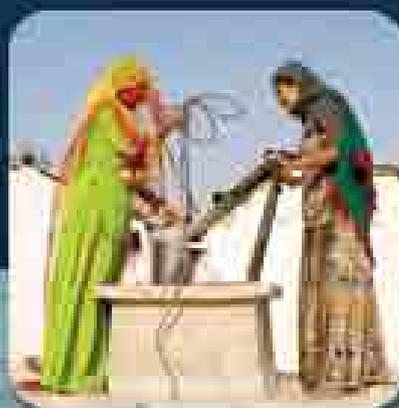


# GOOD PRACTICES IN WATER SECURITY

Ideas for Praxis







# GOOD PRACTICES IN WATER SECURITY

IDEAS FOR PRAXIS

Authored by Jal Bhagirathi Foundation  
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# EXECUTIVE SUMMARY

*Good Practices in Water Security: Ideas for Praxis* is a compendium of best practices that are an outcome of a five-year project -- 'Vulnerability Reduction through Community Empowerment and Control of Water in Marwar Region'. The project was funded by the Italian Development Cooperation and implemented by the Jal Bhagirathi Foundation with techno-managerial support from the United Nations Development Programme. It was implemented in 200 villages spread across 2,500 kms in Pali, Barmer and Jodhpur districts of the Marwar region.

Marwar, in the Thar Desert of western Rajasthan, is the most densely populated desert in the world. It has the lowest water endowment in Rajasthan, which itself is in a zone of extreme water scarcity. Marwar is a land of extremes with low annual rainfall, non-perennial rivers, saline groundwater and extreme temperatures. It has also been identified as one of the most vulnerable areas of India to be adversely affected by global warming.

Due to these adverse conditions, the people of Marwar have for long struggled to access drinking water. The situation of acute water scarcity has led to the drudgery of women and children, especially the girl child. Moreover, the people of this water-scarce land are forced to buy water resulting in enormous financial strain.

To address these vulnerabilities, the five-year project which adopts a people-oriented approach was rolled out. This approach evolved around developing solutions to water problems from within the

community itself and involving people in construction and conservation of water structures and sources. Purposive action was taken in order to mobilise, empower and build capacities of people to achieve water security.

Communities in more than 200 villages were galvanised and organised into water institutions to restore/build and manage water harvesting systems. About 291 water harvesting structures were restored and/or built. Women and the marginalised community were empowered to participate in water management of their villages. A decentralised system of social governance was set up and community-level social capital was built by forming effective and accountable village water user associations called Jal Sabhas to plan, manage and implement micro projects. Through contributory Jal Kosh (water development and management fund) communities were able to maintain bank accounts to collect money for carrying out sustenance and maintenance activities. Local leadership was encouraged for sustainable development and water security in the region.

The project improved the overall availability and access to water for around 300,000 people. The interventions led to the creation of women's Jal Sabhas and Jal Mandals to ensure proactive participation of women in resolving their own water problems. Formation of children Jal Dals provided an excellent example of volunteerism and community service, enabling children to learn about their environment through hands-on experiences in water

management systems. Further, the facilitation of small water enterprises (SWEs) in villages as community-owned institutions has contributed to increased availability of inexpensive and safe drinking water. It has also proved to be a source of income for the water suppliers, especially for women, thus making people secure about access to water and also providing financial security. It has also nurtured goal-directed, purposive social interaction wherein natural leaders organise their people into a meaningful, empowered social group. It ensures socialization of children as responsible future citizens of their country.

This document includes several case studies that illustrate the implementation of these strategies at the grassroots. Each aspect presented here has been chosen on the basis of proven results, effectiveness and sustainability, viability of costs/systems and scope for replication. These good practices assert ideas of praxis in water security by underscoring the concept of community management of water resources.

These cases talk about effective methods of building people's institutions and how communities have evolved and imbibed new strategies of water management involving collective action and traditional wisdom thus laying the foundation of sustainability. It also showcases the benefits of linking water access to better hygiene and dignity by educating people on benefits of constructing their own sanitation facilities and thus promoting hygiene practices.

It is important to note that all of these practices are led by local communities themselves, while the project supported them only with necessary capacity development inputs and a part of financial burden. Therefore, any attempt to replicate these practices with a top down approach may not be fruitful.

This volume is expected to serve as a databank of good practices that could be taken up as a model approach for replication scale up not only in other parts of Marwar but also in other water stressed areas. Sharing of these practices is expected to result in wider networks and collaborations on the core issue of community led water management.

# SNAPSHOT : MARWAR





## MARWAR

The Marwar region of the Thar Desert in western Rajasthan is the most densely populated desert in the world. On account of its harsh geography and fragile ecology, the region has the lowest water endowment in Rajasthan - a state that itself falls in a zone of extreme water scarcity (World Economic Forum, 2009). Marwar is a land of extremes with low annual rainfall ranging from 100-500 mm (Khan, 1998), non-perennial rivers and extreme temperatures. The topography is dry and arid, marked with sparse vegetation and saline groundwater. Its main ecological resources include

pastures, grazing lands and sacred groves which are fast depleting given the rapid increase in human and livestock population.

Its human population of more than seven million relies on agriculture and animal husbandry for livelihood sustenance (Census of India, 2001). However, given the depleting water resources, frequent droughts and monsoon failures, there is a significant shift in earnings with non-agricultural activities fast superseding agriculture-based income in the region. Unstable and insecure

means of livelihood are forcing the inhabitants of Marwar region to either migrate in distress or incur debts to survive. Marwar has also been identified as one of the most vulnerable areas of India to be adversely affected by global warming (Majra and Gur, 2009) and is fast becoming an ecological hotspot marked by increasing desertification (Pimental, et al., 2007), depleting groundwater resources, marginal forest cover (less than one percent) and marked increase in barren and uncultivated land areas.

The socio-economic profile of the region also represents a matrix of vulnerabilities. It is estimated

**While the United Nations (2003) established a legal basis for right to water by highlighting everyone's entitlement to sufficient, safe, accessible and affordable water for personal and domestic uses, the global UNDP Human Development Report of 2006 indicated that the failures to do so in India was a result of skewed infrastructure access, unequal distribution and power relationships, poverty and poor operation and maintenance.**



that 74 percent of the Indian villages with multiple water quality problems fall in Rajasthan (Government of Rajasthan, 2005). The sex-ratio is skewed with more number of males than females on account of preference for male child. Among all seven districts of Marwar region, Jodhpur and Barmer with sex ratios of 907 and 892, respectively, are the worst-off.

Access to labour and employment benefits are minimal (if any) with over 58 percent of population falling under the non-workers/ non-formal workers categories and about 11 percent being marginal workers (Census of India, 2001).



- The term Marwar is derived from the Sanskrit word *Maruwat* which means the land of death.
- Marwar comprises seven districts spanning a geographical area of 13.5 million hectare and is 39.4 percent of the total geographical area of Rajasthan (IDS, 2008).
- It has 84-90 inhabitants/sq.km compared to other deserts which have three to four inhabitants/ sq. km (Dhir, 2003).
- The Total Dissolved Salts of groundwater is in the range of 10,000 parts per million (JBF).
- Most villages in the project area do not have a single source of safe drinking water within a radius of 1.6 kms (NFHS, 2003).
- On an average the region witnesses six drought years in a decade (Mohnot, 2003).

Traditional biases and discriminations have led to set patterns of social exclusion especially of women and people belonging to lower castes who are often deprived of any decision-making powers on matters related to village governance and especially on issues concerning water management. Moreover, increased dependence on government for relief coupled with lack of public awareness has created negative spin-offs.

Marwar's struggle to exercise this basic human right continued with perennial non-availability of drinking water along with high ground water salinity. Government supply of drinking water through Ground Level Reservoir (GLR)<sup>1</sup> served a negligible

population while hand pumps once installed continued to be non-functional. Communities who had developed their own ways of capturing rainwater in village ponds and in traditional *tankas*<sup>2</sup> found these efforts insufficient to meet even their basic requirements. Thus in order to access water, families, especially women and children endured daily hardships of carrying water over long distances.

<sup>1</sup> Ground Level Reservoirs, usually made of RCC with around 10 to 20,000 litres capacity.  
<sup>2</sup> Underground storage tanks of capacity ranging from 10 to 100,000 litres.





The socio-economic ramifications of water insecurity has influenced all aspects of community life in Marwar - health, finance, personal and social well-being. Further, as water scarcity increased, the consumption of unsafe drinking water also rose resulting in widespread water-borne diseases and in-turn greater expenditure on health. In the project area, most of the villages remained isolated and cut-off from the water supply and were designated as Not Covered<sup>3</sup> in government records. Habitations having a source of water were affected with quality problems such as excess salinity, fluoride, chloride, calcium, magnesium, alkali salts or other toxic elements or biological contamination. Lack of water had direct impact on the survival of people and led to difficult living conditions including lack of livelihood opportunities, increase in incidences of distress, sale of livestock and family assets and increased water conflicts.

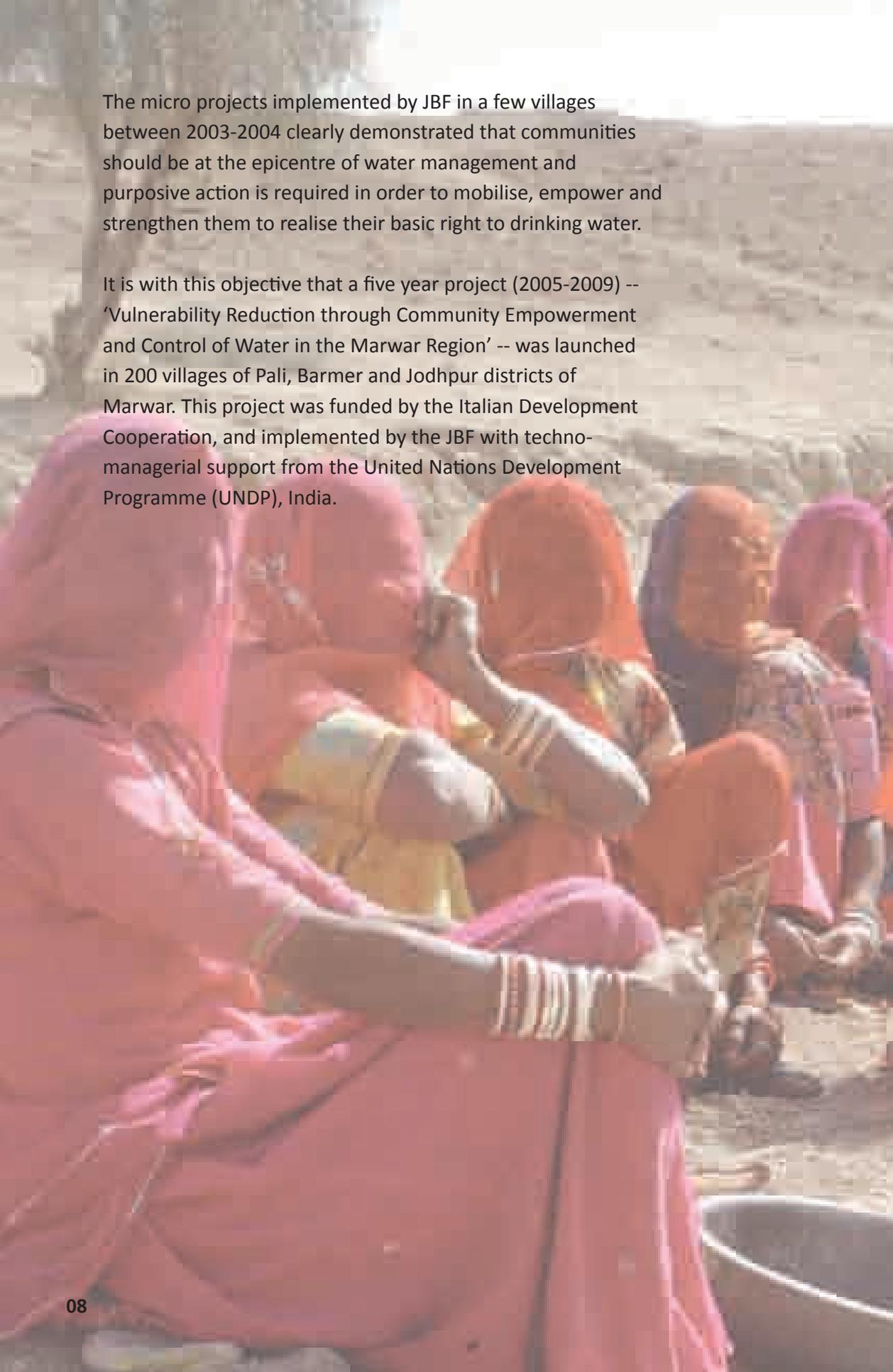


In such a scenario the Jal Bhagirathi Foundation (JBF), its partners and the people themselves reiterated the importance of community participation in water management issues and demonstrated the success of community led model of water security.

<sup>3</sup>Not Covered habitation means that there is not even a single safe source of drinking water within 1.6 km of the habitation (National Habitation Survey, 2003).

The micro projects implemented by JBF in a few villages between 2003-2004 clearly demonstrated that communities should be at the epicentre of water management and purposive action is required in order to mobilise, empower and strengthen them to realise their basic right to drinking water.

It is with this objective that a five year project (2005-2009) -- 'Vulnerability Reduction through Community Empowerment and Control of Water in the Marwar Region' -- was launched in 200 villages of Pali, Barmer and Jodhpur districts of Marwar. This project was funded by the Italian Development Cooperation, and implemented by the JBF with techno-managerial support from the United Nations Development Programme (UNDP), India.



# EMPOWERING PEOPLE TO HELP THEMSELVES





## EMPOWERING PEOPLE

The project Vulnerability Reduction through Community Management and Control of Water in the Marwar Region was structured and directed by a three-pronged framework which is as follows:

- 1 Global commitment to achieve the MDG of halving the proportion of people without sustainable access to safe drinking water and basic-sanitation<sup>4</sup> by 2015.
- 2 Address the suffering created by severe ecological degradation due to poor drought-proofing and mitigate the crisis manifesting itself in acute drinking water scarcity for humans and livestock<sup>5</sup>.
- 3 The institutional vision of the JBF to develop water security, sustained by people-owned institutions which are decentralised and responsive to the social and natural resource realities of the region.



This three-pronged framework led to the planning and preparation of a decentralised system of water management. Over a five-year project period, JBF addressed a complex matrix of water vulnerabilities by adopting a people-oriented approach revolving around developing solutions to water problems from within the community by involving the people in construction/conservation of water structures.

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<sup>4</sup>While the United Nations (2003) established a legal basis for right to water by highlighting everyone's entitlement to sufficient, safe, accessible and affordable water for personal and domestic uses, the global UNDP Human Development Report of 2006 indicated that the failures to do so in India was a result of skewed infrastructure access, unequal distribution and power relationships, poverty and poor operation and maintenance.

<sup>5</sup>The National Habitation Survey, 2003 found that about 52 percent of the total rural habitations of Rajasthan were not covered by the government's water supply system, 16 percent were partially covered whereas only 32 percent habitations were fully covered with optimum water supply.

The overall development objective of the project was to ensure equitable water access to the people of Marwar region. To this end, the project executed several strategies, primarily focussing on creating an atmosphere that promoted sustainable levels of human interaction with natural resources and revival of traditional water management practices by:

(a) Enhancing access of women and socially excluded groups over natural resources as primary stakeholders;

(b) Creating an integrated model for micro-level development by addressing community issues concerning water and its associated impact on health and hygiene;

(c) Building local capacities to help communities address their own needs by strengthening decentralised social governance processes; and

d) Fostering and nurturing local leadership to promote sustainable development and water security in the region.



To actualise this, village communities were mobilised in more than 200 villages and organised into water institutions (see Organogram) to restore/build and manage water harvesting systems. Community-level social capital was built by forming effective and accountable village water user associations to plan, manage and implement micro projects. Capacity building initiatives of the beneficiary communities were undertaken and a strong cadre of village volunteers were trained on management of traditional water harvesting systems. Finally, water harvesting systems were built/restored that were responsive to local demand and enabled communities to realise their basic right to obtain access to drinking water.

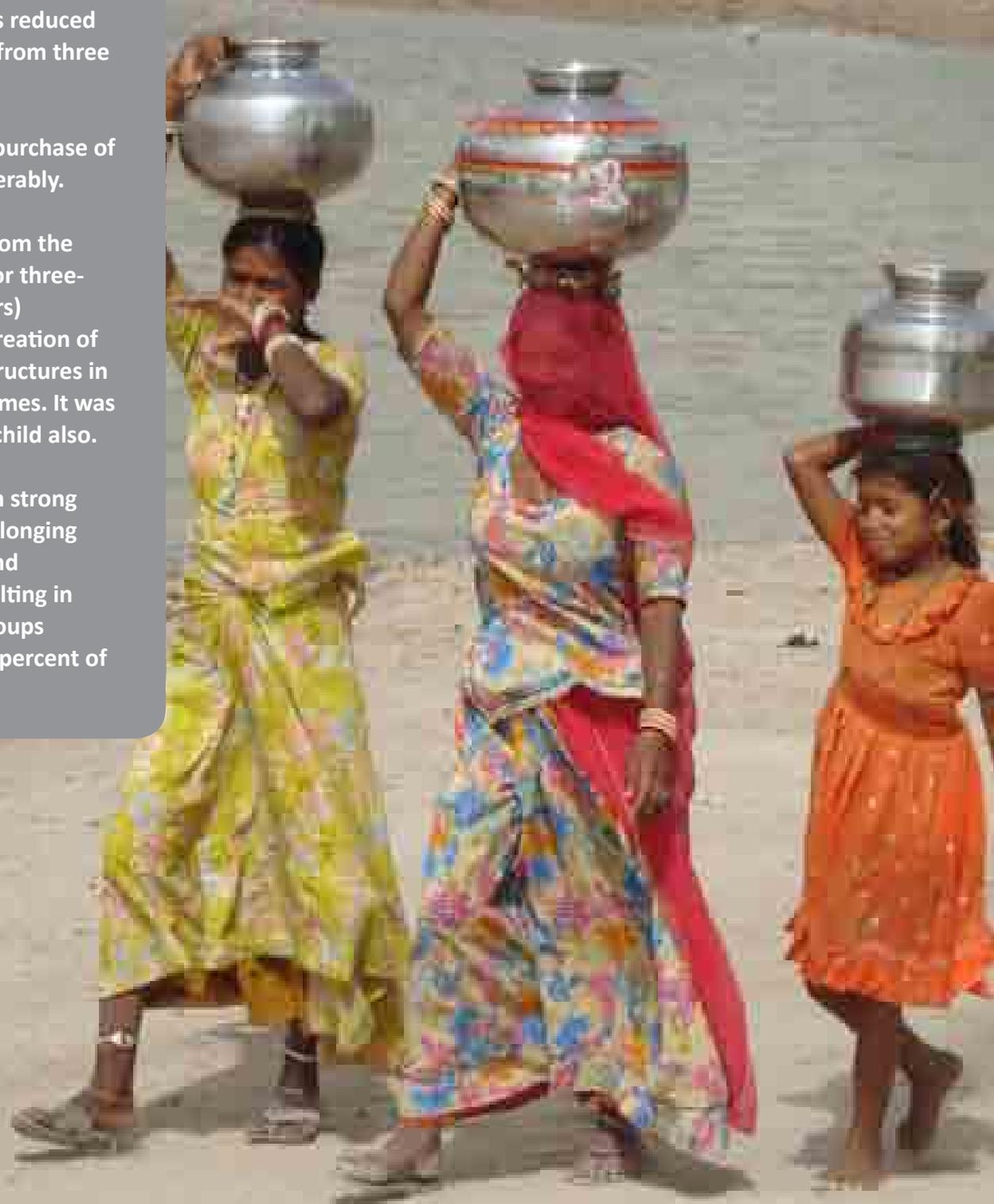
Project interventions, in a relatively short period of five years, have resulted in significant improvement in overall availability and access of water to around 300,000 people or three percent of the population in the region; reduction in distress months and time spent by women and girls in fetching water; and a 140 percent decline in expenditure costs on water per household (Pastakia, 2008).



## Significant Achievements

- 291 Jal Sabhas, 4 Jal Samitis and 1 Jal Parishad were formed.
- 55 Jal Mandals (Self-Help Groups) were formed. By the end of June 2009, these groups had saved a total of approximately USD33,500.
- 291 water harvesting structures were constructed/restored by village water user associations or Jal Sabhas.
- Communities across 200 villages were trained to keep the catchments of the water harvesting structures clean.
- Access to water for drinking and other household needs was brought within a radius of 100-250 metres for a household.
- Community contribution to projects in cash on an average covered 30 percent of the total project cost at village-level.
- Jal Kosh or a water fund has been instituted where communities open bank account and collect money for the sustenance and maintenance of the work.

- The Water Resource Centre at Jodhpur became an operational hub of training and awareness generation.
- Water distress months reduced considerably, ranging from three to six months.
- Expenditure towards purchase of water reduced considerably.
- Women were saved from the drudgery of walking for three-four kms (five-six hours) everyday due to the creation of community storage structures in the vicinity of their homes. It was a big relief to the girl child also.
- The project resulted in strong inclusion of people belonging to Scheduled Tribes and Scheduled Castes resulting in these marginalised groups owning more than 46 percent of the community tanks.



# Organogram

## JAL SANSAD (Stakeholders Forum)

- Members are drawn from JBF's project area in the entire Marwar region.
- Forum is held yearly and is responsible for annual progress reviews and work-plan formulation.
- Discuss new and existing strategies that are reviewed periodically and incorporated into approach to water security.

## JAL PARISHAD (Regional Water Forum)

- This forum is a project sanctioning and monitoring body.
- The forum comprises of dedicated community leaders, technocrats and bureaucrats from government departments and members of Jal Samiti and Jal Sabha.
- The members meet once a month to assess the progress and ensure project alignment on a macro level.

## JAL SAMITI (Water Development Group)

- This is a forum of people selected at the block level.
- It comprises of members of the Jal Sabha along with key community leaders of the area.
- It is a proposal recommending body and a platform to encourage volunteerism and resolve conflicts.

## JAL SABHA (Water Development Group)

- The group devises plans and proposals for development of water resources at the village level.
- It decides on the strategy of executing work and collects all the necessary economic, human and physical resources.
- It collects financial resources from the community for the maintenance of the water resources.

## JAL MANDAL

(Women's Self Help Groups)

- Informal women groups that are encouraged to practice small savings and credit activities.



# LEARNING FROM GOOD PRACTICE





## LEARNING FROM GOOD PRACTICE

During the course of the project, JBF invested in multiple people-owned processes to enhance access to drinking water and empower communities to manage their own water systems. This project strategy enabled JBF to work within a highly vulnerable ecosystem and hostile terrain to not only create additional water capacity but also improve the availability of fresh and clean water in this parched region. The initiative indicates that community participation, traditional knowledge and technical guidance were effective in developing sustainable practices at the grassroots.

Good practice emerging from five cross cutting themes:

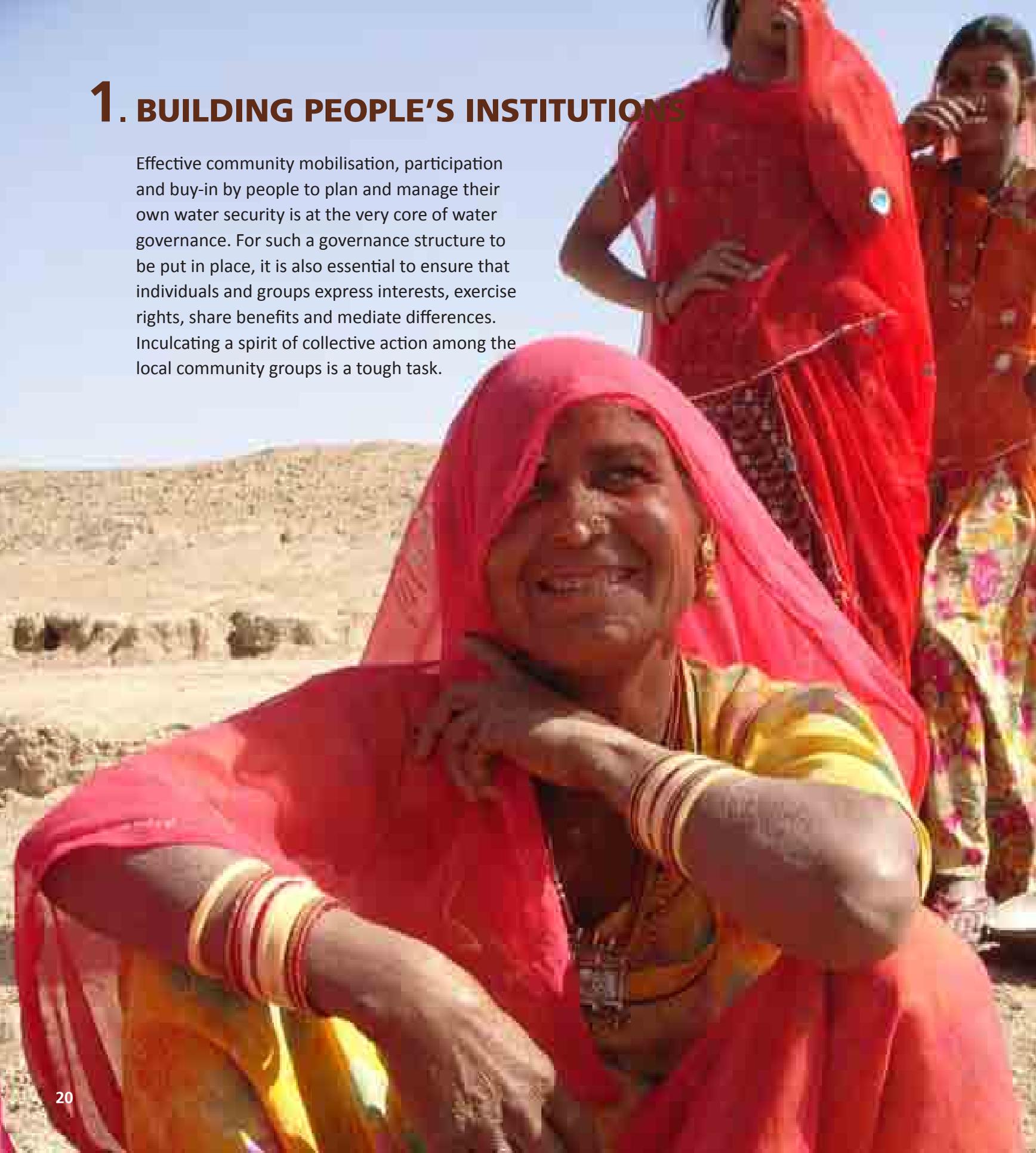
- 1. Building People's Institutions**
- 2. Sustainable Water Management Systems**
- 3. Small Water Enterprises and Social Entrepreneurship**
- 4. Harnessing Traditional Wisdom/Knowledge**
- 5. Access to Safe Water and Sanitation**

As we proceed, we will come across several examples that will illustrate the implementation of these strategies at the grassroots. Each indicator presented in this document has been chosen on the basis of proven results, effectiveness and sustainability, viability of costs/systems and scope for replication. These best practices establish praxis in water security by underscoring the concept of community management of water resources.



# 1. BUILDING PEOPLE'S INSTITUTIONS

Effective community mobilisation, participation and buy-in by people to plan and manage their own water security is at the very core of water governance. For such a governance structure to be put in place, it is also essential to ensure that individuals and groups express interests, exercise rights, share benefits and mediate differences. Inculcating a spirit of collective action among the local community groups is a tough task.



This approach requires institutional arrangements, social capital, clarity on property rights, strong leadership, and a culture of transparency in benefit sharing.

To this end, JBF has worked extensively with communities to establish a four-tiered system of community water governance in its project area. The first tier at the village-level is the Water Users Association called the Jal Sabha. The next level is the Water Development

Group called the Jal Samiti which covers a much larger area or block. The Jal Samiti comprises members from the Jal Sabha and other key community leaders. The next is the Jal Parishad – comprising people’s representatives and experts from reputed institutions. The fourth and final tier is the Jal Sansad which represents the entire Marwar region, meeting annually to review the progress. This four-tiered system has evolved as a good practice in management and governance of water.

**This section will look at effective methods of building people’s institutions and how communities have evolved and imbibed new strategies of water management involving collective action thus laying the foundation of sustainability.**



## JAL SABHA - PEOPLE MANAGING THEIR WATER NEEDS



### Sarwari Purohitan Village, Barmer District, Rajasthan

Practices followed by Sarwari Village have become a model to showcase:

- How collective community action resulted in revival of traditional water management system in Sarwari Purohitan and created a year-long perennial supply of water;
- How the formation of Jal Sabhas not only ensured community participation and ownership but also enhanced responsibility and accountability;
- How working on water issues brought unity among people and helped them take self initiatives for macro-level water management; and
- The impact of Jal Sabhas in enhancing water availability not just for humans but also for livestock which in turn increased milk production.

Earlier, the people of Marwar followed the traditional methods of managing water resources on their own through usufruct rights, setting up of sharing mechanisms for livestock and implementing systems to preserve local resources. However, this community framework of water management has been taken over by a centralised water control system that overlooked the traditional wisdom. Acute depletion of resources has also resulted in a marked increase in dependence on the government.

Village Sarwari Purohitan in Barmer district was one such example where the village had difficulties meeting the water requirements of its 450 odd households. Sarwari Purohitan received water only once a month through government supplies and people were forced to purchase water from tankers at high costs.



To address this grave situation, the community decided to form a water association to renovate and increase the capacity of their main water resources - the Ghoda Nadi (grassland pond) and the Gawai Talab (pond) with both bodies having *Gauchar*<sup>6</sup> and *Agor*<sup>7</sup> as catchments.



**“Work done by the JBF helped us build confidence within ourselves as well as taught us to be self-reliant rather being dependent on others for our own water needs,” says Chand Singh, Treasurer, Sarwari Purohitan Jal Sabha**

<sup>6</sup>Gauchar means pasture land.

<sup>7</sup>Agor means a catchment of water body with permanent plantations for fodder and firewood.

## THE PRACTICE

As this village faced acute water problems, an immediate and sustainable solution was needed. The villagers had participated in a series of community discussions facilitated by JBF which later led them to form a village Jal Sabha. The functioning of this Jal Sabha was based on principles of democratic governance and participatory management.

The Jal Sabha also served as a focal point for all sections of the community to meet, discuss and contribute towards planning their water security. For the first time, many communities put aside their caste prejudices and came forward to plan

jointly to restore their water structures. In 2007, the Jal Sabha began work on the Ghoda Nadi. In the first phase, the depth and size of the pond was increased and in the second phase, the water channel was repaired. Thirty percent of the overall costs were generated by the community and deposited in a water development fund called Jal Kosh and the rest of the amount was raised through project funds. Funds for the Jal Kosh were collected by the Jal Sabha through household campaigns which encouraged the families to contribute a minimum of INR200 towards making the village water secure.



This intervention increased the square area and capacity of the pond to harvest more water from its catchment area. Extra funds for its maintenance and upkeep were received by way of further community contributions. This fund was also used to appoint a watchman to safeguard the pond from animal and human misuse, thus ensuring a check on the usage of water and ensuring availability of quality drinking water. The success of their efforts at Ghoda Nadi inspired the Jal Sabha to raise funds for restoration of another village pond called the Gawai Talab. In subsequent years, Jal Sabha undertook restoration/construction of various water structures including the construction of a tank within the village school to demonstrate the technique of rooftop rainwater harvesting. Since this project was a part of school premises, school children were able to get a glimpse of community participation and social action.



## IMPACT

In Sarwari Purohitan the impact of forming Jal Sabhas in the village enhanced community participation and ownership of common property resources resulting in easier and round-the-year availability and access to water. Expansion in capacity of Gawai Talab from 960 Cubic Metre (CuM) to 5,218 CuM and that of Ghora talab from 17,280 CuM to 26,601 CuM resulted in a 50 percent increase in water availability in both cases. This resulted in marked reduction in cost of purchase of water which went down from INR3,480 before intervention to INR960 after this intervention per annum. (Details in Annexure, Table 1).

## KEY LEARNING

Based on the experience of the Jal Sabha, key components that create effective people's institutions in water management include:

- ***Enabling Environment:***  
Reinforcement of rules and regulations for management of common assets and water structures. These rules include the establishment of mechanisms for conflict resolution, regulation of behaviour and adherence to respecting the norms for sharing costs and benefits. An agreed upon enabling environment adds cohesiveness to the process and later contributes to the emergence of community led governance structures.
- ***Participation and Organisational Performance:***  
The actual design and establishment of local mechanisms for coordination and implementation. This often calls for establishment of user groups, committees and associations, where the basic structure of authority and decision making is negotiated and established at the community-level. Here the marginalised groups are also integrated in the process of decision making.



In Sarwari Purohitan, the establishment of a Jal Sabha has not only created social capital but has also ensured that people manage water systems themselves. Furthermore, interactions within the three tiers -- Jal Sabhas, Jal Samitis and Jal Parishad -- have enhanced people's faith and ability to collaborate on issues related to water management in the region. JBF's role as a facilitating agency ensured equal participation of men, women and the deprived sections of the community in the decision-making processes.

## SCOPE OF REPLICATION

This approach speaks of decentralised organisation of communities to create cohesive water governance, and is worth replicating not only throughout Marwar but also in other water scarce regions. JBF has mobilised 300 Jal Sabhas in its project area to manage village water resources. These Jal Sabhas have been found to be very effective in addressing conflicts on sharing scarce water resources and promoting intra-village and inter-village cooperation.

For example, in Rewara Jaitmal and Thob villages in Barmer district (with a population of 500 and 5,000 households, respectively) the problem of water sharing and the resulting water conflicts between the two villages were amicably resolved by the constitution of one joint Jal Sabha. This Jal Sabha administers water sharing arrangements between the two villages and runs a common Jal Kosh for maintenance and upkeep of the water structures. The two villages now share water equitably and are using the Jal Sabha as a mechanism to address water conflicts.





## **JAL DALs: CHILDREN'S INSTITUTIONS FOR CONSERVATION**

Godawas Khurd in Barmer district like many other villages of Marwar region faced chronic water problems which became severe with declining rainfall and irregular water supply. Further, the only open well in the village contained saline water with a Total Dissolved Solids (TDS) of 6,500.

The whole village was under the influence of acute water crisis. Women and children (mainly girls) were the most affected since a huge amount of their time was spent in meeting the daily requirements for water.

Children were irregular in attending schools and their education was put on the backburner due to the burning issue of water access. The Government High School of Godawas experienced extremely poor enrollment and attendance rates. The onset of summer worsened the situation further with the school registering zero attendance due to lack of availability of drinking water. Children dropped out as they had to devote large amounts of time and efforts in helping their mothers fetch water from distant places.

The Gram Panchayat (locally elected self-government body) constructed a 10,000 litres water tank in the school to address the water problem, but water for the tank was completely dependent on tankers which was enormously expensive ranging from INR1,200 - 1,800 per tanker. The school collected small contributions between INR5 to INR10 from students every month for the refilling of the tank. This practice was followed till the year 2007, when the number of students enrolled in the school was 150.



## Godawas Khurd Village, Barmer District, Rajasthan

**The mechanism adopted by Godawas Village is an example to showcase:**

- Volunteerism and community service led by school children;
- Awareness about environment and local traditions of water management and conservation;
- Enhanced school attendance in the dry periods of summer;
- Increased school enrollments;
- United efforts of the villagers, school administration and students to work together to ensure that every child gets her/his right to education; and
- Creating leadership skills and confidence of the Jal Dal members.





## THE PRACTICE

In search of a sustainable solution to the problem of water availability at low cost, people mobilised themselves and under the guidance of the school headmaster got in touch with JBF to create a village Jal Sabha in Godawas. The community realised that excessive dependence on the government was not the solution to their problem. Once the Jal Sabha was constituted, they undertook the task of increasing the capacity of the village pond called the Godawas Talab. In 2008, the Jal Sabha also constructed a school tank, following the rooftop water harvesting technique.

The community was involved in each level of designing and constructing the rooftop structure. They decided that the capacity of the tank was to be 40,000 litres and raised 30 percent of the total construction cost through community contribution. For the remaining 70 percent, they received support from JBF.

Under constant supervision of the Jal Sabha, the tank was constructed within a period of three months. This enabled the school to become independent from supply of water through tankers and allowed efficient use of rainwater. This was also a lesson for school children on management of water resources. Conservation of rain water thus became a source of teaching civic sense to children.

Further, to ensure maintenance of the newly constructed tank, a student body of 10 members called Jal Dal was constituted. Students from classes VI to VIII became members of the Jal Dal. The Jal Dal took the responsibility of cleaning the roof and ensuring clean water in the tank. They were also accountable for cleansing of the silt chamber and meticulous functioning of the hand pump. Additionally, the school teachers also began educating children on water distress and encouraged them to be a part of environment conservation plans in and around their village. The school students were also involved in environment conservation activities and planted 50 trees in the school premises. Each plant has been adopted by two students who nurture it. This practice is passed on to the younger students so that both the structure as well as the plants are maintained. These democratic practices inculcated in these students, a sense of duty to the fragile ecology of their village.

Students have recently started a piggy bank in which students from higher classes contribute one rupee per month for maintenance of the tank and purchase of water during times of distress.



**“This scheme has proved to be like *Sanjivani* (life giving herb) for the children in this region,” says Hanuman Ram Bishnoi, School Headmaster**





## IMPACT

This intervention has positively impacted education in the desert thus yielding growth in the literacy rate. Children no longer have to miss schools to accompany their mothers in search of water.

There has been a noticeable fall in the school dropout rate and attendance has become more consistent. Students have become aware of environment conservation and its correlation with rainfall. The Jal Dal has instilled a sense of leadership and responsibility towards preservation of the environment.

## KEY LEARNING

The Jal Dals provide an excellent example of volunteerism and community service, enabling children to learn about their environment through hands-on experiences in water management systems.

This practice also puts forward an instance of uniting the school administration and students to work together to ensure that every child gets her/his right to education without worrying about the availability of drinking water. It teaches them to unite for a socially useful goal. They learn to take all people along in meeting their personal need for water and negate all caste and class differences.

## SCOPE OF REPLICATION

This practice enables the younger generation to take responsibility for their fragile and scanty resources. It helps them understand the importance of conservation and regeneration. It can be adopted for replication in schools where water problems are acute.





## WOMEN UNITING FOR WATER SECURITY

In Satuni Purohitan, the source of water, Songra Nadi was located at a distance of four kms from the village. Water was available to the villagers either through tankers or by covering the long distance afoot to fetch water from Songra Nadi. It was only during the rains (two-three months) when the women could access water from a smaller pond called Hemajal Nada or a pond which was close to the village. This pond saved them the drudgery of making the two-way journey of four kilometres to Songra Nadi.

### THE PRACTICE

In order to have round-the-year availability of water in close proximity, women of Satuni Purohitan village joined hands to enhance the capacity of the Hemajal Nada.

They mobilised themselves and collected INR10,000 and approached JBF with a request to support them to bring water closer to their homes. The level of mobilisation and dedication

of women catalysed the formation of a women's Jal Sabha. This Jal Sabha comprised of 30 women members who collected money for the Jal Kosh to undertake the capacity enhancement of Hemajal Nada. Thus, 30 percent of the total funds were mobilised by the women Jal Sabha while the rest was contributed by Jal Parishad as a grant.

When asked about whether men complained about formation of women Jal Sabha and contribution to Jal Kosh, Chota Devi said: "If the men spend INR500 per household and we do not complain so when we spend INR200 to 300 per household to secure greater water availability and convenience, men should not say anything."



## Satuni Purohitan Village, Barmer District, Rajasthan

Satuni Purohitan is an example to indicate the creation of an institutional space for women's participation in water management. It showcases:

- Establishment of a process that resulted in institution building and women's empowerment;
- Greater awareness among women about safe drinking water practices, health and hygiene which has in-turn contributed to better community health; and
- Empowerment of women and an increase in their leadership capacities.



This unique women's Jal Sabha came into existence at a time when women had no active role in the water management issues of the village. Marwar has a typically patriarchal culture, where women are confined to homes while men are involved in planning and managing community matters. This was the situation in Satuni village despite the fact that it was mandatory to have 20 percent women representation in the Jal Sabhas.

The women of this village have now set an example for other villages and showcase how their active involvement enhanced women's access to water.

Women proudly call the pond the 'woman's pond' and they have forbidden access of tankers to their pond. They regularly carry out maintenance activities like de-silting and cleaning the catchment area that maintain the quality of water. With the establishment of this Jal Sabha, women have taken a more informed role within their households creating greater awareness about safe drinking water practices, health and hygiene as well.

## IMPACT

The capacities of the two water harvesting structures was increased at a total cost of INR177,380 (30 percent community contribution) at INR70 per person (one time cost). More specifically, returns to investment included reduction in women's drudgery in terms of distance travelled to fetch water. Before intervention women had water closer to home only for two months and had to walk for the rest of the year. After intervention they have water available for seven to 12 months depending on the water source being accessed. As a result, their drudgery has reduced remarkably. (Details in Annexure, Table 2)

The formation of this women's Jal Sabha has tremendously influenced the community mobilisation process. This was probably the first instance of women participating actively to resolve their own water problems. This practice of forming a women's Jal Sabha has most importantly contributed to empowerment of women and has led to their engagement with the larger water restoration/construction projects being implemented in the village along with other Jal Sabhas in the area.





## KEY LEARNING

**The women who are now seen as leaders within their community have become role models for women of other villages. This practice put forward the creation of institutional space, allowing women to pursue development goals for themselves, their family and the community at large. As a result of such initiatives, women's access to and control over natural resources has improved, thus substantially reducing the time and effort spent in collecting water.**

This practice also showcases how women succeeded in their goal despite the typical patriarchal culture which limited their participation in planning issues related to availability and access of water. Additionally, uniting women into a Jal Sabha also showcases how external barriers can be surmounted and life can be made easier and better through collectivization.

## SCOPE OF REPLICATION

This practice is worth replicating in development projects, however, care should be taken that such initiatives should not result in further exclusion of women leaders from social issues especially in places where the society is still in the grip of patriarchal system and adequate social mobilisation has not taken place.



## 2. SUSTAINABLE WATER MANAGEMENT SYSTEMS

Water resource systems that manage to satisfy demands without degradation are called sustainable. Sustainable water resource systems are therefore those designed and managed to fully contribute to the objectives of society, now and in the future, while maintaining their ecological, environmental, and hydrological integrity (ASCE, 1998; UNESCO, 1999). Ensuring such sustainable water management systems is a major challenge to the community at large.

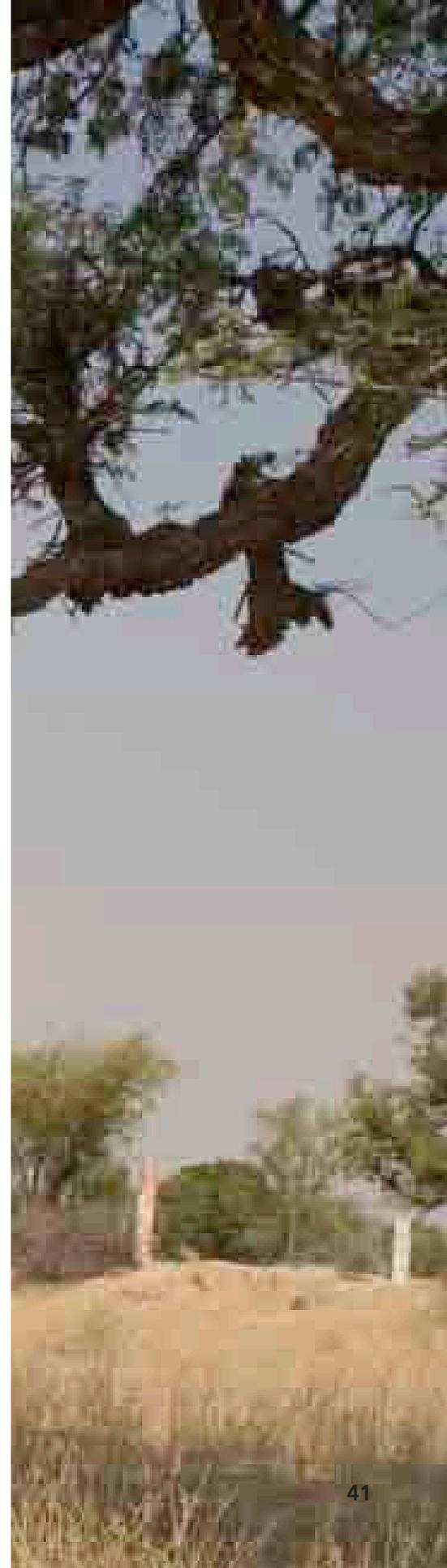


Efficient planning, establishment and management of a water resource system are all often seriously constrained by the absence of a monitoring mechanism and information on water demand, usage patterns and socio-economic variables. Fragmented institutional structures, lack of a regulatory mechanism, public awareness and inability to manage the demand can also lead to unsustainable exploitation and use of water resources (WEHAB, 2002).

In Marwar, increasing water scarcity has led the communities to adopt strategies that are of sustainable nature. Some of these practices involve establishing an economic and

financial regime for usage of water. There has been a shift from the centralised to the decentralised management system that recognises the importance of local institutions, thus laying the foundation of good governance. These approaches have complemented one of the basics of sustainability - wherein institutions focus on getting 'rights right', and produce the right conditions for collective action (Schlager and Ostrom, 1992, quoted in Roth, Boelens, et al., 2005). An ideal management system in a water scarce region, however, will be the one which minimises conflicts and establishes rules and priorities among the users (Cravidao & Mateus, 2002) and ensures sustained water access to all.

**This section will look at a system of procedures and techniques pursued for sustainable water management. This system has evolved within the community and has contributed to transparent, community-led, equitable and adaptive management of water resources ensuring better utilisation of water on a sustainable basis.**





## COMMUNITY COHESION LEADING TO ADAPTIVE WATER MANAGEMENT

Scanty rainfall and water scarcity are common features of a desert region. The situation becomes grim when these problems are magnified by changing climate and recurring droughts. This 525-household village with a population of 3,785 people receives erratic rainfall. There is a perpetual water crisis in this village. Hence, village communities took the onus to improve accessibility of water, rather than depend on external agencies and the government for supply of water.

The main source of water for this village was a pond called the Gawai Talab which has the capacity of 2,869 cubic metres. During monsoon, rainwater used to overflow from the pond since its catchment area was small and could not retain all the rainwater. Whatever amount of water was harvested in the pond lasted only for four months in a year. The situation worsened during summers when the pond became dry and women had to walk a distance of four–six kms a day in search of water. Add to that, the villagers either had the option of purchasing water, causing a severe financial strain, or they had to depend on the limited supply of saline water supplied by the government. Consuming saline water meant compromising on the quality of water resulting in health hazards. Under such circumstances people of this village were struggling to survive.

Community members of the village believed that if all the rainwater was harvested properly, the pond would have enough water to meet their yearly demand. The community collectively took one decision to change the water situation of their village.

### Mandli Village, Barmer District, Rajasthan

Mandli village has emerged as a model of social cohesion to address water scarcity. It showcases:

- Emergence of management systems lead by the community;
- Adaptation to the changing climatic patterns and recurring droughts; and
- Emergence of community participation along with enhancement of leadership skills and self-confidence.

## THE PRACTICE

A few villagers of Mandli, inspired by the successes achieved by the interventions of JBF mobilised others in the village. They came together and formed a Jal Sabha. This Jal Sabha had a representative from each community in the village along with an assured 20 percent of women participation. The members undertook a participatory planning exercise and decided to increase the area of the pond which would allow it to capacitate more water. In order to accomplish this task, funds were generated through contributions from each household of the village. This money was then pooled in the Jal Kosh in a joint bank account to ensure a measure of accountability towards the sum collected.





Thirty percent of the project cost came from the Jal Kosh and the remaining funds were provided by JBF as a grant. In the first year, the pond size was increased by 50 percent. The community discovered that the pond could now harvest enough water to last for a period of 10 months. Even though water was available comparatively for a longer duration, people were still worried about the fact that changing patterns of rainfall and increasing probability of droughts might cause water crisis in the village in the future. Therefore, the Jal Sabha felt the need to enhance the efficiency of water harvesting and enhance the storage capacity of the pond.

They also realised the need of a regulatory mechanism for controlled use of water in order to ensure that it lasts for longer periods. Difficulties that stemmed from the absence of a management system

for water distribution within the village became evident in the first year itself. Jal Sabha members realised that free availability of water for neighbouring villages also needed to be checked. After considerable discussions, a consensus was reached to introduce a coupon system for distribution of water. This way of water management allowed people from other villages to use water from the pond at a cost of INR100 per tanker of 4,000 litres. The coupon system not only provided a means of accountability of the money collected against the amount of water consumed by the people belonging to nearby villages but it also ensured distribution of water according to the needs of the people. After the successful implementation of the distribution system, the village pond was able to provide water access to 14 other villages.

The money thus collected was deposited in the Jal Kosh for enhancing the capacity and catchment area of the pond. This facilitated regular maintenance of the catchment areas. Maintenance was carried out by the village volunteers twice a month to retain water quality. To improve efficiency of water harvesting, they renovated water channels in the catchment area and planted trees to improve water inflow. Moreover, an equitable distribution system was keenly followed by the villagers by way of maintaining a register that noted the time and coordinates of people taking water. This system kept a check on usage of water thus ensuring prolonged availability of water.





A guard was appointed to safeguard the pond. The Jal Sabha took all measures to ascertain that not a drop of water was overused or wasted. With the accumulated funds in the Jal Kosh and support of JBF, the depth and area of the talab or pond was further increased in the second phase. The whole process has created cohesiveness among the community members and

has increased accountability. This village illustrates how the community has resolved a chronic problem and built social capital for development. In a village meeting, people stated: “This year (2009) we could harvest the entire rainwater of this season (though rains were less), only because they increased the depth, maintained water channels, and strengthened the embankments.”

## IMPACT

Primary impact has been in the availability of sweet drinking water round-the-year despite 2009 being declared as a severe drought year. A community member said: “It is incredible that we have achieved water security even in a severe drought year that completely wiped off our crops.”

Expansion in the capacity of Gawai Talab from 2,869 CuM to 5,218 CuM and that of Narsingh Nada from 2,308 CuM to 26,601 CuM has resulted in a 50 percent increase in water availability in both cases making water available all year long. Further, 13 villages also benefit through this intervention by sourcing water through tankers. (Details in Annexure, Table 3).

Lastly, the practice of creation of Jal Sabhas has put forward a bottoms-up approach in achieving development goals. It has enhanced leadership skills and motivated people for a better and improved life. The Jal Sabha has also achieved a sustainable financial source for regular maintenance of the talab through coupon system.







## KEY LEARNING

This approach showcases how investment in building robust and sustainable community systems and institutions positively impacts round-the-year availability of water. It also exhibits how an external agency with the cooperation of the local community can facilitate the revival of a traditional and sustainable water management system.



## SCOPE OF REPLICATION

Similar best practices are already replicated in the project villages of the Foundation such as Trisangari Soda and Rodwa Khurd in the Barmer district of Rajasthan. It is worth wider replication since it is an organised way to enhance the capacities of communities to manage water resources.

# REVIVING THE TRADITION OF COMMUNITY CONTRIBUTION



Vishnu Nagar and Dhandiya neighbourhoods in Pali district have a population of 2,500 people and 400 households. Agriculture and livestock rearing serve as the main stay. However, water situation in the area had been pathetic in terms of availability and ease of access. The village pond called Kherali Nadi is at a distance of three kms and had enough capacity to store rainwater for a period of six months only, leaving villagers to source water from other villages for the remaining period of the year.

## THE PRACTICE

During a participatory appraisal in 2005, the problem of water accessibility and poor capacity of the pond emerged. To address the same, community tanks were constructed in village hamlets called dhanis. With the tanks, water came closer to people's homes but the issue of limited availability remained the same. Therefore, in the year 2007, Jal Sabha initiated capacity enhancement on the Kherali Nadi.

While JBF contributed 70 percent funds, remaining needed to be raised through community contribution. The cash contributed was not sufficient to carry the work forward. To overcome this hurdle, members of the Jal Sabha revived the traditional practice of contributing

through grains where a minimum of 40 kg of Bajra (Pearl Millet) was contributed by each household. This system was a success and the villagers were able to collect a total 30 quintals of Bajra which was then sold in the market at a price of INR850 per quintal resulting in collection of adequate funds for the restoration of the pond.

The Jal Sabha now charges a nominal fee of INR10 per tanker from the village community but they do not sell water to neighbouring villages. The income thus generated is duly collected in the Jal Kosh to be utilised for regular maintenance activities for which villagers volunteer in kind services.



## Vishnu Nagar and Dhandiya Village, Pali District, Rajasthan

### This practice reflects:

- How community-level resource mobilisation contributes to round the year availability of water;
- How poor and marginalised communities participate in mobilising resources to maintain water resources; and
- How collective strength of individual contribution leads to sustainable solution in water management.

“Earlier, we used to preserve potable water as we preserve sweets and *ghee* (purified butter) in the house, using them with utmost care and efficiency. Potable water was a rare commodity and required real hardships to have access to it.

The pond now is a real boon to us and has rescued our wives and daughters from the drudgery of carrying water for miles,” says a male resident of Dhandiya.

### IMPACT

The villagers were able to successfully enhance the capacity of the three water structures from 6,974 cubic metres to a total of 21,903 cubic metres. This created a year-long uninterrupted supply of water in the village, reducing money spent in buying water from an average of INR3,150 to INR2,100 per annum. (Details in Annexure, Table 4).

### KEY LEARNING

Learnings that emerge from the strategy adopted by the villagers indicate that community participation helps provide local solutions to overcome impediments that arise in executing a project.

### SCOPE OF REPLICATION

This practice is unique in the manner by which the people revived the practice of material contribution when cash flows were insufficient. The whole practice can be adopted by other organisations or Self-Help Groups.

## WOMEN OPERATIONALISING SUCCESSFUL WATER ALLIANCE

While women traditionally bear the biggest brunt of water scarcity by walking long distances<sup>8</sup> to fetch water, their involvement in planning for water security at village-level remains insignificant in most areas. The typical patriarchal culture fails to recognise that women who devote all their lives in managing water at the home front, would be better managers of water in the larger context also.

The village of Rampura located 40 kms from Jodhpur in Pali district, presents this poor state of affairs. This village is spread into smaller dhanis or hamlets and the only water source is a village pond that is located at a distance of three kms from the village. Women fetch water from this pond daily and their problems intensify in summers when the pond runs dry and women have to travel a distance of six kms each day to collect water.



<sup>6</sup>According to an internal study, a woman on an average spends one-fourth of her day fetching water and walks an average of four kms to fetch 20 litres of water.



## Rampura Village, Pali District, Rajasthan

It looks at an approach through which water management systems can be infused with greater gender equality. It demonstrates how:

- Forming SHGs enhance women's role in water governance;
- SHGs give women financial independence to manage water in their villages; and
- SHGs enhance savings and in turn contribute to the betterment of the community at large.

## THE PRACTICE

A village Jal Sabha with 20 percent women representation was created to address this extreme state of distraught. With JBF's intervention a time analysis exercise was conducted with the women to map their life and routine. The outcomes revealed that women were involved in agriculture for two-three months in a year and for the remaining period they were free to be associated with other livelihood activities. Therefore, they were motivated to revive and renovate the village water management structures. Women expressed keen interest in constructing individual tankas to reduce their drudgery. They were also motivated to form SHGs or Jal Mandals to solve their financial problems.

Women Jal Mandals comprising 10–16 members began operating joint SHG bank accounts and contributed INR100 on a monthly basis towards the group corpus. SHGs also facilitated inter-loaning of money. Through the Jal Mandals, women were able to realise their dream of building individual tankas. Five out of the total 10 members managed to fulfill their wish of owning individual tanka through loans taken from the Jal Mandal and with technical assistance from JBF. This led to a sense of empowerment and motivated other women to save money so that they could own their own tankas. At present, each member of the Jogmaya Jal Mandal has a saving of INR2,500 in the bank to spend on ensuring water security for their families and the community at large.

## IMPACT

The forming of Jal Mandals greatly impacted the life of women. In Rampura, while the Jal Sabha played the role of addressing larger community water issues, the Jal Mandals in tandem catered to the individual requirements of women by construction of individual tankas. Further, this model introduced women to the practice of saving money which has proved to be a boon for them.





## KEY LEARNING

Jal Mandals showcase how teaming up of women resulted in increase in their participation and contributed to greater social inclusion in a predominantly patriarchal society. As it has been stated by Batliwala (1995), the process of empowerment has to begin from within a woman's individual self and later has to be externalised through greater autonomy, physical mobility, remunerated labour, and a strong role in the household. The beliefs, thoughts, conscience and attitude that contribute towards water governance need to be constantly upgraded to ensure equality and the Jal Mandal has a great role to play in this.

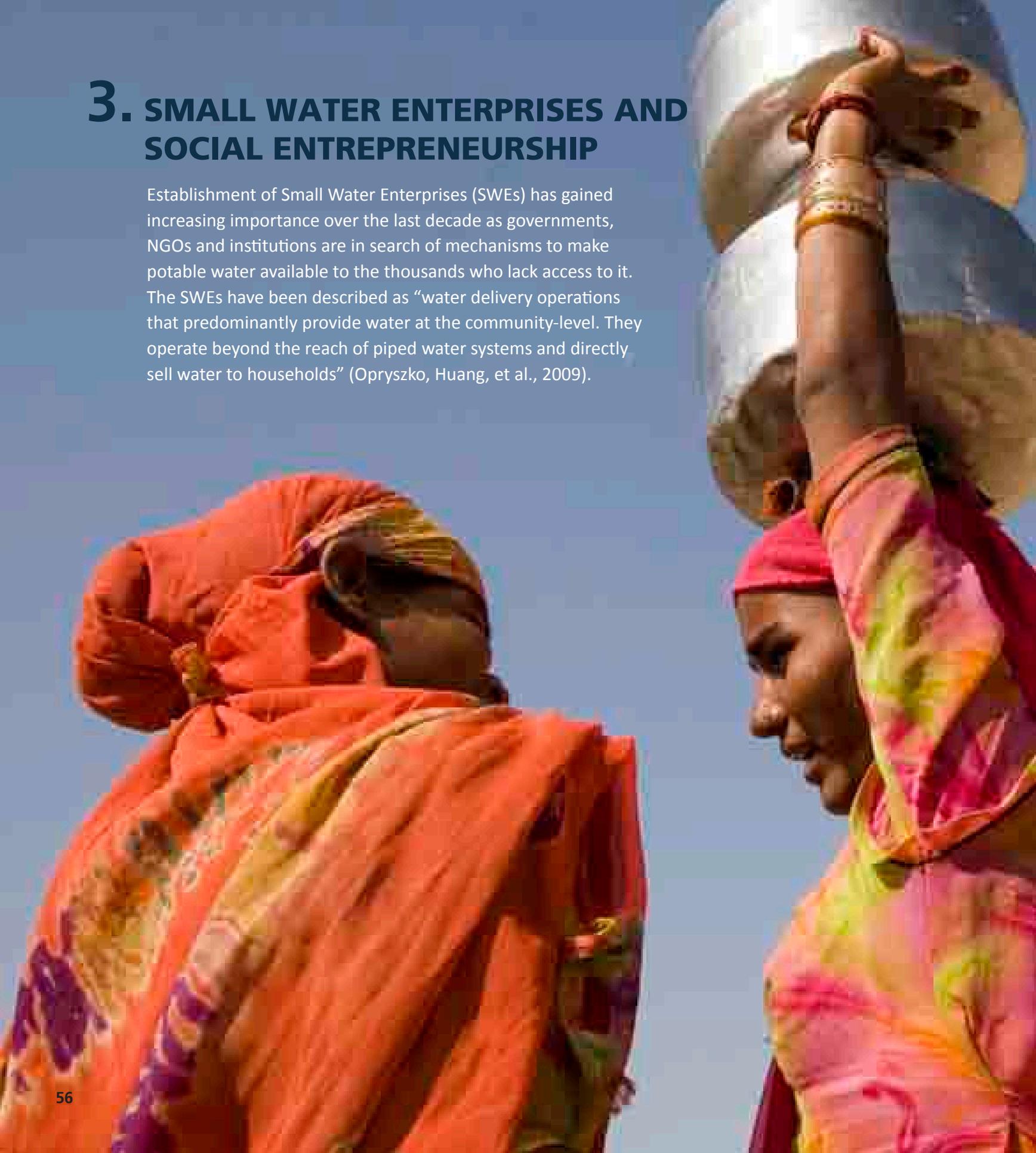
## SCOPE OF REPLICATION

This practice of forming a Jal Mandal has already been replicated in 10 villages each of Barmer and Pali districts as well as seven hamlets of Pachpadra in Barmer district amounting to a total of 55 Jal Mandals. This practice can be implemented as an important means to increase the involvement of women in water management and in the revival of traditional water management systems.



### 3. SMALL WATER ENTERPRISES AND SOCIAL ENTREPRENEURSHIP

Establishment of Small Water Enterprises (SWEs) has gained increasing importance over the last decade as governments, NGOs and institutions are in search of mechanisms to make potable water available to the thousands who lack access to it. The SWEs have been described as “water delivery operations that predominantly provide water at the community-level. They operate beyond the reach of piped water systems and directly sell water to households” (Opryszko, Huang, et al., 2009).



Despite the fact that access to safe drinking water has been a global health priority as indicated in the UN's MDGs and the role of small-scale water vendors has been flagged as critical in improving potable water availability (UN/UNESCO, 2003), the functionality of SWEs has just begun to unfold. Studies have described SWEs as having adaptability to local conditions and norms, making them locally viable. In some cases, SWEs have also been successful in accessing even the most remote populations regardless of terrain, governmental boundaries, regulations, economic conditions and population density (Solo, 1999; Collignon & Vezina, 2000; McIntosh, 2003; Solo, 2003; McGranahan, et al., 2006). Another benefit of SWEs is known to be their ability to cater to poor households, by allowing intermittent purchase of water in quantities these households can afford. Finally they have also been able to generate rural employment in many areas (McGahey, 2009).

SWEs are slowly emerging as acceptable models in the rural and peri-urban areas of India. The world over SWEs have been accepted as private profit-making institutions that are competing to provide services and they have been criticised for promoting competition by privatising natural resources. Many social scientists are of the opinion that such a practice will eventually lead to exclusion of poor communities from accessing quality water. They anticipate a hike in the price of water made available through these SWEs due to the possibility of oligopoly in controlling the water resources.

In the Marwar region, however, JBF is facilitating a different model of SWEs. These SWEs are managed by community members within the village, thus preventing unfair increase in prices of water. In this region, SWEs are emerging as community-owned institutions practising social entrepreneurship, which harness the advantages of both market mechanisms and community management while keeping a tab on the disadvantages of private profit-making systems.

**This section will look at a good practice in sustainable water delivery which has augmented people's access to safe drinking water - at affordable prices. It also looks at innovative methods of water management that have built business opportunities for locals.**

# MAKING PEOPLE WATER SECURE

## Pachpadra, Barmer District, Rajasthan

It is an example of public-private and community partnerships which enhance community access and availability of safe drinking water. The practice has helped to:

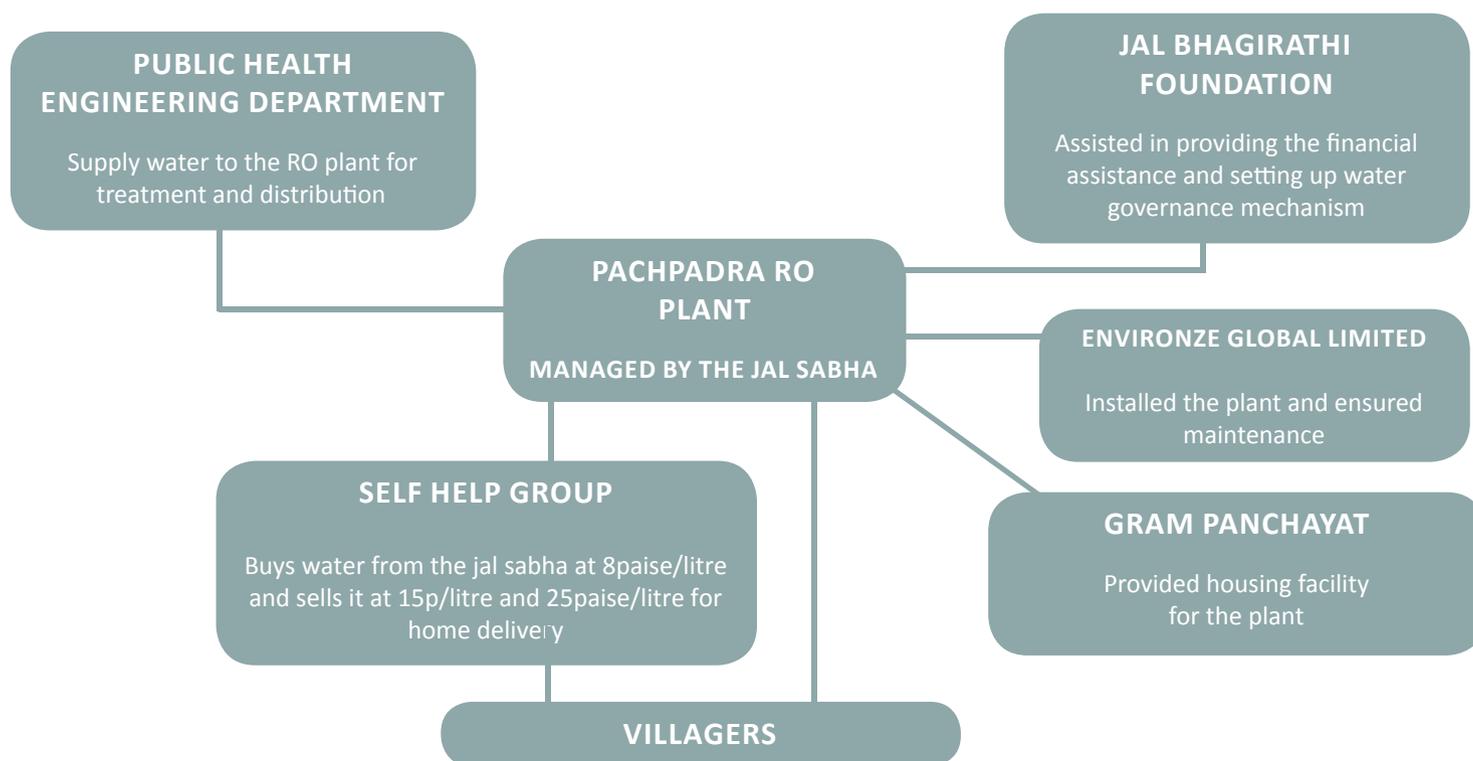
- Make available inexpensive, easily affordable and safe drinking water;
- Provide income generation opportunities to water suppliers, especially women;
- Act as a demo-model of a water micro-enterprise in the region.



Pachpadra is a village where people rely on just one pond to meeting their water requirements. The dependence of the villagers on surface water is exacerbated by the saline groundwater present in this area. During the dry spells, water is bought from nearby villages to fill up underground tanks in households at a cost of INR500-600 per 4,000 litre tanker. Choices of people are further narrowed by the fact that water supplied by the Public Health Engineering Department (PHED) is largely considered unfit for drinking. Sourced from a nearby groundwater well and then supplied through a Ground Level Reservoir contains TDS ranging up to 4,500 ppm, including chlorides, fluorides and nitrates which are above permissible levels. Such conditions forced the community to compromise on quality issues and consume the water thus supplied resulting in high prevalence of water borne diseases.

## THE PRACTICE

To solve this issue and provide livelihood, the JBF initiated a pilot project under a Public-Private-Community Partnership model. This project not only ensured the availability of safe drinking water but also improved livelihood opportunities of SHG members in the village. It set out to design a business model for the provision of safe water to the community, and facilitated a micro-level water enterprise project. This was a joint collaboration of the PHED, the Jal Sabha, the Gram Panchayat, the JBF and the SHGs that examined ways to encourage local entrepreneurship through the creation of community driven business models of supply of drinking water through SHGs, who will further sell water and create livelihood opportunities for themselves. Such a system would contribute to improved health and hygiene by removal of fluorides, nitrates, and other salts from water and build capacity of the community members through training for maintenance and operation of the project.



To fulfill these objectives, a technically efficient and effective Reverse Osmosis (RO) Plant was designed as a social business model to operate a water enterprise which provides safe drinking water to Pachpadra village. Environze Global Limited, a private manufacturer of water treatment systems installed the plant, whereas the government provided raw water and the Gram Panchayat provided housing facility to the plant. The Foundation was primarily responsible for facilitating the project and empowering community institutions to initiate local entrepreneurship through creation of community-driven business models.



While the RO plant was expected to be technically effective, there were challenges in developing an appropriate delivery mechanism for building it as a sustainable model for safe, reliable drinking water supply for the village. The plant presented few challenges during its setting period which are as follows:

- People were not aware about the advantages of RO water.
- They were paying for water for the first time. Till now they only paid for transportation of water.
- They were apprehensive to use the water from the RO plant due to cultural beliefs.
- There was an absence of a distribution system that was affordable and accessible for the scattered population in the village.
- By examining the demographics of the villagers, it was discovered that access to the plant was a limiting factor. It was found that maximum walking distance of one km was acceptable to the people for collecting water, while to reach the RO plant people had to walk more than a kilometre.



Global Social Benefit Incubator (GSBI) and Acumen Fund helped in overcoming these hurdles. They assisted in setting up a distribution network and also provided for business coaching and contributed towards the development of a business model and plan.

Therefore, to allow for inexpensive means of maximum distribution and reachout, four outlet stations were set up in different parts of Pachpadra ensuring that all communities were within walking distance of the RO treated water. To ensure the affordability of water, an affordable selling price of INRO.15/litre of water was set as the plant saved immensely on packaging and distribution costs. Moreover, the traditional pots were found very convenient for the rural women to transport water.



The RO plant and the delivery system is managed and coordinated by community members. The outlets are owned and managed by women from Jal Mandals (SHG), allowing them to augment family incomes. The outlets, with a storage capacity of 2,000 litres, get water from the RO plant for INR0.08/litre. With a financial plan that fixed the selling price at INR0.15/litre and household delivery of water at INR0.25/litre, the outlets managed to generate profits ranging from INR3,500 to INR4,500 per month. The emergence of this SWE as a business model is an example of a public-private partnership with community investment where people have accepted differential pricing and are willing to pay for the service provided by the model.

To make the business model successful and improve livelihood of women, all the participating women were regularly trained in running and maintenance of the plant. They were also trained in financial dealings, record keeping, marketing and distribution. Women were also made aware of the importance of safe water and how it leads to a healthy life. From a humble beginning, the SHG participants now take part in a wider awareness campaigns on safe water in Pachpadra.

## IMPACT

In Pachpadra, the RO-SWE has become an innovative option for the delivery of safe water. There is now availability of inexpensive, easily affordable and safe drinking water in the area for the first time. People have adopted clean water practices of washing water containers with a chlorine solution before filling. Subsequently, a decrease in the instances of water-borne diseases as well as improved health has been noticed among families purchasing water from the plant. With regular awareness campaigns, there has been increased usage of safe drinking water. This has led to income generation for families that source water and further sell it in their community.

Regular supply of drinking water has contributed to growth of a micro enterprise. Regular training of women have contributed to their social and economic empowerment.

## KEY LEARNING

Running the RO enterprise successfully required dedicated inputs in entrepreneurial and technical skill development. Maintaining product quality is essential to the sustainability of the intervention. Further, outlet infrastructure was not sufficient to guarantee viability and a delivery system was needed to ensure continuous sale of water. Finally, the biggest learning has been that social enterprises run by communities are viable economic propositions provided that the right back-end and front-end linkages exist.

## SCOPE OF REPLICATION

In an area where saline water is the root cause of people's problems, this practice can be extremely helpful in making quality water available to the people of Marwar. The main constraint is the initial financial investment and personnel training required to operate the RO plant. It also depends upon the government and the private players to recognise the potential of this process and invest in the same.



## 4. HARNESSING TRADITIONAL KNOWLEDGE

In the present scenario while the world is looking at scientists for technological solutions to their problems, the importance of traditional knowledge driven by local needs and requirements cannot be undermined. Robert Chambers explains local knowledge as “a whole system of knowledge which includes concepts, beliefs and perceptions and the process whereby it is acquired, augmented, stored and transmitted” (Chambers, 1983). Indigenous knowledge or rustic wisdom is considered to be indomitably linked to local economic, social, cultural and political conditions.



Examples from the world over have demonstrated that blueprint solutions developed in laboratories do not work well when applied to grassroots. This is because ideas often do not work unless they take into account people's perceptions, knowledge systems and beliefs. However, dealing with local knowledge can be challenging - mainly because local knowledge is an unwritten resource and lacks scientific validation. For JBF, the very process of learning from the community is integral in its approach and an indicator of recognising the community as an equal partner in the development process. Project experiences have revealed that this process of collaboration on knowledge is cost effective, helpful and workable as it diversifies options of water management and empowers local communities during the process.

**This section will look at good practices of traditional water management systems. It will talk about how these approaches were found to be embedded in a holistic and ecological sound system of water management.**





## BELIEF IN TRADITIONAL WATER MANAGEMENT SYSTEMS AND TRADITIONAL KNOWLEDGE

The village of Araba comprises 350 households and has a total population of 1,000 people. The village has a pond called Kheteshwar Sagar which collects rainwater and provides water to the community for a period of four-six months in a year. The groundwater is saline in nature and there is no other source of water in the village.

To resolve the problem, JBF mobilised the community to become part of the Community led Water Management System. The severity of the problem resulted in the quick formation of a Jal Sabha. The first solution provided by the Jal

Sabha was to construct a new *beri* (well) close to the pond that would provide potable water and reduce water shortage. The villagers believed that a *beri* near the pond would be recharged with rainwater collected in the pond and would provide for potable water. However, government reports of that site suggested the exact opposite of the traditional wisdom. According to the reports, there was no chance of obtaining sweet water beyond 45 feet. These reports were based on studies of underground water levels conducted by the government on the Araba village site.

The villagers, however, relied on their traditional wisdom of water systems. It was locally known that there was an underground river near the village and sugarcane farming was practised around the village centuries ago.

This fact was supported by the evidence of a stone machine called ganha that was used to take out sugarcane juice in those days. After the discovery of the ganha, the villagers were convinced that sweet groundwater was available in the region. Thus, an ideal location for the beri was selected and the Jal Parishad was approached to seek permission for digging.

The Jal Parishad agreed to dig up to 40 feet initially with a condition that if sweet water was not found at that level, then further digging would be carried out at the expense of the Jal Sabha and the villagers. The villagers and the Jal Sabha took this risk and struck sweet water at 75 feet. Consequently, a beri was constructed and the pond recharged the water in the well and kept it sweet for 12 months. The village Jal Sabha then set up a small motor room with funding from the Panchayat to lift water from the well. Water is now taken out from the well through this motor and is filled in separate tanks for human consumption and stray animals. The running cost of the generator and other maintenance works are covered by the Jal Kosh, thereby, ensuring sustainability of the enterprise.



### Araba and Sutharon ki Dhani Villages, Barmer District, Rajasthan

**They are successful examples of people accessing traditional knowledge that enhanced water security in their villages. They reflect:**

- Use of traditional knowledge to enhance water security; and
- How traditional wisdom made water access easier.
- How communities can find solutions to their own problems.

## SUTHARON KI DHANI

Sutharon ki Dhani is an isolated village in the sand dunes and experiences severe water shortage. It has a population of 725 people with 92 families spread over different dhani. The region around the village is covered with sand dunes which makes it impossible to dig ponds due to the sandy soil. The only water source available to the people is saline groundwater which is unfit for consumption. The villagers had to walk long distances to collect water for drinking as well as domestic purposes. Being an economically backward village that even lacked electricity, families in this village were heavily financially strained since they had to pay up to INR2,500 for tankers.

The villagers of Sutharon ki Dhani relied on their traditional wisdom and believed that if a beri was made near the sand dunes then it would be recharged with sub-soil water thus creating a resource of potable water. The Jal Sabha members collected money from the villagers and deposited it in the Jal Kosh. The Jal Sabha raised 30 percent of the requisite amount while the remaining 70 percent was provided by the JBF. The beri was thus constructed and it collects seepage water and has a depth of 25 feet. It provides water throughout the year and has been named Puniyo Ka Tala. The traditional source of knowledge greatly helped the community and now they have access to water for drinking and other uses.



## IMPACT

Traditional wisdom of the villagers has been a boon to these villages since it has considerably improved their accessibility to water. The success of this effort also established the importance of traditional wisdom. The beri at Araba has spelt hope for the community with a 100,000 litre per day capacity available all year long. This has remarkably reduced expenditure on water from INR4,250 to INR500 on an average per family. Similar impact is visible in Sutharon Ki Dhani where 8,000 litres per day availability of water has resulted in availability of water 12 months a year. (More details in Annexure, Table 5a and 5b).

## KEY LEARNING

Amalgamation of modern technology alongside traditional water harvesting structures both managed by the communities, is an effective strategy for water management. This practice enables communities to contribute their knowledge and learn new skills of water management systems.



## SCOPE OF REPLICATION

The simple traditional knowledge that a well, dug strategically near a pond, yields sweet water has been in practice for generations. Its adaptation and replication, however, into a project or village micro-plan requires faith in traditional wisdom and community participation from the initial stages of planning the project.





## **BAGLOP TALAB: REVISITING TRADITIONAL WISDOM FOR SECURING WATER**

Environmental and ecological changes are increasing the vulnerability of people. Changes in the pattern of seasonal monsoon have become more frequent and the number of drought years have increased. This has resulted in a continuous trend of adaptation

where communities struggle to adjust to new challenges. Water-related adaptation is also increasing as it not only affects the availability of drinking water but also influences other factors such as sanitation, health and livestock.



## Kalyanpur Village, Barmer District, Rajasthan

With water scarcity and its availability being an issue, the communities in Marwar are constantly in search of ways to secure and save water. This practice showcases:

- Growing community belief in traditional systems;
- How gradual adaptation to a water harvesting structure has increased water availability; and
- How communities come up with innovative systems of management of their resources and become self-reliant for their basic water needs.

## THE PRACTICE

In order to adapt and find new ways of accessing water, people explore new and old techniques, knowledge systems and beliefs. Kalyanpur, a village with 864 households is located on the Jodhpur-Barmer highway. The village has a pond called Baglop Talab where rainwater is harvested. During good monsoons, the water would last for eight-nine months only. In months of scarcity, a water tanker of 4,500 litres had to be purchased costing upto INR2,500 per household.

To address this dismal situation of water availability, people turned to their traditional knowledge. Traditionally, it is believed that if a *beri* is made near the pond, it would be recharged with rainwater from the talab giving a perennial source of sweet water. However, government reports based on studies of underground water levels on that site suggested the exact opposite. The reports rejected the availability of sweet water. Yet the villagers relied on their traditional knowledge of local water systems that revealed the directional flow of underground water in their village. The community jointly agreed that water flowed from west to east in the region and digging a *beri* in the northwest direction of the pond would give them sweet water.

Villagers found sweet water in the *beri* and they were able to obtain about 22,500 litres (equivalent of four-five tankers of 4,500 litre capacity) of water in a day. But due to lack of regulatory mechanism, this precious resource sadly became a victim of irrational use following the 'first-come-first-serve' approach.



The community realised that this system was not based on an equitable and resource-efficient approach and thus would soon lead to the problem of water scarcity once again. Therefore, to resolve this problem, the Jal Sabha decided to introduce a '*tanka* checking system' through which an inspector would check every household, evaluate their water requirements and then distribute water accordingly. This whole practice of evaluation and distribution helped the village to manage their newly found water resource responsibly.

The success of this initiative enabled the community to refer back to their traditional wisdom and once again observed the pattern of groundwater flow. Based on their observations, they expanded the *beri* to add five additional side bores to significantly enhance water availability. There were chances of obtaining unusable saline water but planning and reliance on century-old knowledge helped them obtain a water quantity equivalent to another 20-21 tankers of 4,500 litres every day. With the existing water distribution system, the Jal Sabha has also introduced a token system which charges a village household INR60 for a water tanker and INR100 for people from the neighbouring villages.

The villagers have, further introduced checks and balances to ensure there is no wastage of water. They have researched and realised that a family needs 5,000 litres of water in a month. Therefore, they give one tanker to a household at a cost of INR60 through token system. People are encouraged to use water efficiently and are made aware of the fact that a tanker from outside costs INR500 which is far more expensive than buying water from the Jal Sabha at INR60 only. With this norm of one tanker per household per month, the possibility of using water by all and for longer periods has become a reality.

## IMPACT

This village showcases the amalgamation of modern management with traditional water harvesting management system, both under the supervision of communities, is an effective strategy for water conservation. This practice has contributed to enhance the capacities of the rural community for development and proper management of ecological resources. The entire process of accomplishing the tasks and defining the norms for maintenance of water harvesting structures has strengthened the community and ensured sustainability. (Details available in Annexure, Table 6).

## KEY LEARNING

The sustenance of the practice has helped to identify, that the stake of the people in projects for their own development helped in better monitoring and upkeep of the resource and made it sustainable for a much longer period. Hence, for use of such practices and for them to be successful, it is important that the people are integrated and community leadership is involved at each level. Finally, the practice signifies that building synergy among people along with accountability and transparency is critical for sustainability. This approach also advocates how to build effective usage mechanisms leading to behavioural change within the society.

## SCOPE OF REPLICATION

This practice has helped strengthen the belief in traditional practices. It has brought about a need-based cohesive management system which is innovative and monitors wastage of water. It has also facilitated emergence of strong and organised water management and distribution systems which can be replicated in other villages in the Marwar region which face acute water shortage.



## 5. SAFE WATER AND SANITATION

Access to water and sanitation are considered basic human rights. Easier access to water and sanitation facilities is known to improve human and social capital and it lies at the very heart of human well-being. It is rightly labelled as a “moral and ethical imperative” by Lenton and Wright (2004).



While water and sanitation have been a significant part of the national agenda since the first five-year plan of 1951, there have been serious concerns about the effectiveness of services delivered to address concerns over these issues. Incidences of diarrhoea continue unabated with nine percent of all children below five (National Family Health Survey, 2005) falling victim to this disease, while high infant mortality (62 deaths/1,000 live births) continues to be attributed to poor-sanitation (TSC, 2004). Sustainability of government-run arrangements is also questioned wherein despite 86 percent population having access to safe water (UNDP's global Human Development Report, 2006), many habitations quickly regress from full coverage<sup>9</sup> to partial/no coverage situations. Sanitation coverage

at a low of 22 percent (Census, 2001) is a major deficit combined with poor water supply, cumulates into serious public health hazards, especially for women and children. The Planning Commission (2002) identified the primary reason of failure to be lack of beneficiary participation in planning and management and this placed operational responsibility solely on to the government.

Sanitation in particular is considered to be one of the most difficult goals to achieve among the MDGs, with about 2.4 billion people worldwide lacking access (UN Secretary General Ban Ki-moon, 2008). Key challenges include tackling cultural and social issues of the behaviour change required to ensure that toilets are not just built, but they are also used and maintained.

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<sup>9</sup>Government of India norms of 40 litres per capita per day define full coverage.





There is an emerging need to go beyond top-down notions of toilet construction and toilet coverage (Movik and Mehta, 2009). In Marwar region, poor hygiene practices, open defecation and minimal environmental sanitation take a major toll on public health. Such customary practices, entrenched over time, have led to deep-seated behaviours, which are hard to change. With increased populations, these practices have become a major cause of health hazards. Rajasthan has only 34 percent sanitation coverage and is ranked 24th among the 28 Indian states (CCDU Department, 2005). Studies conducted by the JBF reveal that over 70 percent of health problems of school going children are due to inadequate water and poor sanitation facilities and only three percent of the rural population in Marwar has access to toilet facilities (national average being 36.4 percent).

In order to find ways to secure people's access to water resources for consumptive and productive use as well as adequate sanitation, it is necessary to draw on innovative ideas both in terms of technological solutions and institutional frameworks.

**This section addresses the provision of safe water and sanitation. It highlights the creation of supportive arrangements for households to make decisions, promote demand for sanitation, initiate behavioural change and stimulate systems for local supply and management which provide for better facilities for waste disposal at the household-level.**

## LINKING WATER ACCESS TO BETTER HYGIENE AND DIGNITY

Inspired by the WASH campaign<sup>10</sup>, the JBF with the support of Wells for India, a UK-based organisation, adopted a multi-pronged strategy: creating supportive arrangements for households to make decisions around sanitation; promoting demand for sanitation; initiating behaviour change and stimulating systems of local supply; and management to provide better facilities for waste disposal at household-level.

This approach comprised three inter-related activities: a) Revival and construction of traditional rainwater harvesting systems to ensure availability of water; b) Construction of sanitation facilities; and c) Promoting hygienic practices.

To initiate this, a baseline household survey was conducted in Janadesar village to assess the health of the people and the kind of health problems faced by them. The Jal Sabha initiated a campaign to boost awareness on sanitation, health and hygiene through various community initiatives such as wall paintings, street plays, slogans and foot-walks. In conjunction with these, in-house production films were made by the Foundation and the Community Video Unit. This video unit was led by people identified from the community itself who were trained on video documenting social programmes and problems. Screening of films around better sanitation encouraged local people to take action and individuals approached the Jal Sabha with written applications for construction of toilets. The toilets were constructed with community interventions. This initiative in Janadesar spread around to other nearby villages and people came to witness the newly built sanitation facilities in Janadesar village. They were motivated to seek Panchayat support for replicating the same in their villages.



### Janadesar village, Jodhpur district, Rajasthan

It showcases a pilot campaign started by JBF to promote sanitation practices. The good practice resulted in:

- Enabling a large portion of the community to construct sanitary facilities (wherein each toilet was made through 50 percent community contribution);
- Improvement in personal hygiene and waste disposal in the area;
- Capacity development of 425 people in the village who are now trained in water, sanitation and hygiene practices and have benefited from the practice; and
- Households are conducting solid and liquid waste management in an environmentally responsible manner.

<sup>10</sup> WASH Campaign is a people-centred approach which focuses particularly on underserved poor, women, children and young people for safe water, adequate sanitation and hygiene.



## IMPACT

The biggest impact of the sanitation programme has been that it has motivated a large portion of the community to ponder over the benefits of having individual sanitation facilities. Individual sanitation facilities have led to improved personal hygiene and waste disposal in the area thus reducing health hazards. Through the awareness campaign, many others have learnt about the issues related to poor sanitation and hygiene as well as ways to address them. For women and older girls, in particular, having a toilet at home meant privacy and saved them from the dangers of going out before dawn or after dark for defecation. Fear of anti-social elements lurking in the shadows was a source of constant anxiety for the women.

## KEY LEARNING

Individual contributions in construction of these facilities served to inculcate a sense of ownership and value, ensuring its maintenance. Moreover, combining behavioural and attitudinal change through awareness generation along with co-financing sanitation infrastructure, as an incentive, motivated people to become a part of this change and own and sustain it.

## SCOPE OF REPLICATION

This practice is followed in only one village as of now but is worth replicating in other villages as well since poor sanitation is a grave problem. The model is worthy of replication investment for the same comes from both people and village local self-governance bodies. This strategy puts forward an example of a holistic approach to enable access to sanitation facilities, promote hygiene practices and enhance water security. This combined approach requires scaling up by government and civil-society protagonists.



# GLOSSARY

**Agor** : Fallow land which servers as catchment area of a pond.

**Beri** : A well near a pond which is a perennial source of water. The water in this well is sweet and it gets recharged on its own.

**Gauchar** : Livestock grazing land which is also used as the catchment area for ponds.

**GLR** : Ground Level Reservoir.

**Jal Dals** : Children's institutions for conservation.

**Jal Kosh** : It is a development fund collected from the villagers and deposited in a bank account of a Jal Sabha.

**Jal Mandal** : Women's Self-Help Group and/or informal groups that are encouraged to keep small savings.

**Jal Sabha** : It is a water user's association and is a forum of minimum 30 members who are elected by the villagers. The members then elect five office bearers, at least one of them must be a woman. This is the group that devises plans and proposals for development of the village's water resources. They also decide how the work will be executed and collect all the necessary economic, human and physical resources to complete the work for water security in the village.

**Jal Samiti** : It is a water development group and is a forum of people selected at the block-level. It comprises of members of the Jal Sabha along with area's key community leaders. It is a proposal recommending body and a platform to encourage volunteerism and resolve conflicts.



**Jal Parishad** : It is a regional water forum which is a project sanctioning and monitoring body. The forum comprises of dedicated community leaders, technocrats and bureaucrats from government departments and members of Jal Samitis and Jal Sabhas. The members meet once a month to ensure project alignment on a macro-level.

**Jal Sansad** : It is a stakeholders' forum which has members drawn from all the project areas in the Marwar region. This forum is held yearly and is responsible for annual progress reviews and work-plan formulation. They also discuss new and existing strategies that are incorporated into approach to water security.

**Mahatma Gandhi NREGA** : Mahatma Gandhi National Rural Employment Guarantee Act (NREGA) is the world's largest job-guarantee scheme that provides 100 days of wage labour to any rural household demanding it.

**PPM** : Parts Per Million.

**Tanker** : One tanker's capacity is 4,000 litres.

**Tankas** : Traditional underground storage tanks of capacity ranging from 10 to 100,000 litres.

**Total Dissolved Solids (TDS)** : It is a measure of the combined content of all inorganic and organic substances contained in water in molecular, ionized or micro-granular suspended form.



# BIBLIOGRAPHY

ASCE Task Committee on Sustainability Criteria (1998): Sustainability Criteria for Water Resource Systems, ASCE, Reston, Virginia, USA.

CCDU (2005), State Water and Sanitation Mission, Rajasthan. Data accessed from <http://www.ccduraj.org/Default.aspx>

Census of India (2001), Government of India.

Chambers, R. (1983), *Rural Development: Putting the Last First*, London: Longman.

Collignon, B. & Vezina, M. (2000) Independent Water and Sanitation Providers in African Cities: Full report of a 10 country study. Water and Sanitation Program. World Bank, Washington, DC, ([http://www.wsp.org/UserFiles/file/af\\_providers.pdf](http://www.wsp.org/UserFiles/file/af_providers.pdf)).

Cravidao, D.F. and Lurdis, D M. (2003) Water and Sustained Development: A Challenge for the 21st Century: The Case of Portugal, in Kamta (ed) (2003), *Water Resources and Sustainable Development*, Delhi, Shipra Publications.

Dhir, Ram Paul, 2003: Ecological Fluxes in the Thar Desert: Narain, Pratap; Kathju, Suresh; Kar, Amal; Singh, Mahendra Pal; Kumar, Praveen (Eds.), 2003: *Human Impact on Desert Environment* (Jodhpur: Arid Zone Research Association of India).

Government of Rajasthan, 2005: Report of Expert Committee on Integrated Development of Water Resources.

IDS (2008), Human Development Report, Rajasthan: An Update, Prepared for Government of Rajasthan by Institute of Development Studies, Jaipur.

Khan, Mohammad Allauddin, 1998: Rainwater Management: Faroda, Amar Singh; Singh, Manjit. (Eds), 1998: *Fifty Years of Arid Zone Research in India* (Jodhpur: Central Arid Zone Research Institute).

Lenton, R. and Wright, A. (2004) Interim Report of Task Force 7 on Water and Sanitation, Millennium Project.

Majra J.P. and Gur, A. (2007), Climate Change and Health: Why India Should be Concerned, *Indian Journal of Occupational and Environmental Medicine*, Vol. 1 No. 1 pp 11-16.

McGahey, C. (2009), Small Water Enterprises in Reading Material for Working forum on Beyond the Pipes. Conducted by Safe Water Network, in collaboration with Johns Hopkins Bloomberg School of Public Health's Center for Water & Health, Baltimore on 22 October 2009.

McGranahan, G., Njiru, C., Albu, M., Smith, M. & Mitlin, D. (2006) How Small Water Enterprises can Contribute to the Millennium Development Goals: Evidence from Dar es Salaam, Nairobi, Khartoum and Accra. WEDC, Loughborough University (<http://wcdc.lboro.ac.uk/publications/online-catalogue.php>).

McIntosh, A., 2003 Asian Water Supplies: Reaching the Urban Poor. Asian Development Bank. ([http://www.adb.org/Documents/Books/Asian\\_Water\\_Supplies/asian\\_water\\_supplies.pdf](http://www.adb.org/Documents/Books/Asian_Water_Supplies/asian_water_supplies.pdf)).

Mohnot, Surendar Mal, (2003) *The Maru Gauchar Yojana 2003* – Government of India (Jodhpur: The School of Desert Sciences).

Movik, S., and Mehta, L., (2009) *Going with the Flow? Directions of Innovation in the Water and Sanitation Domain*, STEPS Working Paper 29, Brighton: STEPS Centre.

Opryszko, M., Huang, H., Soderlund, K. & Schwab, J.K. (2009) Data gaps in evidence-based research on small water enterprises in developing countries in *Journal of Water and Health*, Vol. 07 No. 4 pp 609–622, IWA Publishing.

Astad Pastakia (2008), *Meeting the Challenge of Drinking Water Security in Marwar Region of Rajasthan*, A mid-term evaluation study of project on 'Vulnerability Reduction through Community Empowerment and Control of Water in the Drought Prone Areas of Marwar Region'.

Pimentel, D., Cooperstein, S., Randell, H., Filiberto, D., Sorrentino, S., Kaye, B., Nicklin, C., Yagi, J., Brian, J., O'Hern, J., Habas, A., and Weinstein, C. (2007): *Ecology of Increasing Diseases: Population Growth and Environmental Degradation*.

Roth, D., Boelens, R., et al. (2005) *Liquid Relations: Contested Water Rights and Legal Complexity*, New Brunswick, New Jersey, and London: Rutgers University Press.

Solo, T. M. (1999) Small-scale entrepreneurs in the urban water and sanitation market in *Environment and Urbanization*, Vol. 11. No. 1, pp117–132.

UNESCO Working Group M.IV (1999) *Sustainability Criteria for Water Resource Systems*, Cambridge, UK: Cambridge University Press.

United Nations Development Programme global Human Development Report, 2006: *Beyond Scarcity: Power, Poverty and the Global Water Crisis*, Palgrave Macmillan.

# ANNEXURE

**TABLE 1: Sarwari Purohitan Village, Barmer District, Rajasthan**

Name of the Village	SARWARI PUROHITAN					
Direct Beneficiaries	Households	450	Population	2,940	Livestock	3,000
	Before Intervention			After Intervention		
Water Harvesting Structure	Capacity (CuM)	Availability		Capacity (CuM)	Availability	
Gawai Talab	960	2-3 months*		5,218	6-7 months	
Ghora Nadi	17,280	6 months*		26,601	12 months	
Cost of the Project						
Name of the Structure		Total Cost		Community Contribution		
Gawai Talab		INR 127,747/-		INR 38,324/-		
Ghoda Nadi		INR 294,486/-		INR 88,346/-		
Direct Impact of the Project						
Variable		Before Intervention		After Intervention		
Money Spent in Buying Water*		INR 3,480/- per annum per household		INR 960/- per annum per household		
Time Saved by Women to fetch Water (in hours)		-		2 hours per day		
Indirect Impact of the Project						
Variable	Before Intervention			After Intervention		
Number of villages collecting water from the village	Villages	No. of Tankers per month	No. of months	Villages	No. of Tankers per month	No. of months
	-	-	-	Badu ka Bada	100	6 months
	-	-	-	Jaton ki Dhani	100	6 months

\*In months of non-availability of water people either consume saline water or incur huge financial cost to purchase water.

**TABLE 2: Satuni Purohitan Village, Barmer District, Rajasthan**

<b>Name of the Village</b>	<b>SATUNI PUROHITAN</b>					
<b>Direct Beneficiaries</b>	<b>Households</b>	<b>205</b>	<b>Population</b>	<b>2,500</b>	<b>Livestock</b>	<b>2,500</b>
	<b>Before Intervention</b>			<b>After Intervention</b>		
<b>Water Harvesting Structure</b>	<b>Capacity (CuM)</b>	<b>Availability</b>		<b>Capacity (CuM)</b>	<b>Availability</b>	
Hemajal Nada	353	2 months*		5,218	6-7 months	
Songra Nadi	1,200	2-3 months*		26,601	12 months	
<b>Cost of the Project</b>						
<b>Name of the Structure</b>		<b>Total Cost</b>		<b>Community Contribution</b>		
Hemajal Nada		INR 58,820/-		INR 17,646/-		
Songra Nadi		INR 118,560/-		INR 35,568/-		
<b>Direct Impact of the Project</b>						
<b>Variable</b>		<b>Before Intervention</b>		<b>After Intervention</b>		
<b>Money Spent in Buying Water*</b>		INR 4,200/- per annum per household		INR 1,800/- per annum per household		
<b>Time Saved by Women to fetch Water (in hours)</b>		-		3-4 hours per day		

**TABLE 3: Mandli Village, Barmer District, Rajasthan**

<b>Name of the Village</b>	MANDLI					
<b>Direct Beneficiaries</b>	<b>Households</b>	525	<b>Population</b>	3,785	<b>Livestock</b>	2,700
	<b>Before Intervention</b>			<b>After Intervention</b>		
<b>Water Harvesting Structure</b>	<b>Capacity (CuM)</b>	<b>Availability</b>		<b>Capacity (CuM)</b>	<b>Availability</b>	
Gawai Talab	2,869	5 months*		5,218	12 months	
Narsingh Nada	2,308	4-5 months*		26,601	7-8 months	
<b>Cost of the Project</b>						
<b>Name of the Structure</b>		<b>Total Cost</b>		<b>Community Contribution</b>		
Gawai Talab		INR 501,850/-		INR 150,555/-		
Narsingh Nada		INR 66,732/-		INR 20,020/-		
<b>Direct Impact of the Project</b>						
<b>Variable</b>		<b>Before Intervention</b>		<b>After Intervention</b>		
<b>Money Spent in Buying Water*</b>		INR 3,550/- per annum per household		INR 500/- per annum per household		
<b>Time Saved by Women to fetch Water (in hours)</b>		-		2-3 hours per day		

<b>Indirect Impact of the Project</b>						
<b>Variable</b>	<b>Before Intervention</b>			<b>After Intervention</b>		
<b>Number of villages collecting water from the village</b>	<b>Villages</b>	<b>No. of Tankers per month</b>	<b>No. of months</b>	<b>Villages</b>	<b>No. of Tankers per month</b>	<b>No. of months</b>
	-	-	-	Nagana	30	6-7
	-	-	-	Deria	40	6-7
	-	-	-	Bakiyanwas	15	6-7
	-	-	-	Kalyanpur	20	4
	-	-	-	Araba	25	4
	-	-	-	Bagawas	40	6-7
	-	-	-	Meghawas	30	6-7
	-	-	-	Bhilon ki Dhani	15	6-7
	-	-	-	Satuni Purohitan	15	4
	-	-	-	Kelankot	15	4
	-	-	-	Simrakhia	20	4
	-	-	-	Charlai	15	4
	-	-	-	Thoriyon ki Dhani	10	4

*\*In months of non-availability of water people either consume saline water or incur huge financial cost to purchase water.*

**TABLE 4: Vishnu Nagar and Dhandiya Village, Pali District, Rajasthan**

<b>Name of the Village</b>	VISHNUNAGAR					
<b>Direct Beneficiaries</b>	Households	150	Population	900	Livestock	700
<b>Name of the Village</b>	DHANDIYA					
<b>Direct Beneficiaries</b>	Households	250	Population	1,650	Livestock	1,000
	Before Intervention			After Intervention		
<b>Water Harvesting Structure</b>	<b>Capacity (CuM)</b>	<b>Availability</b>		<b>Capacity (CuM)</b>	<b>Availability</b>	
Kherali Nadi	4,480	5-6 months		10,872	12 months	
Mama Nada	1,438	2-3 months		5,798	5 months	
Piplai Nadi	1,056	2 months		5,233	6-7 months	
<b>Cost of the Project</b>						
<b>Name of the Structure</b>		<b>Total Cost</b>		<b>Community Contribution</b>		
Kherali Nadi		INR 199,200/-		INR 5,9760/-		
Mama Nada		INR 100,000/-		INR 30,000/-		
Piplai Nadi		INR 96,879/-		INR 29,064/-		
<b>Direct Impact of the Project</b>						
<b>Variable</b>		<b>Before Intervention</b>		<b>After Intervention</b>		
<b>Money Spent in Buying Water*</b>		INR 3,150/- per annum per household		INR 2,100/- per annum per household		
<b>Time Saved by Women to fetch Water (in hours)</b>		-		2-3 hours per day		
<b>Indirect Impact of the Project</b>						
<b>Variable</b>		<b>Before Intervention</b>			<b>After Intervention</b>	
<b>Number of villages collecting water from the village</b>	<b>Villages</b>	<b>No. of Tankers per month</b>	<b>No. of months</b>	<b>Villages</b>	<b>No. of Tankers per month</b>	<b>No. of months</b>
	Rendri	35	1	Rendri	35	4-5 months
	Bisawas	5	1	Bisawas	5	4-5 months

*\*In months of non-availability of water people either consume saline water or incur huge financial cost to purchase water.*

**TABLE 5A: Araba, Barmer District, Rajasthan**

Name of the Village	ARABA DHUDAWATAN					
Direct Beneficiaries	Households	274	Population	2,042	Livestock	14,000
	Before Intervention			After Intervention		
Water Harvesting Structure	Capacity (CuM)	Availability		Capacity (CuM)	Availability	
Kheteshwar Sagar Beri**	-	-		100,000 litres per day	12 months*	
Cost of the Project						
Name of the Structure		Total Cost		Community Contribution		
Kheteshwar Sagar Beri		INR 377,449/-		INR 148,762/-		
Direct Impact of the Project						
Variable		Before Intervention		After Intervention		
Money Spent in Buying Water*		INR 4,250/- per annum per household		INR 500/- per annum per household		
Indirect Impact of the Project						
Variable	Before Intervention			After Intervention		
Number of villages collecting water from the village	Villages	No. of Tankers per month	No. of months	Villages	No. of Tankers per month	No. of months
	-	-	-	Araba Chauhan	200	12
	-	-	-	Araba Purohitan	150	12

\*In months of non-availability of water people either consume saline water or incur huge financial cost to purchase water.

\*\* This is a new recharge well and before this intervention, water harvesting structures of the village-Khema Nadi, Mapudi Nadi, Mordi Nadi, Varnalia Nadi retained water for only five months. After the intervention, the people are supporting other villages as well.

## TABLE 5B: Sutharon ki Dhani, Barmer District, Rajasthan

<b>Name of the Village</b>	SUTHARON KI DHANI					
<b>Direct Beneficiaries</b>	<b>Households</b>	92	<b>Population</b>	725	<b>Livestock</b>	600
	<b>Before Intervention</b>			<b>After Intervention</b>		
<b>Water Harvesting Structure</b>	<b>Capacity (CuM)</b>	<b>Availability</b>		<b>Capacity (CuM)</b>	<b>Availability</b>	
Puniyo Ka Tala	-	-		8,000 litres per day	12 months*	
<b>Cost of the Project</b>						
<b>Name of the Structure</b>		<b>Total Cost</b>		<b>Community Contribution</b>		
Puniyo Ka Tala		INR 62,373		INR 18,712/-		
<b>Direct Impact of Project</b>						
<b>Variable</b>		<b>Before Intervention</b>		<b>After Intervention</b>		
<b>Money Spent in Buying Water*</b>		INR 10,000/- per annum per household		INR 3,000/- per annum per household		
<b>Time Saved by Women to fetch Water (in hours)</b>		-		5-6 hours per day		

\*In months of non-availability of water people either consume saline water or incur huge financial cost to purchase water.



## TABLE 6: Kalyanpur Village, Barmer District, Rajasthan

<b>Name of the Village</b>	<b>KALYANPUR</b>					
<b>Direct Beneficiaries</b>	<b>Households</b>	<b>864</b>	<b>Population</b>	<b>6,294</b>	<b>Livestock</b>	<b>11,000</b>
	<b>Before Intervention</b>			<b>After Intervention</b>		
<b>Water Harvesting Structure</b>	<b>Capacity (CuM)</b>	<b>Availability</b>		<b>Capacity (CuM)</b>	<b>Availability</b>	
Baglop Talab	2,034	6 months*		7,645	9 months	
Baglop Talab Beri**	40,000 litres/ day	8 months*		-	12 months	
<b>Cost of the Project</b>						
<b>Name of the Structure</b>		<b>Total Cost</b>		<b>Community Contribution</b>		
Baglop Talab		INR 168,330/-		INR 50,499/-		
<b>Direct Impact of the Project</b>						
<b>Variable</b>		<b>Before Intervention</b>		<b>After Intervention</b>		
<b>Money Spent in Buying Water*</b>		INR3,380/- per annum per household		INR2,220/- per annum per household		
<b>Time Saved by Women to fetch Water (in hours)</b>		-		2-3 hours per day		

\*In months of non-availability of water people either consume saline water or incur huge financial cost to purchase water.

\*\* This is a recharge well and before the intervention, potable water was available only for eight months. With the work on the talab, the water available in the well is for the whole year.



# PROFILES OF PARTNERS

## JAL BHAGIRATHI FOUNDATION

The Jal Bhagirathi Foundation (JBF) was established as a trust on 15 January 2002 in Rajasthan, India. Since then, JBF has been focusing on addressing the issue of water distress in Marwar region, located in the Thar Desert. With region-specific strategies, the Foundation is driven by a vision of water security, sustained by responsive governance and inclusive growth leading to sustainable development. It is involved in creating an enabling environment for the revival of traditional water harvesting systems through community institutions.

The focus is on developing adaptive strategies to climate change through capacity building of rural communities for the development and better management of ecological resources, especially water. By positioning its work and learning at a wider level for further replication, the JBF contributes towards strengthening pro-poor policies. Since inception, its work has directly benefited 300,000 people in nearly 220 villages. The Foundation has also started focusing on sanitation and hygiene as it plays a major role in the availability of safe water.

JBF's organisational structure is a unique amalgam of village-level volunteers and a professional resource base. It has also adopted international management standards of operations and has been awarded ISO 9001-2000 for its management systems and procedures.

<http://www.jalbhagirathi.org/>

## ITALIAN DEVELOPMENT COOPERATION

The work of the Italian Development Cooperation (IDC) in India is implemented under the framework of the Indo-Italian Cooperation Agreement signed by the two governments in February 1981. Since then, the Directorate General for Cooperation to Development, a division of the Ministry of External Affairs, has financed several projects in India. In 1999, the Italian parliament reiterated India's status as a Priority Country for Italian Cooperation in the Asia-Pacific region.

The programmes are executed through bilateral, multilateral and multi-bilateral channels (e.g. financial support to UN agencies like UNDP, UNIDO, WHO, UNODC, UNICEF, ILO). Besides these, funds of the Government of Italy are channeled directly to Italian non-government organisations (NGOs) working with local Indian counterparts. Furthermore, Italian Regions, Municipalities and Provinces have been sponsoring numerous development projects in India through a Decentralized Cooperation Mechanism. The most active ones in India are: the Region of Lombardy, the Municipality and the Province of Milan, the Autonomous Province of Trento and Bolzano, the Region of Sicily, Sardinia, Liguria and Tuscany. The Italian Development Cooperation's concern for the water situation in the world and its commitment towards more effective water management in the drought-struck regions of the globe is evident through the support to institutions such as the JBF for upscale of grassroots experiences into models of replication in developing countries.

<http://www.cooperazioneallosviluppo.esteri.it/pdgcs/inglese/intro.html>

## UNITED NATIONS DEVELOPMENT PROGRAMME

The United Nations Development Programme (UNDP) is the UN's global development network to help people meet their development needs and build a better life. It is on the ground in 166 countries, working as a trusted partner with governments, civil-society and the people to help them build their own solutions to global and national development challenges.

The UNDP in partnership with the JBF has initiated the project 'Vulnerability Reduction through Community Management and Control of Water in Marwar Region' that supports social mobilisation efforts and strengthens people's organisations for sustainable natural resource management. It also attempts to ensure women's empowerment and advocates community's rights over common property resources.

[www.undp.org.in](http://www.undp.org.in)









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