes, monitoring etc., vests solely with Naandi.
6. User-fee compliance - The user-fee amount at a plant is set by Naandi in its initial agreement with a government or community. All agreements entered into by Naandi clearly specify the price and conditions under which it can be revised. The proper enforcement of the initially agreed pricing is

guaranteed by the fact that plant operators are on Naandi's payroll and closely supervised. Across its geographies of operation, Naandi currently sells water at less than 10 cents (USD 0.08) for 20 litres, making the cost of consumption of up to 4 litres per capita per day of safe drinking water less than 2% of the income of the very poor who earn as little as one dollar a day. A core concern of Nandi is to keep water rates affordable and Naandi believes that its pricing is adequately set to meet that goal.

7. Users of Naandi water are expected to buy water cans as prescribed and are discouraged to use any other vessels for ensuring uniformity in off take and maintenance of basic hygienic standards and lends status and prestige to 'superior' water in the wider community. Also, every water plant keeps complete details of its water users and water usage and this a robust MIS ensures regular follow-ups, facilitates consumer feedback and helps also guards against unrealistic surges of water purchase - for purposes other than domestic and limited commercial purposes - to prevent misuse of water available at low rates.
8. Monitoring the quality of water is one of the primary responsibilities of the Naandi team. Water samples are taken and tested at regular intervals at raw water stage, product or post treatment water, rejected water that emerges as waste from use of RO technology and waste water that prevails in outlets that receive reject water. WHO guidelines serve as the benchmark for monitoring the quality of product water. Samples of water are sent to local laboratories as well as to those in the nearest big city and reports are regularly displayed at the water plants. These reports are also translated into local languages and build the capacity of user communities for interpretation of these technical reports for surveillance by their members. Any deviation from expected quality is immediately acted upon either locally or through inputs from technical partners. Engineers from their technical partners and the Naandi team have a hot line of communication that enables prompt response. Maintenance of water quality remains the litmus test of Naandi's strategy and claims to delivering what is promised.

6. Gaps bridged by the Naandi model

The characteristics of the ideal system are - affordability, efficiency, effectiveness, scalability, inclusiveness and quality control. The Naandi model attempts to address each of these. It attempts to address issues of equity and marginalisation - thereby enabling universalisation of access. It also generates community ownership over created assets and ensures sustained management. The decentralised nature of this model allows greater flexibility to adapt to local contexts of demand and capacity. The managing and monitoring the sustainable working of the plants by Naandi provides a capacity that is

not available at local level - neither with the government department nor with the GPs.

The model has the potential of building into it a mechanism that does not allow any of the actors to default on its commitments and neither is able to monopolise on the resources and revenues. This model provides an inbuilt regulation of private agencies - thereby addressing the concerns of those who fear profitability, rather than economic viability, will become a motive in the delivery of a common good such as water.

In the last 5 years the biggest strength of the Naandi model has been the fact that it has provided space for incorporating learnings from the operation of each plant that feeds into subsequent installations. For instance recent plants have raised the height of water collection taps and provided a platform so that people don't have to bend over to collect the water cans - this was found to be rather uncomfortable in earlier plants. This sensitivity to user community creates a goodwill capital that inspires further «ownership» of the service and its efficiency by the users. Another example is that now the plants have storage facilities for storing raw water as well as treated or product water as buffers to maintain continuity of supply even in case of electricity failure - an eventuality that is quite frequent in rural India.

7. Moving into a for-profit social business framework

Having established a successful delivery platform for providing safe drinking water in over 400 villages of India and reaching out to half a million people already, Naandi is today a major "water player". However, it is quite obvious already that there is an urgent need to ramp up the speed of replication and expansion and evolve a mechanism of high quality operations & maintenance which is effective on a large scale - if every village in the country is to have safe drinking water by the year 2020. In this context, the current model has the following limitations:

- Even in cases where government is committed to fund installation of the water treatment plant, Naandi needs to have working capital for setting up the plant as government payments happen on a reimbursement basis, and in most cases are significantly delayed. When the number of plants in question is 15 to 20, it is not much of a challenge. However, when the number is 100 plus, Naandi as a not-for-profit is not in a position to put in the money.
- While this was not an issue when the plants were new, a time has come when the plants are beginning to age and standardised procedures and protocol to service the plants are needed. This entails tracking of wear and tear, stringent quality control, efficiency in servicing costs, mechanisms to ensure continued contribution from community, large-scale cash collection, vendor-servicing, inventory management etc. The current field level team of community workers are not cut out for providing this service. We need a professional team with

technical skills and management abilities to carry out this service.

Clearly, a new institutional framework – one that is different from a purely grant-funded NGO's - was needed. In 2010, after several rounds of brainstorming internally as well as with experts in the sector, a transition into a social business framework was decided upon. For us, a social business (or a social for-profit) could be defined as follows:

- An enterprise in which investors are prepared for submarket returns on their investment and willing to share profits with the project and the community
- The objective is to use the revenue for further formation of development capital. Therefore there is a cap on the dividend, beyond which the wealth created is used for further development activities

Overall, this new institutional framework would address the issue of safe drinking water for rural communities in the following ways:

- Decentralised, village-based treatment of water
- Guaranteed quality
- Increased adoption of safe water by more and more users
- Involvement of state – meet installation expenditure, facilitate fast power & water connections, accept a culture of user-fees
- Transformation in the basic norms of drinking water in the country – by making WHO-standard potable water the quality benchmark

The translation of this social business idea into a real-life working model began in May 2010, with the Naandi spinning off a for-profit water company called Naandi Community Water Services (NCWS), with danone communities as a major investment partner. This new company is now taking over entire responsibility of operating and maintaining the rapidly growing number of treatment plants across the country.

8. What have been the challenges of this model so far

With over 400 operational water treatment plants and more in various stages of construction, across the states of Andhra Pradesh, Punjab, Haryana and Rajasthan Naandi's Safe Water division has grown from a single plant with 5000 beneficiaries to a social enterprise managing 440 plants in the current year reaching out to more than half million for accessing safe water. However, there are a number of challenges that are yet to be successfully overcome. Some of these challenges are mentioned here. In spite of offering a price of water that is lower than that provided through the government's Rural Water Supply – the poorest 5-10% of households are unable to avail of the service. Since Naandi's object is not to sell water but to make it accessible to all - their exclusion from such a basic facility raises issue of designing various forms of

cross subsidies targeted specifically on such households. Co-existence of freebies along with paid water however, can create problems as all would like to avail of concessions. The NCWS is the attempt to find a full market affordable solution ideally with no grants and subsidies to make it sustainable. And for this we may have to not only educate and prepare communities but also negotiate with governments to increase the price to 25 or 30 paise and close viable plants that are not viable.

Secondly, misusing treated water meant for providing safe water for domestic consumption by village residents for commercial, industrial or other purpose. Cases of re-selling of Naandi water in neighboring markets was discovered and checked. Constant vigilance over sudden increase by individual user or such strange behavior pattern needs to be maintained.

Thirdly, handling the reject water from RO plants that has a high concentration of contaminants is a major technological challenge that requires more concerted efforts. These effluents are at present being let out into any available channel- a drain, a pond. Such a disposal is not sustainable and it might increase levels of contamination at some other point in the environment. Further expert consultation is being sought in this subject, we are aware that this is a solution eluding RO users across the world.

Fourthly, insulating routine operations and maintenance from interference by local politics is a challenge as it affects managerial autonomy, product quality and even equitable access.

Last but not the least, the model is designed in such a way that there are pressures for greater accountability and transparency are generated on all the actors through mutual checks and balances. This sometimes poses a threat to established structures for utilisation of public resources that are deeply entrenched in corrupt practices and traditions. The situation may inspire opposition to Naandi strategy that needs to be dealt with through pro-active measures.