



DEPARTMENT OF DRINKING WATER AND SANITATION
MINISTRY OF JAL SHAKTI

unicef 
for every child

A study on domestic water security from the aspects of gender, social inequities and water management practices in Barmer and Jaisalmer districts of Rajasthan, India



2020



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2020



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The inter-connected concepts of Water Sanitation & Hygiene (WASH) are a critical aspect of human life and have a close connection to people's well-being, productivity and prosperity. Achieving universal, equitable, and affordable access to safe drinking water for all by 2030 requires a huge expansion in infrastructure and in sustainable water resources, specifically for the water-stressed regions of Rajasthan. Furthermore, providing functional tap water to every household in Rajasthan by 2024 is a huge task which is to be taken forward in mission mode. Currently only 12 of households there have tap connections.

This report is an effort to present evidence and information meant to assist in the development of an equity-focused, gender-transformative water security strategy, led by the Government of Rajasthan in line with the national flagship programme on water, the recently launched Jal Jeevan Mission. Implementation plans will be informed by the strategy so formulated and will have a special focus on western Rajasthan,

It was our pleasure to be part of this study. We would like to thank the Jaipur UNICEF Team for entrusting us with the great responsibility of conducting it.

We express our sincere gratitude to the Public Health Engineering Department at the state and district levels, the local administrations of Barmer and Jaisalmer for their insightful conversations on the status of the rural water supply, as well as the scope for enhancing water security and equity.

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Team CFID

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Abbreviations

ARWSP	Accelerated Rural Water Supply Programme
BCM	Billion Cubic Metre
BRC	Block Resource Centre
CAG	Comptroller and Auditor General
CAZRI	Central Arid Zone Research Institute
CGWB	Central Ground Water Board
CSR	Corporate Social Responsibility
DWACS	Drinking Water Advocacy and Communication Strategy
DWSM	District Water and Sanitation Mission
DWSP	District Water Security Plan
FGD	Focus Group Discussion
GoR	Government of Rajasthan
GLR	Ground Level Reservoir
GP	Gram Panchayat
IEC	Information, Education, and Communication
IGCP	Indira Gandhi Canal Project
IMIS	Integrated Management Information System
IWMI	International Water Management Institute
IWRM	Integrated Water Resource Management
JBF	Jal Bhagirathi Foundation
JJM	Jal Jeevan Mission
LPCD	Litre per Capita per Day
Mg/l	milligrams per liter
MGNREGS	Mahatma Gandhi National Rural Employment Guarantee Scheme

MLD	Millions of Litres Per Day
mm	millimeter
MJSA	Mukhyamantri Jal Swavlamban Yojana
MoWR	Ministry of Water Resources
NGO	Non-Governmental Organization
NRWDP	National Rural Drinking Water Programme
NWP	National Water Policy
PHED	Public Health Engineering Department
PRI	Panchayati Raj Institution
PWS	Piped Water Supply
RDWE	Rural Drinking Water Enterprise
SC	Scheduled Caste
ST	Schedule Tribe
SURE	Society for Upliftment of Rural Economy
SWP	State Water Policy
SWRPD	State Water Resources Planning Department
UNICEF	The United Nations Children's Fund
VWSC	Village Water and Sanitation Committee
WASMO	Water and Sanitation Management Organization
WHO	World Health Organization
WSSO	Water and Sanitation Support Organization
WUA	Water Users Association
WUG	Water Users Group
µS/cm	microSiemens/cm



1.1 Background

The **Jal Jeevan Mission (JJM)**, the national flagship programme of the Government of India (building on the National Rural Drinking Water Programme – NRDWP) envisions safe and adequate drinking water for all, at all times, in rural India. It aims to ensure that by 2022, at least 90 per cent of rural households are provided with piped water supply; at least 80 per cent of rural household have piped water supply with household connections, that less than 10 per cent use public taps and less than 10 per cent use hand-pumps or other safe and adequate private water sources.³ Both the State and Central Governments have laid emphasis in their manifestos on providing safe and adequate water to all communities by 2024. The recently christened ‘Jal Shakti’ Ministry in the newly elected central government is a step towards focusing once again on ‘nal se jal’ (household water connection for all) through the JJM by 2024.

1.2 Water supply and equity issues

Rajasthan has only 1.16 per cent of the total surface water available in India, though it covers more than 10.4 per cent of the country’s geographical area, supporting more than 5.5 per cent of the human population and 18.7 per cent of the livestock. Out of a total of 142 desert blocks in the country, 85 are in Rajasthan, resulting in

the aggravation of the water crisis there. The ground water condition is alarming due to over exploitation, with only 30 of the total 236 blocks in a safe category.⁴ The rainfall pattern is also erratic and traditional water harvesting structures are declining because there is no one to take ownership and there is a severe shortage of local water management institutions.

Barmer and Jaisalmer districts in western Rajasthan are characterized by low to very low rainfall and excessively high aridity due to high temperatures. These factors have an impact on safe water availability for domestic and productive purposes round the year. Apart from scarcity, these districts face major water quality issues. They receive water in bulk from the Indira Gandhi Canal (IGCP) for irrigation and domestic purposes. Barmer also receives water from the Narmada Canal and there are plans to provide more from the Pokhran–Falsoond–Balotra–Siwana (PFBS) Project.

Moreover, the region is characterized by a number of fringe habitations (known as “*dhani*”), populated sparsely and extending to a radius of 10 km or more. With limited resources at the grassroots level, techno-economic viability for setting up a water supply network in these areas is a major challenge. As noted earlier, fewer than 5 per cent of households in the two districts have tap connections. The water received by more than 80 per cent of the habitations in Barmer is quality affected. Only 8 per cent of the habitations

³ NRDWP Revised Guidelines 2013

⁴ State Water Policy 2010, State Water Resource Planning Department, Rajasthan

are fully covered under the 40 lpcd water supply standards. In Jaisalmer district, about 22 per cent of the habitations have access to 40 lpcd, whereas 70.1 per cent still receive less than 40 lpcd.

Thus, challenges in terms of provision and adequacy of water supply in the tail-end habitations continue to undermine social equity and water security in this region.

Apart from limitations on the supply side, the inherent social inequities, traditional gender biases and discrimination also create major barriers to the achievement of water security and better governance in this region. Water collection and management at the household level are still primarily the responsibility of women and girls. The result is that an unequal burden is placed on them, which in turn impacts their health as well as the opportunity costs in terms of employment and schooling. It must be noted, however, that women and girls are rarely represented or involved in decisions pertaining to water governance at the community level.

1.3 Rationale for study

The rationale for the study was the need to generate adequate evidence to inform the development of an equity-focused, gender-transformative water security strategy, which in turn can inform the implementation plans (with a special focus on western Rajasthan) led by the Government of Rajasthan in line with the JJM.

The findings of the study can be used:

- at the state level, to help guide policy directives and the programmatic framework for water governance; and
- at the District or Gram Panchayat level for strengthening operational measures and demand-side management.

More specifically, the findings will be useful in:

- **Advocacy for gender-sensitive and equity-focused transformative water security programmes:** At the State level, the study should be instrumental in developing recommendations for the development of equity and gender-based policy advocacy to address the last mile gap for equitable distribution within the drinking water supply network; focussing on reaching the marginalized within a habitation or a village or a gram panchayat; and in providing a way to initiate mainstreaming of gender-sensitive and equity-focused transformative programming for these difficult areas.
- **Strengthening programme delivery of JJM:** The outcome of the study, which was carried out in two districts, Jaisalmer and Barmer, should be the establishment of an inclusive water management programme based on equity and gender justice for communities residing in the desert and arid zones. The findings should help districts and Gram Panchayats (GPs) to formulate appropriate strategies and to implement plans.
- **Formulating capacity enhancement framework:** The study will assist in providing specific inputs for modules in the capacity development programmes for human resources. It will thus be of value to the WSSO, PHED and other stakeholders at state, district, block and panchayat levels, including social mobilizers, NGO members, and volunteers working on water management with a primary focus on domestic water security, inclusiveness and gender justice in the given communities.
- **SBCC strategy:** The study should provide critical inputs for Government functionaries at state and district levels for developing an effective behaviour change communication

strategy, including functional monitoring and review mechanisms for its effective roll out as a part of the Jal Jeevan Mission..

Scope of the study:

- To map and analyze inequity –gender, caste, tribal, geographic–in access, availability and adequacy of water for domestic purposes in relation to the formal government system, as well as informal community and/or household measures, such as traditional water harvesting systems. This study will also include an analysis of the existing private water markets prevalent in the area, the costs involved (including an analysis of who in the household pays them) the frequency of their interventions and footprint on the current ecosystem.
- To study prevailing practices, including community participatory mechanisms, regarding domestic water security including collection, storage, distribution, management (including O&M) as well as the roles of women, men, girls and boys. It will also examine roles within households, with specificity in respect of caste/ tribe/ geography. There will be a focus on households having members with disability and women–headed households.
- To compute and analyze socioeconomic costs (including opportunity cost) of domestic water security and its trade–offs, including opportunity cost of time, for women, men, girls and boys with specificity in respect of caste/ tribe/ geography/ disability in the area studied. This will include the impact on schooling and other opportunities and the rights of adolescents, especially girls, and a focus on women–headed households as those are usually the most disadvantaged in India.
- To map current barriers and enablers (knowledge, attitude, norms) around water access and management, as well as opportunities for community engagement (including community–based platforms and mediums) to inform a comprehensive SBCC strategy.





2

Approach and methodology

2.1 Qualitative research approach, secondary data, and field study

In this study we have used the qualitative research approach with the aim of gaining insights through discussions with community groups, stakeholder consultations and a review of secondary literature. Hence the emphasis of the study is on:

- a) Secondary data collection and analysis :
Study of government and non-government organization reports, MIS data, documents, journals, etc. to collect data and insights on water resources, distribution, design and planning processes, existing and planned water infrastructure, quality of ground water and other issues regarding surface water, as well as gender and social inequities in water management.
- b) Field study to get first-hand insights and to collect evidence through interactions with men, women, boys and girls in the community and other stakeholders like PRIs and water committees.
- c) Consultations with NGOs and relevant government departments at state, district and block levels (Total 11). A consultation meet was held in Jodhpur with 12 NGOs working in Rajasthan in October 2019. A list of people/organizations consulted during the study have been attached as Annexure 1.

Sampling frame:

A total of eight (8) gram panchayats across four (4) blocks in two (2) districts of Barmer and Jaisalmer were identified for the study based on consultations with various stakeholders. As the universe of the study was large and parameters of investigation were varied, 'Purposeful Stratified Sampling' was applied to get better insights on issues with limited samples.

Sampling of blocks:

The purpose of sampling was to capture dependence on various water sources, prevalent water management practices, water quality issues across social and gender lines. Two blocks in Barmer District (of a total of 17) and two blocks in Jaisalmer district (of a total of 3) were included in the study. Block sampling in each district was based on a combination of the following parameters:

- Located centrally or on the outskirts: one each in both districts
- Types of water sources (a major focus area): canal supply (Indira Gandhi Canal and Narmada Canal, ground water, ground water + traditional water resources)
- Water quality: issues like high fluoride and salinity; potable/ fewer water quality issues
- SC/ST population: two blocks in each district with a high proportion of SC/ST households

Sampling of gram panchayats and villages:

Stratified Random Sampling was adopted for selecting villages and habitations considering the following criteria:

- Dependence on water sources: external/ local, surface/ ground water
- Location in terms of regional rural water supply: tail-end, middle/near source
- Location of habitations: concentrated village, fringe habitations (dhanis) near the core village/ away from core village.
- Specific cases: Villages demonstrating traditional water harvesting structures, good water management practices, cluster water supply and management, villages with strong indigenous institutions, active role of women and/ or community in water planning and management were also studied.

Larger issues of water supply and management, PRI functioning, role of women in water governance, water quality issues, upkeep of local water resources, etc. were studied at gram panchayat level. However, detailed studies of specific issues of equity in water access were carried out at the habitation or village level; these issues included the role of men, women, girls and boys in water fetching and management; whether women and marginalized castes/classes had a say in water management within the village; and water quality and its impact on men/women, boys/girls at the point of use, etc.

Sampling of groups within village for focus group discussions:

Consultation with groups in each village was based on its socioeconomic profile, location of habitation, and perceived marginalization in terms of access to water.

The blocks and habitations for field study were identified after a thorough desk review and consultation with PHED and NGOs.

Table 1: List of gram panchayats covered under the study

	Gram Panchayat	Block	Villages
District: Jaisalmer			
1	Dedha	Sam	Dedha, Khaba, Khabia
2	Dangri	Sam	Dangi, Ramsar
3	Rasla	Sam	Lala
4	Mokla	Jaisalmer	Mokla, Bhadasar
District: Barmer			
1	Aakora	Chohtan	Aakora, Sanwlore
2	Ramzan ki Gafan	Chohtan	Ramzan ki Gafan, Arbi ki Gafan
3	Kharantiya	Sindhari	Kharantiya, Trishuliya
4	Ed Sindhari	Sindhari	Ed Sindhari, Dabhar Bhatiyani
5	Sanpa	Sindhari	Sanpa (mainly to study landless community)

Figure 1: Map showing study area



2.2 Study tools

Table 2: Tools used for the study

Tool	Purpose/ Key issues probed	Stakeholder	Number / Frequency	Participants
Consultative meet	<ul style="list-style-type: none"> Understanding existing situation, challenges, opportunities and best practices in water management Understanding gender roles and social inequities in access and control of drinking water resources and water assets 	NGOs	1	12 agencies
Transect walk	Understanding types of water sources, location, access, control mechanism; distribution mechanism, storage and point of use	Men and women community groups, men and women PRI members	8 GP/ villages	4–5 men; 4–5 women per walk
FGD and PRA exercises like resource mapping, seasonal chart, institutional ranking	<ul style="list-style-type: none"> Get information on water management and social issues, including gender, at village/ habitation level. Include issues of access, seasonal change, equity, quality of water; gender roles; socioeconomic trade-offs for water security, decision and control; barriers and enablers in relation to water security 	Men's and women's groups and PRI members	16 (8 men's groups + 8 women's groups)	4–10 persons per group

Tool	Purpose/ Key issues probed	Stakeholder	Number / Frequency	Participants
Photo story	To understand perception, role, priority, communication with boys and girls on drinking and domestic water related issues	Children (aged 8–14 years) divided into two distinct categories of boys and girls	16 (8 boys+ 8 girls separately)	5–10 per group
Key informant interviews (KII)	<ul style="list-style-type: none"> To understand the extent of coverage of water supply, method of water retrieval from and type of sources; quality issues To discuss Programmatic, Technical, and Managerial challenges in water supply and management; Enabling and disabling factors from a social and gender point of view, and Trend of change in water resources and management over decades; Formulate strategy for implementing Jal Jeevan Mission and identify roles of stakeholders overall, as also in ensuring gender and socially equitable distribution of drinking water 	Govt officers PRI members, research institutions, NGOs, CSR projects	11	1 per interaction
Life cycle story	To understand changes in water sources, method of fetching, access and control of sources, drudgery, quality of water, storage facilities and consumption patterns over a period of 30–50 years	Women of above 40 years	11	1 per interaction

A checklist and probing points for various tools used for field study are attached as Annexure 2.

DC (letter dated 13 December 2019 as part of a protocol for the protection of human subjects in the study. Letter of approval attached as Annexure 3.

2.3 Ethical research protocols

Research ethics approval has been obtained from the HML Review Board (IRB), Washington

Water in Rajasthan– Resources, policies, and management

This chapter is based on an analysis of secondary data/literature on the subject, and draws inferences on water resources, water policies and programmes, status of rural drinking water supply as well as the institutional structure for the rural water supply programme in Rajasthan. It also provides insights on good practices in terms of institutional structures for delivery mechanisms that have worked well in other states.

3.1 Water resources in Rajasthan

Two-thirds of Rajasthan is an arid/semi-arid area comprising the Great Thar Desert, and although it has one-tenth of the country's land area, over 5 per cent of population and nearly a fifth of the livestock, its share of India's surface and ground water resources remains under two per cent.⁵ The state is divided into 16 basins, out of which only two (Chambal & Mahi) have sufficient rainfall and yield. The surface water available within the state boundary is 25.38 BCM and the water allocated from various interstate treaties is 17.88 BCM. Distribution of district wise average rainfall in the state varies from a minimum of 158.0 mm in Jaisalmer to a maximum of 968.0 mm in Sirohi.⁶

The state is highly prone to droughts with the frequency of occurrence being once every 3 years in Jaisalmer and Barmer Districts. There

is a progressive increase in ground water draft due to increasing population, urbanization and industrialization. Out of 249 blocks, the draft in as many as 164 has exceeded the estimated levels required for them to remain replenishable resources. In nine blocks, the stage of development has reached a critical level and in another 28 blocks, it is semi critical (ground water resource estimation 2013;) leaving only 44 blocks in the safe category.⁷ As per the 2013 CGWB estimation, in Jaisalmer district, two blocks are below the over-exploited stage and one is in the safe category. In Barmer district, of a total eight blocks, five fall under the "over-exploited", category, two under "critical" (Sindri and Chauhtan) and only one under "safe" (Barmer block).

As per the Rajasthan State Water Policy, the availability of water from all sources has come down to under 780 cum per person per year and is estimated to reach 450 cum by the year 2050. According to internationally accepted norms, this situation is considered as absolute water scarcity. As per the Ground Water Year Book of Rajasthan (2016–17) by the Central Ground Water Board, Electrical conductivity in ground water ranges from 190–26900 S/cm. Higher values (above permissible limits) are seen in Barmer, Jaisalmer, Churu, Nagaur, Jalor, Jodhpur and Bharatpur districts. The occurrence of high fluoride in the ground water in Rajasthan is a great concern with

⁵ Executive Summary of Vyas Committee Report in Integrated Water Resources Development in Rajasthan, Department of Water Resource, Government of Rajasthan (<http://water.rajasthan.gov.in>)

⁶ Department of Water Resource, Government of Rajasthan (<http://water.rajasthan.gov.in>)

⁷ Ground Water Year Book 2016–17, Central Ground Water Board, Ministry of Water Resources, River Development & Ganga Rejuvenation, Government of India

some pockets in Barmer and Jaisalmer district having fluoride content above the permissible limit of 1.5 mg/L. High nitrate concentrations have also been observed in the ground water at several other places. Barmer, Churu, Jalore, Nagaur, Jodhpur, Sikar, and Sirohi Districts are worst affected by nitrate concentration with more than 50 per cent of the samples tested having values beyond the permissible limit of 45 mg/L. Jaisalmer, Rajsamand & Karauli Districts also showed nitrate contamination in 40 to 50 per cent of the samples tested.

The Vyas Committee Report, 2005 on Integrated Water Resources Development in Rajasthan reveals that a disproportionate reliance on groundwater adds to the problems of water availability, especially in drought years. Similarly, heavy reliance on 'imported' water from neighbouring states adds to the uncertainty. Inefficiency in storage measures and conveyance aggravates an already difficult situation. The report also mentions inequitable access to water across different user groups, economic strata, and regions.

The Rajasthan State Action Plan on Climate Change, 2010 prepared by The Energy and Resource Institute (TERI) for the Government of Rajasthan highlights the critical situation of water resources in the state and how climate change will act as an additional stressor. Climate projections indicate a decrease in rainfall in the future which will further limit the recharge of ground water resources while the extraction is already on the rise. This situation can have serious implications for the quality of groundwater and consequently the health of the people living in the area. It is projected that the occurrence of drought in the state will increase and lead to acute water stress conditions for River Luni along with the

west-flowing rivers of Kutch and Saurashtra.

Though most parts of Rajasthan receive scanty rainfall, the state has a history of floods and inundations, mostly along the basins of rivers like the Luni and Chambal. The areas that get flooded include major parts of the basins and sub-basins of River Luni in Barmer, Pali, Sirohi and Jalore; and the basins and sub-basins of River Chambal in Baran, Kota and Bundi districts. Barmer district experienced flash floods in 2006.⁸ In 2017, the Sheo – Kawas and Dhirmanna – Gudamalani belt of Barmer district received 245 mm rainfall in the last week of July which caused flood-like conditions in many parts of the district. At the same time, the state government had to declare 1,900 out of 2,775 villages of the district as drought affected.⁹ Climate change is only going to increase such incidents.

According to a report on the impact of rising temperatures in the arid region of Rajasthan by the Central Arid Zone Research Institute (CAZRI) water resources will be impacted as follows¹⁰:

- ▶ 1 per cent rise in temperature will increase evapotranspiration by 35 mm to 96 mm. The outcome will be an additional requirement of 1.57 lakh MLD water per annum to feed irrigated land.
- ▶ Rajasthan at present has 595 ground water zones of which 268 zones are under the categories of grey and dark zones where more than 65 per cent of the water has been utilized.

Thus, three main factors place Rajasthan in a precarious situation: a) frequency of droughts b) extremely low and erratic rainfall; and c) very limited surface water sources, like perennial river basins, resulting in greater dependence on

⁸ State Disaster Management Plan 2014, Disaster Management & Relief Department, Jaipur, Rajasthan

⁹ <https://www.firstpost.com/india/drought-in-rajasthan-poor-groundwater-situation-erratic-rains-in-barmer-indicate-ecological-distress-across-thar-desert-6306931.html>

¹⁰ <https://timesofindia.indiatimes.com/city/jaipur/western-raj-faces-climate-change-perils-report/articleshow/69656801.cms> (June 5, 2019)

groundwater. Anthropogenic factors like low water use efficiency, along with water pollution further worsen the situation. Climate change will impinge on all these factors resulting in multiple stressors on the limited and scarce water resources of the state.

3.2 Traditional water harvesting

Historically, across the drylands of Rajasthan, communities developed a deep understanding about water and its management. There is thus a rich tradition of water harvesting structures to capture run-off from sporadic rainfall during monsoon, storing it on the surface and underground for year-round availability. The structures include surface water systems like talabs including large lakes (sagar and naada) and small ponds (naadi) as well as ground water access and recharge systems like wells, tanka, kunds, baoris, johads. Recently the tanka (or underground cistern) has become a major source of drinking water in western Rajasthan capturing surface run-off rainwater or a storage unit at the household and community levels. Just a few decades earlier, water harvesting, distribution, and its use were well regulated by the community, but with introduction of piped water supply, gradually these water sources got neglected and were abandoned.

Heavy sedimentation, high evaporative and seepage losses and water pollution are some factors affecting naadis. Poor maintenance systems have also resulted in high pollution levels and the presence of guinea worms, water hyacinth, mosses and algae in many places.¹¹ The traditional wisdom of water harvesting was steadily discarded and community action for maintenance of these structures almost

Figure 1: Kuis/ small wells



Figure 1: Surface rain water harvesting system



Figure 1: Naadi/village pond



stopped. Now, these natural and constructed water harvesting structures are categorized as unimproved source of water, which may not be suitable for domestic consumption directly.

¹¹ Dhruv Saxena, Water Conservation: Traditional Rain Water Harvesting Systems in Rajasthan, *International Journal of Engineering Trends and Technology (IJETT)* – Volume 52 No. 2 October 2017

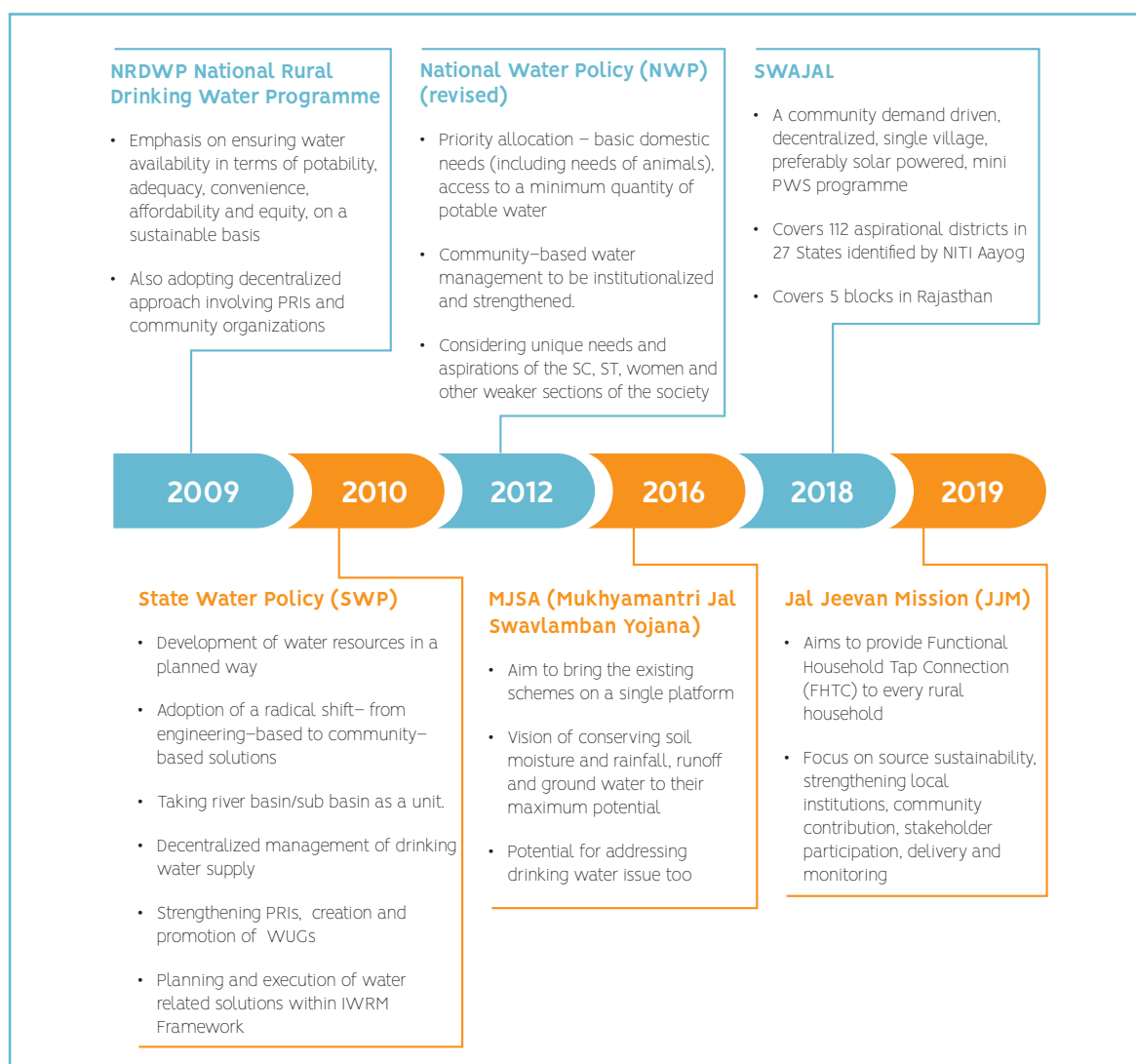
In the past decade various government programs have been undertaken for the revival of traditional water harvesting systems in Rajasthan. Works done under the Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA) and Mukhyamantri Jal Swavlamban Abhiyan (MJSA) by the Government of Rajasthan, have shown good results in terms of water conservation, harvesting and recharge.¹² Based on reports of improvement in ground water levels and increase in availability of water for agriculture (irrigation), the district administration of Jaisalmer has

approved funds for developing 141 ancient ponds and Barmer administration has identified 1000 water bodies for revival and conservation.¹³

3.3 Water policies and rural water supply programmes in Rajasthan

Since independence there have been many policies, both at the state and national levels, addressing drinking and domestic water needs. Some of them have been chronicled below:

Figure 5: Glance on Water Policies and Rural Water Supply Projects in Rajasthan



¹² <http://mowr.gov.in/sites/default/files/Best-Practices-MJSA-Rajasthan.pdf>, https://nrega.nic.in/netnrega/Data/JSA_sucsessstory/Mukhyamantri-Jal-Swavlamban-Abhiyan-Impact-Assessment-Booklet.pdf

¹³ As per the article : A lease of Life for Old Water Sources in Jaisalmer and Barmer, 22 May 2019, Times of India (<https://timesofindia.indiatimes.com/city/jaipur/a-lease-of-life-for-old-water-sources-in-jaisalmer-barmer/articleshow/69435684.cms>)

National Water Policy was the first Indian National Water Policy (NWP), adopted in 1987 by the Ministry of Water Resources (MoWR). Since then, the Indian NWP has been revised twice, in 2002 and then in 2012.

State Water Policy, Rajasthan¹⁴

The Government of Rajasthan adopted a State Water Policy (SWP) in 2010 with the aim of developing water resources in a planned way, adopting a radical shift from predominantly engineering solutions to community-based water management solutions. The policy was to adopt an integrated and multisectoral approach to water resources planning, development and management on a sustainable basis, taking the river basin/sub-basin as a unit.

National Rural Drinking Water Programme¹⁵

In 2009, the Accelerated Rural Water Supply Programme (ARWSP) was modified into the NRDWP. The 12th Five Year plan priority of piped water supply, increasing household tap connections, and raising drinking water supply norms from 40 lpcd to 55 lpcd had to be incorporated. Drinking water infrastructure is mainly created under NRWDP.

Mukhyamantri Jal Swavlamban Abhiyan (MJSA)

MJSA was initiated by the Government of Rajasthan in January 2016 with an objective of making villages self-sufficient in water through the implementation of water conservation and harvesting related activities in rural areas. For achieving the objective of MJSA, various works for construction of water conservation structures were implemented through people's participation

by motivating community members as well as active engagement of various Government line departments and District Administration.¹⁶

Swajal¹⁷

In 2018, the Ministry of Drinking Water and Sanitation launched Swajal, a community demand driven, decentralized, single village, preferably solar powered, mini PWS programme for the 112 aspirational districts in 27 States identified by NITI Aayog India. These districts have a low coverage of habitations with piped water supply as compared to the national coverage.

Jal Jeevan Mission (JJM)¹⁸

In 2019, the Government of India restructured and subsumed the ongoing NRDWP under the JJM to provide a Functional Household Tap Connection (FHTC) with the capacity of 55 lpcd, to every rural household by 2024, i.e., Har Ghar Nal Se Jal .

Other programmes that have contributed to water management and governance in the State are mentioned below:

Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS)

Various works related to water conservation and drinking water security have been taken up under this national scheme in Rajasthan. One of the most significant contributions of this scheme in addressing domestic water security in the western part of the state, is the construction of household and community tankas. Some 1.5 lac tankas were constructed under MGNREGS (between 2007 and 2018) in Barmer District alone. The scheme is operational in all 33 districts covering 9894 Gram Panchayats in 295 blocks

¹⁴ Feb 2010, State Water Policy, State Water Resource Planning Department, Jaipur, Rajasthan.

¹⁵ 2013 (updated), National Rural Drinking Water Programme, Rajiv Gandhi Drinking Water Mission, Ministry of Drinking Water and Sanitation, Government of India

¹⁶ May 2019, Issue -10, Jalansh, monthly newsletter of Central Water Commission (<http://cwc.gov.in/sites/default/files/cwc-nl-may-2019-eng-1.pdf>)

¹⁷ <https://nrdwpgov.in/content/swajal>

¹⁸ <https://ejalshakti.gov.in>

in Rajasthan. The outcome has been a huge reduction of the drudgery of carrying water over long distances and of social discrimination in access to water sources. There has been very significant enhancement of water security at the household level.

Various other programs have been undertaken related to drinking water under the Border Area Development Programme (BADP) and State Finance Commission, specifically in Barmer and Jaisalmer blocks. Civil society organizations (CSOs) have also contributed to the improvement of water management. They include:

- a. Marudhar Mein Jal Swavlamban– ensuring Water Security and Combating Desertification in Western Rajasthan supported by the European Commission (April 2018 – March 2023) – The aim is to address water security in the Thar Desert region of western Rajasthan through enhanced community action, with the participation of women's groups (Jal Saheli Group) and PRIs. The project plans to cover 150 villages in Sindri and Patodi block and 750 villages of 10 districts – Jodhpur, Barmer, Jaisalmer, Pali, Jalor, Bikaner, Nagor, Churu, Sikar and Jhunjhunu. The project is implemented by an NGO named Unnati , Organization for Development Education.¹⁹
- b. Jeevan Amrit Project is an initiative to provide safe drinking to the community In Barmer, implemented by Cairn India. The project was initiated in 2015 and will run through March 2022 . The vision is to ensure access to safe drinking water within a 1 km of distance from homes in Barmer. It is planned to provide safe drinking water to 1.1 million people living in 800 villages. The plan is to establish 330

small distributed RO plants (500 to 3000 liter per hour), connected to government water sourced, in Barmer district.²⁰

- c. Gramya Vikas Vigyan Samiti (GRAVIS) has implemented various water security programs in the Thar Desert region covering Barmer and Jaisalmer districts. Programmes promote more traditional methods of water security including *tankas*, *naadis*, and *beris* with extensive community participation. Up till now GRAVIS has built 6,635 *tankas*; 588 *beris*, and desilted 263 *naadis*, supporting 801,140 families in Rajasthan.²¹
- d. Society to Uplift Rural Economy (SURE) an NGO–based in Barmer has through various programmes supported the revival of traditional water harvesting structures for drinking and agriculture purpose, mainly in Barmer and Jaisalmer districts, providing water security to more than 2 lakh families.²²

At this stage it will be useful to examine major government policies and programmes related to water in Rajasthan through the lenses of gender discrimination, social inequities and water management practices with the aim of identifying the interfaces, provisions and enabling framework they provide for future planning, execution and operations. The analysis of programme guidelines in the context of the objectives of this study leads us to the following observations: (They are listed in table form in Table 3)

- Not all programme guidelines address the concerns of social inequities, gender and water management issues effectively.
- JJM 2019, which is the logical extension of NWDRP 2009 addresses gender concerns, social inequities and water management

¹⁹ <http://www.unnati.org/current-eu-projects.html>

²⁰ <https://csr Rajasthan.gov.in/project/jeevan-amrit-project-an-initiative-to-provide-safe-drinking-water-to-the-community-in-barmer-rajasthan.html>

²¹ <https://www.gravis.org.in/>

²² www.sure.org.in

practices in a more comprehensive and sustainable manner than any other policy or programme. While the NWP has elements of ‘gender sensitivity’, the SWP is completely blind to gender needs. However, none of the policies and programmes can lead to ‘gender-transformative governance’, although JJM has the potential for initiating it by its provision of 50 per cent representation for women in VWSCs.

- The NWP acknowledges broad inequities in terms of the urban–rural and poor–rich divides, but does not break down the analysis further in terms of marginalization and disfranchisement of communities in the context to water. Swajal treats

the community as a homogenous block to buy–in participation and does not acknowledge the inequities and disparities within a community or among communities together.

- Water resource management (WRM) practices have been given due importance in planning and design of the projects in NWDRP and JJM to ensure sustainability. Conservation has also been emphasized in national and state water policies and programmes like MJSA and Swajal. However, these points cover the broader issue of awareness and the principles of conservation rather than any specific practices at the community or administrative level.

Table 3: Summary of government policies and programmes on water with respect to gender, equity and WRM

	Gender	Equity	WRM
State Water Policy	Gender-neutral – Uses several generic terms, i.e., community, farmers, water users, etc. but no mention of gender or needs of women	Acknowledgement of inequities – Identifies issues of inequity based on differences in rainfall, urban– rural and rich poor divides; sense of ownership through WUGs with NGOs; water tariff–affordability to be considered	Water conservation – Awareness and use of water saving technologies; prevention of leakage; water metering; higher tariff for high water use
National Water Policy	Gender-sensitive – Acknowledges and considers gender needs and aspirations	Inclusion and equity – Acknowledges needs of marginalized and weaker sections; Promotes equitable access to water for all, fair pricing, provision of differential pricing (equitable access)	Participatory – Involvement of local governing bodies and Water Users Associations in planning process Conservation – Pricing of water to ensure its efficient use and rewards for such use

	Gender	Equity	WRM
NRDWP	<p>Gender-transformative– Women involvement in decision-making and planning, constitution of GP/VWSC with at least 50% women members; 30% women in technicians’ team for hand pump repairs; role of women’s groups in monitoring and work completion certification</p> <p>Gender-sensitive and responsive – IEC to include gender-specific issues</p>	<p>Sensitization and awareness generation– IEC on equity issues</p>	<p>Sustainability and conjunctive use– Contingency planning for safe drinking water even in distress periods; through conjunctive use of groundwater, surface water and roof– water harvesting</p> <p>Participative process – Participative planning and implementation of water resource management practices recognized as critical issues</p> <p>Promotion of right practices IEC campaign to inform, educate and persuade people to realize their roles and responsibilities, and benefits accruing from investing in right practices.</p>
MJSA	<p>Gender-blind –No direct mention of gender issues</p>	<p>Promotes people’s participation– No direct measures to address social inequities except formation of village committee, representational in nature</p>	<p>Source sustainability and conjunctive use of water Provisions for convergence of schemes, water harvesting, village self-sufficiency in terms of water</p>
SWAJAL	<p>Gender-blind/ Takes community as whole block (generic)– No special reference to gender and inequities.</p>	<p>Social inequities and vulnerabilities not addressed– Takes community the unit for participation</p>	<p>Rules of implementation include safe blocks, ground water use with pump and sensors</p>

	Gender	Equity	WRM
JJM	<p>Gender-sensitive and responsive—Main objective to reduce drudgery by providing safe drinking water at HH level; active participation of women at all levels ; gender needs discussed in DPR</p> <p>(gender-transformative) 50% Women members of VWSC; developing women entrepreneurs and SHG led enterprises; training 5 women for surveillance; output indicators address gender concerns</p>	<p>Equity ensured – 25% representation of SC/ ST and weaker sections; DPR mentions impact of project on weaker sections VWSC to undertake social audit</p>	<p>Integrated approach – Focus on demand and supply side management of water at the local level; creation of local infrastructure for source sustainability like rainwater harvesting, groundwater recharge and management of household waste water for reuse in convergence with other government programmes/ schemes.</p> <p>Participatory process – GP/ VWSC/ Paani Samiti to implement the in-village piped water supply infrastructure and related source development</p>

3.4 Status of rural drinking water supply in Rajasthan

The State’s water resources can be categorized in the following terms²⁴:

- Surface water: stream flows generated from within Rajasthan boundaries;
- Imported surface water: delivered by pipelines or canals to Rajasthan from other states by means of several projects under relevant inter-state agreements;

Groundwater: in terms of dynamic and static availability (fresh as well as saline)

Some of the major projects include Indira Gandhi Canal Project (IGCP), Barmer Lift Water Supply Project, Narmada Canal Project, Pokhran–Falsund– Balotra–Siwana Lift Project, Ummed Sagar–Dhawa–Khadap–Samdari water scheme²⁵

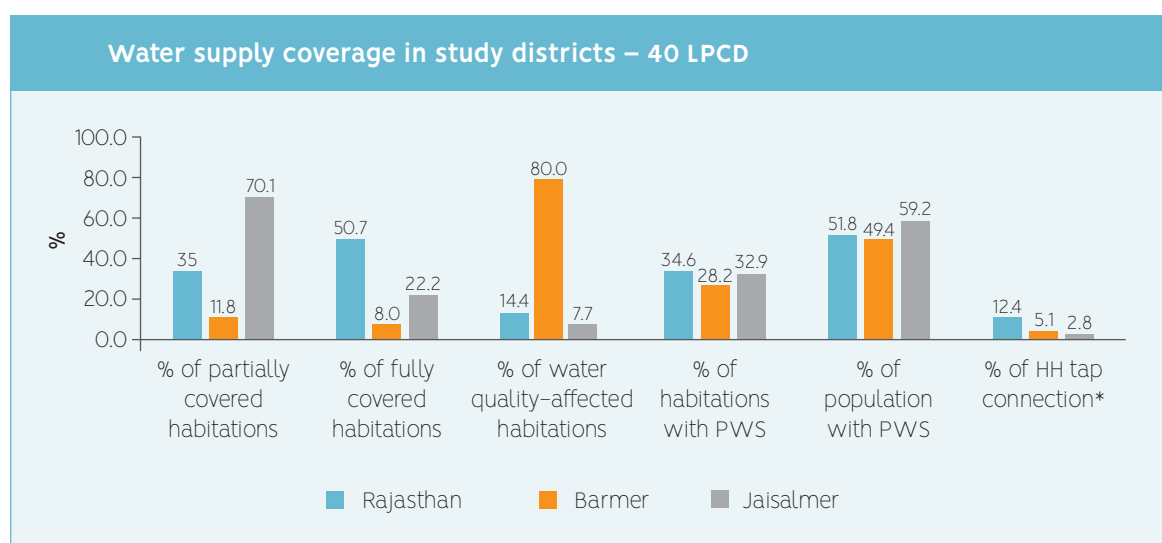
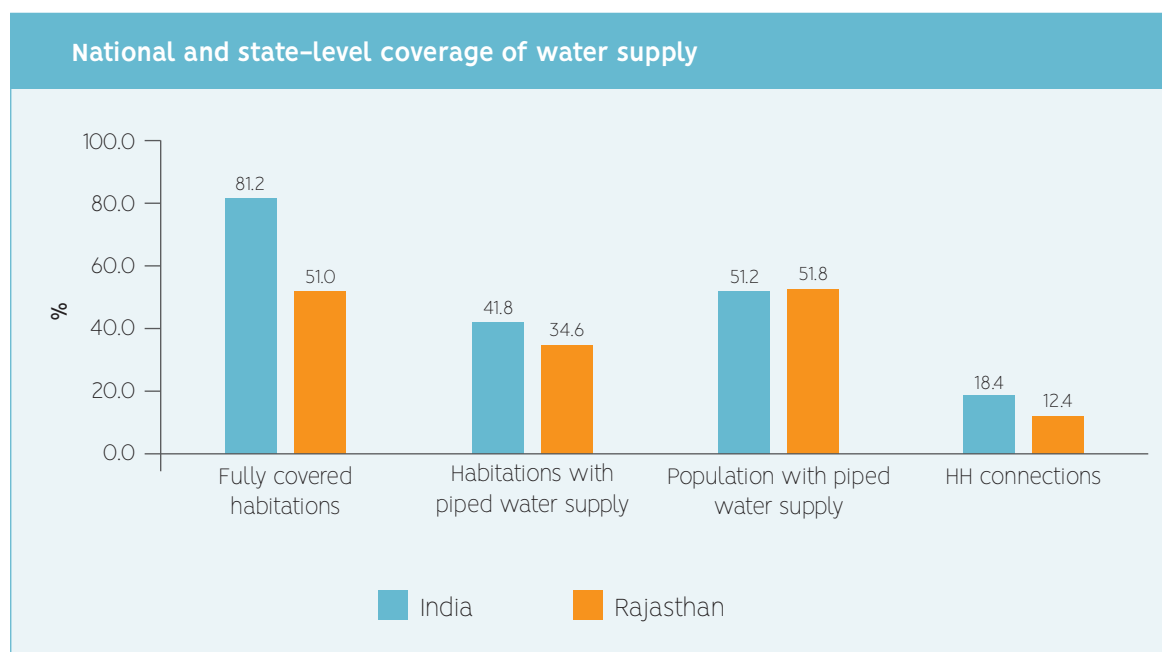
3.4.1 IMIS data habitation coverage

As per the IMIS report (1 April 2019), National Rural Drinking Water Programme, Ministry of Drinking Water and Sanitation, Ministry of Jalshakti (now Jal Jeevan Mission) 17.47 of habitations in Barmer and 25.18 in Jaisalmer are

²⁴ Integrated State Water Resource Plan, 2014

²⁵ <https://www.firstpost.com/india/drought-in-rajasthan-over-rs-7000-crore-spent-on-projects-but-not-much-water-has-flown-through-western-region-6331911.html>

Figure 7: National and State-level Coverage of Habitations for Water Supply (Source: IMIS–NRWDP)

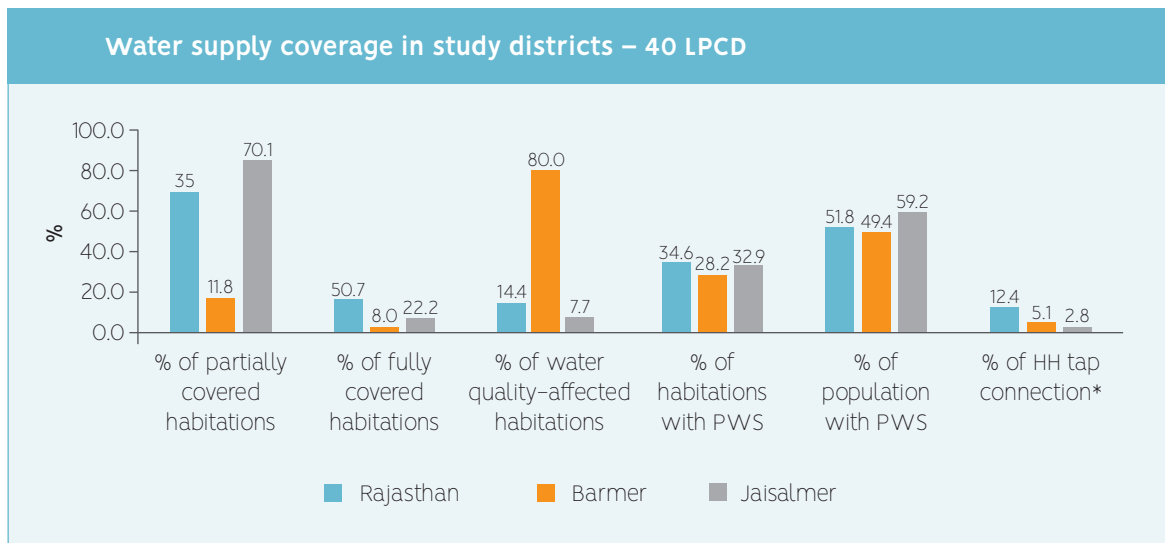


covered under piped water supply based on groundwater, while the coverage under surface water piped supply is only 0.31 of habitations in Barmer and 1.15 in Jaisalmer. However, the coverage of surface water-based schemes may go up with many infrastructure projects lined up for this area. (Refer to Annexure 5)

Rajasthan is far below the national coverage with 51 fully covered habitations, 34.6 habitations

with piped supply and merely 12.4 household tap water connections. (Refer to Figure 7). Further, compared to other parts of the state, Barmer and Jaisalmer districts lag far behind. In Barmer District, only 8 of habitations are fully covered under 40 lpcd, 28.1 of habitations have access to piped water supply covering 49.4 of the population. Only 5 of households have a water tap connection. The scenario in Jaisalmer is comparatively better

Figure 8: Water supply coverage in study districts as per 55 LPCD (as per IMIS)



due to the supply of water from the Indira Gandhi Canal. Here, about 22 of habitations have access to 40 lpcd, while 70.1 habitations still receive less than 40 lpcd. Piped water is supplied to 32.97 habitations covering about 59 of the population. However, household tap connectivity is only 2.8. (Refer to Figure 6)

Thus, Barmer remains amongst the most challenging districts to be covered under JJM for ‘Functional Household Tap’ connectivity. Considering only 16.2 of habitations in Rajasthan are fully covered and merely 2.8 in Barmer and 7.1 in Jaisalmer (Refer to Figure 8), the task of achieving the 55 lpcd target in the near future seems an uphill one.

If we consider coverage in SC/ST or minority habitations, there is no major pattern of inequitable coverage or distribution as per IMIS data.

Field studies reveal that even if there is habitation coverage/HH connections, the major concern is inadequate or irregular water availability due to

various issues. The reasons for the inadequacy and irregularity are seasonality; technical issues like lack of pressure and inadequate pumping in undulating areas and places on a higher terrain; damaged pipes, water theft, etc. Of course, there is inequity in water availability due to various socioeconomic parameters also, details of which are covered in Chapter 4.

Water quality and treatment

Fluoride, nitrate and salinity are major quality issues in the water sources of Rajasthan affecting approximately 15 of total habitations in the state, 80 in Barmer district and 8 in Jaisalmer district. (Refer to Figure 6).

In Barmer district, while certain pockets have a high fluoride content, high nitrate and salinity are also major issues. Fluoride is a major concern in Jaisalmer with about 7.74 sources containing fluoride above permissible limits. Salinity and nitrate are also major concerns in the region. (Refer to Table 4)

Figure 9: Water supply coverage in SC/ST, minority habitations as per 40 LPCD (as per IMIS)

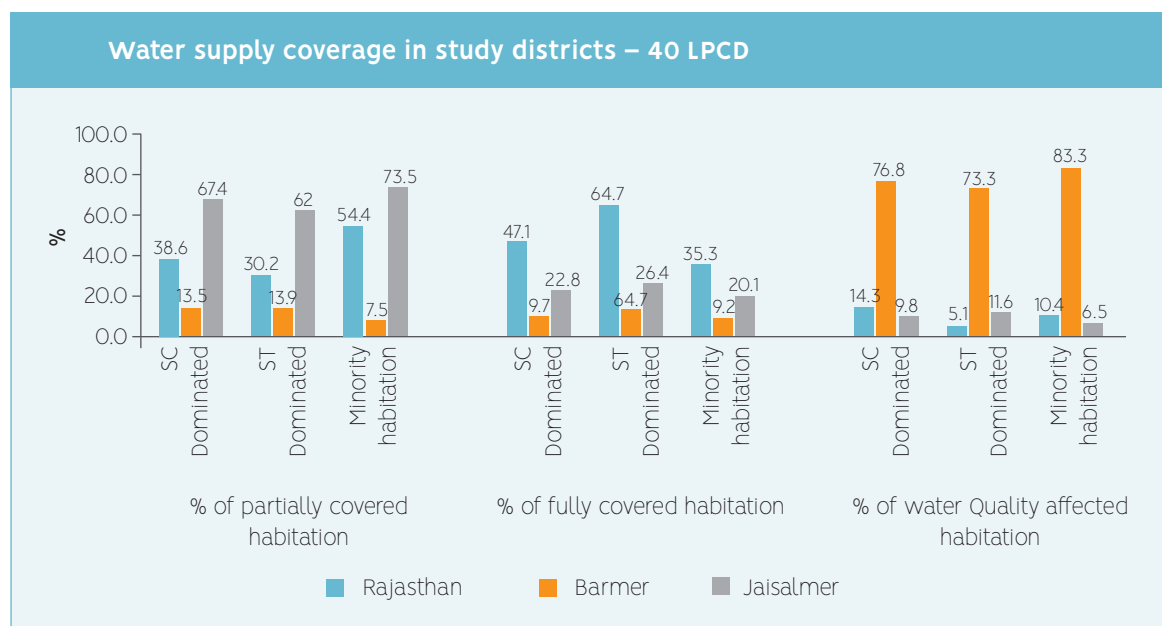


Table 4: Water quality test status in study blocks (as per IMIS)

Water Quality Testing 2018–19								
	No. of sources as of 6 October 2019	No of public taps as of 6 October 2019	% of Sources found contaminated (above IS – 10500 Permissible limit)					
			Arsenic (As)	Fluoride (Fl)	Nitrate (NO ₃)	Salinity (TDS)	Iron (Fe)	Bacteriological
Rajasthan	12,83,480	72,264	0	144	1.70	1.23	0.00	0.03
Barmer	40,208	5,380	0	2.16	5.35	5.86	0.00	0.00
Jaisalmer	21,253	2,175	0	7.74	2.70	4.16	0.00	0.00

Source: https://ejalshakti.gov.in/IMISReports/Reports/TargetAchievement/rpt_WQM_WaterQualityTestingInLabs_D.aspx?Rep=O&RP=Y&APP=IMIS

Interaction with PRI members indicated that they were aware of water testing being done at local sources by PHED, however the results were not known to them.

Various government or CSR/NGO managed defluoridation/RO plants in Jaisalmer and RO

plants in Barmer districts have been established as per record of the IMIS. However, field studies corroborated the findings of CAG (March 2017) that many of the RO plants were not in use due to issues in operation and maintenance, and selection of location.

Table 5: Water treatment system coverage in Rajasthan (as per IMIS)

	Reverse osmosis (RO)	Adsorption	Solar electrolytic defluoridation	Ion exchange	Nano technology	Electric defluoridation plant	No. of habitations	Population in these habitations
Rajasthan	1,534	0	1,647	0	1	3	2,732	27,86,420
Barmer	1,534	0	1,647	0	1	3	2,732	27,86,420
Jaisalmer	3	0	106	0	0	0	107	18,315

Note: Number of Schemes have been taken from sanction year 2014–2015 onwards.

Source: (B–24format) https://ejalshakti.gov.in/IMISReports/Reports/BasicInformation/rpt_RWS_CommunityWaterPurificationPlant_S.aspx?Rep=O&RP=Y

3.4.2 NSSO report data

Sources of drinking water and adequacy

Following critical insights about Rajasthan and comparison with the national average regarding dependence on water sources, adequacy of the supply can be inferred from the data obtained from the National Sample Survey (NSS) 76th round (December 2018).

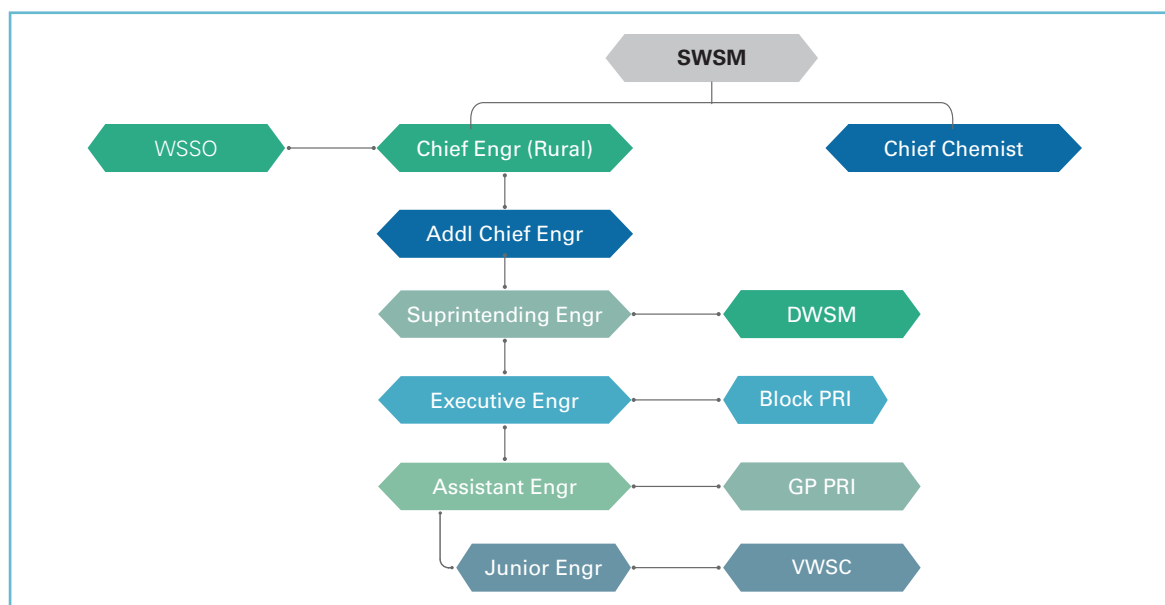
- In Rajasthan, about 30 HHs have access to piped supply, within the dwelling, yard/plot or through a neighbor; only about 7.5 have a higher than national average access.
- About 12 HHs fetch water from public tap/stand post, which is nearly similar to the national average.
- 3.5 HHs collect rainwater for drinking purpose in Rajasthan, which is much higher compared to the all India scenario of 0.2.
- About 2.6 HHs in Rajasthan are dependent on private tanker supply, which is also much higher compared to the all India figure of 0.4.
- Ground water remains a major source of drinking water in rural areas of Rajasthan with 46.1 HHs depending on tube wells, handpumps and open wells (dug wells). However, adequacy of these sources is moderate.
- 3.3 HHs depend on surface water, which is much higher than the national average of 0.7. However, adequacy of water from these sources seems better in Rajasthan.
- About 57 HHs do not have any supplementary source for drinking water.
- For 24.5 HHs, drinking water availability from principal sources like harvested rain water, surface water and even piped supply and public taps (stand posts) is insufficient throughout the year.
- Dependence on other sources (cart with tank/drum, donkey carts, motorized vehicles, etc.) is about 2 which is higher than the national average of 0.2 (Refer to Annexure 4 for data table)

3.5 Institutional set up for rural water supply and management in Rajasthan

As there are various programmes run by different departments, focusing on particular aspects of

water management for rural areas in Rajasthan, it is difficult to determine a single common institutional mechanism or management structure for rural water management. However, it is clear that PHED plays a major role in water supply and quality in rural areas.

Figure 10: Institutional set up for rural water supply in Rajasthan



The major institutions involved in water management are listed here, along with a note on their role and functions:

a) The State Water Resources Planning Department (SWRPD)²⁶

SWRPD was created to achieve an integrated and multisectoral approach to the planning, development and use of the state's water resources. It is the nodal agency entrusted with the task of state-wide planning for water resources and assisting in the development of water and water related policies and a state-wide water related awareness building programme framework. SWRPD is the pivotal agency in the water resources sector of the state.

SWRPD objectives

- ▶ Develop methodology for achieving SWP objective
- ▶ Integrated planning and implementation of surface and ground water development
- ▶ Sustainable development of water resources in the basins and sub basins in state
- ▶ Judicious allocation of water to stakeholders
- ▶ Encourage water conservation and water use efficiency practices
- ▶ Promote water regulations and water pricing structures
- ▶ Facilitate public participation and NGO initiatives

²⁶ <http://water.rajasthan.gov.in/content/water/en/swrpdepartment/aboutus.html>

b) PHED and Water Sanitation Mission

The state-level Water Sanitation Mission (SWSM) is responsible for rolling out JJM in Rajasthan. It has two core committees– i) Apex committee, chaired by the Chief Secretary and ii) Executive committee, chaired by the Principal Secretary, PHED.

There are seven Chief Engineers and eleven Additional Chief Engineers in PHED looking for different functions and different geographies

For Rural water supply, PHED is the nodal agency and the Chief Engineer (Rural) is the competent authority. The Chief Chemist heads the quality testing and reporting of water supply and is assisted by several officers at the district level. The Superintending Engineer coordinates with the District Water Sanitation Mission, the Executive Engineer and Assistant Engineer coordinate with Block-level PRI and GP-level PRI respectively. The Junior Engineer is supposed to work with VWSC, but at present VWSCs are not active.

c) WSSO

The Water and Sanitation Support Organization (WSSO) was formed at the State level in June 2009 for support activities required for implementation of NRDWP. As per NRDWP, WSSO is mandated to deal with the software aspect of rural water supply, to assist PRIs by acting as a facilitating agency between PHED and community organizations, to carry out communication and capacity development of various stakeholders, monitoring and evaluation of water quality, information, education and communication (IEC) and HRD, as well as research and development.

d) NGOs

Though there are many NGOs working for water management in Barmer and Jaisalmer, most

of them are of the view that there is a lack of effective partnership and coordination between them and the government and administration, which prevents the situation from being impacted on a large scale. However, some efforts have been made to involve CSRs and Trusts in a few projects like the installation and maintenance of RO plants on the PPP model.

e) Programmes of other departments

It was observed that different schemes and programmes have their own institutional mechanisms and end up working in silos and in a piecemeal fashion, rather than addressing the holistic water needs of communities. In the absence of an overarching framework of water governance, it becomes difficult to place accountability and ensure domestic water security at the GP or habitation level. With the implementation of JJM, it is expected that a lot of these operational and management issues will be ironed out and emphasis laid on improved service delivery. However, looking at the staggering complexities in the operation and management of water supply, quality issues, deterioration of water sources, geographical challenges, and gender and equity issues, the development of a mechanism for bringing about necessary change would require sustained and prolonged effort by both the government and the communities.

However, in the absence of an overarching common goal of water security, and a coordination mechanism, along with a clear road map and accountability, the best of plans outlined in the programme do not automatically get translated into reality. Hence assessing a programme on both process and performance indicators, becomes extremely important.

CAG report on institutional mechanism

The audit report of the Comptroller and Auditor General (CAG) of India in 2017 on institutional mechanisms and structure for rural drinking water in Rajasthan (NRDWP) makes the following points:

- ▶ The State Water Policy could not get translated into actionable goals and targets in the absence of long term comprehensive/perspective plans and water security plans for the village and district levels.
- ▶ Lack of a clear action plan, coordination and monitoring by the State Water and Sanitation Mission (SWSM)
- ▶ District Water and Sanitation Mission (DWSM) was not established in any of the districts of the State.

Community participation in the preparation of the annual action plan (AAP), as envisaged in the guidelines was not achieved in the absence of functional Village Water Sanitation Committees (VWSCs), Block Resource Centres and DWSMs. Suggestions/proposals of elected public representatives were also not obtained during preparation of AAPs.

3.6 Service delivery models (SDMs) for rural water supply – good practices from other states

To understand effective institutional structures and SDMs, it is essential to draw from the experiences of different states that have implemented different SDMs for water supply and management. A brief overview of a few such

models has been presented here. Apart from the government's Swajaldhara model, several other SDMs have been created over the years at the state level, like the WASMO (Gujarat), Jalswarajya (Maharashtra) and the Jalanidhi (Kerala) models. While they started as externally funded projects, implemented with the support of NGOs, they have since been scaled up to the state level and are thus official SDMs of their respective state governments. Each model has its own prospects and limitations. Some of the key differentiating factors have been highlighted in Table 6:

Table 6: Good practices of service delivery models for rural water supply in a few states

	Model and coverage	Key differentiating factors
Tamil Nadu	Swajaldhara (2002) through Tamil Nadu Rural Water Supply Project (TNRWSP) by Tamil Nadu Water Supply and Drainage (TWAD) Board (2004 onwards)	<ul style="list-style-type: none"> • Provision of rural water supply engineers • Innovative change management process • Improved interaction with the local community • Improved operation and maintenance processes

	Model and coverage	Key differentiating factors
Gujarat	Swajaldhara by WASMO in 2002 Promotes decentralized, demand-driven, community managed water supply and sanitation systems Coverage: 15000+ villages	<ul style="list-style-type: none"> • Formation of Pani Samitis (Water Committees) as nodal agencies at village level • Financial and implementation autonomy of Pani Samitis • Intensive training of Pani Samitis on project management, financial and auditing processes • Ensures transparency in operations and water supply
Maharashtra	Jalswarajya (2003–2009) World Bank-supported rural water supply and sanitation SDM (Jalswarajya) through Reforms Support and Project Management Unit (RSMU) Coverage: 3,000 Gram Panchayats	<ul style="list-style-type: none"> • Formation of 100-member state-level RSMU and 25-member district-level units, with a mixed group of people having technical, administrative, social and financial skills. • Provision of District Facilitation Team (to oversee infrastructure development), District Appraisal and Monitoring team (to oversee the quality of processes), District Finance Monitoring Team (to oversee finances), Village Water and Sanitation Committee (to contract out the construction of infrastructure and then to operate and manage it), Women's Empowerment Team (to provide income-generating opportunities for women working in water and sanitation activities), Social Audit Committee (to check and approve contracts and payments made). • NGOs and para-professionals support villages.
Kerala	Kerala Water Supply and Environmental Sanitation Project Jalnidhi (2000–2008) Coverage: 13 districts	<ul style="list-style-type: none"> • KRWSA – an autonomous institution under the Department of Water Resources acts as the Project Management Unit (PMU) for the programme • PMUs consist of multidisciplinary specialists from government and private sector • NGOs engaged as support organizations for capacity building and trouble shooting • Creation/ empowerment of beneficiary groups and federations • Leadership role provided by the Gram Panchayats.



4

Field study findings

This chapter describes our overall findings on domestic water security, as derived from the field study and segregated by three major parameters as mandated in the objectives of the study: social inequities, gender concerns and water management practices.

At the outset it should be mentioned that gender issues, social inequities, and water management practices are not separate watertight matters. A lot of overlapping issues crop up in the course of the study. These overlapping issues are described in later sections of the chapter on social and opportunity costs, barriers and enablers and in the summary of findings.

3.7 Water management practices

Water sources and management

- Government water supply through PHED in Jaisalmer and Barmer is mainly dependent

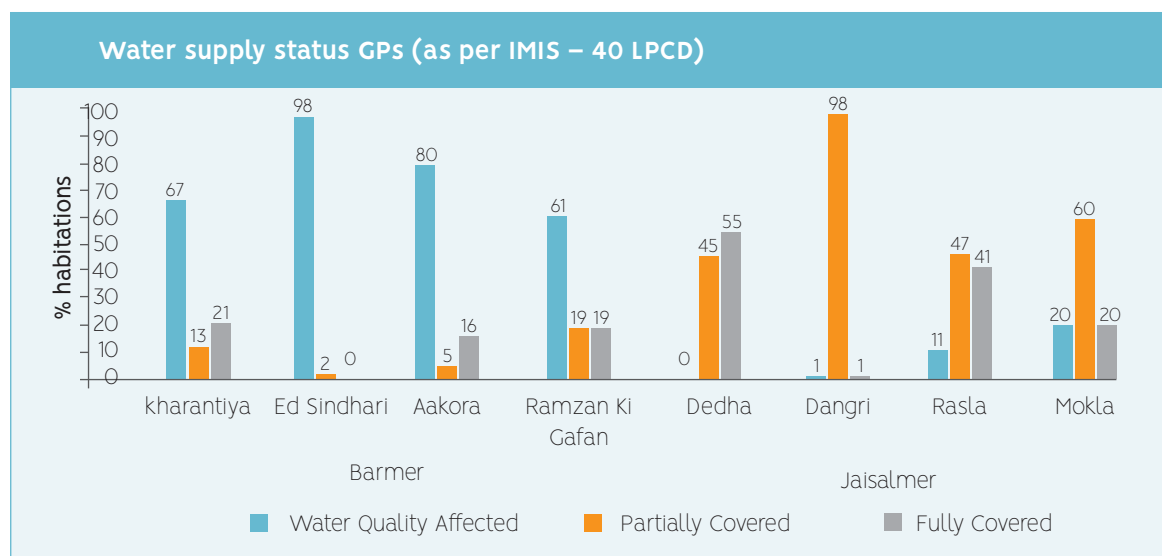
on ground water. In all study villages, the main source of water is borewells, except for Kharantia, Barmer, where the water supply came from the Indira Gandhi Canal. Open wells, kuis and village ponds (naadis) also form major/ supplementary water sources in the village. Currently, a combination of water sources (ground/surface and local/ external) are used to meet the needs and to deal with seasonal fluctuations.

- Local sources are managed entirely by either community groups or gram panchayats. These sources are also used by private water tanker vendors to supply water on a commercial basis.

Distribution and supply

A ground-level reservoir (GLR) is a point of water source for communities in a village/habitation where they come and fetch water and/or household connections are given in some cases.

Figure 11: Water supply status of study GPs (as per IMIS)



Community-level GLRs with stand posts are the main distribution points. There are intermediate elevated service reservoirs (ESR) for gravity supply to larger areas.

- Pipelines with drinking water from the Indira Gandhi Canal and Narmada Canal are being built in a phased manner, but, as of now have reached very few villages and habitations (piped water from these sources had reached only one habitation in the study).
- If we look at IMIS data for 40 lpcd coverage (refer to Figure 11), under 21 of habitations in GPs in Barmer are fully covered, while

in Jaisalmer it ranges from 20–55 (except 1 GP). This indicates that in Barmer there is more dependence on local and community managed sources like naadis, kuis, etc.

- Table 7 shows field-level findings on water supply status and sources for habitations studied.
- Household tap connections were generally not present, except for a few houses in three habitations out of 16.

(refer to Annexure 6 for details on coverage status of habitations as per IMIS as well as field findings)

Table 6: Good practices of service delivery models for rural water supply in a few states

Insight on water sources and supply in study habitations as per field findings		
	Jaisalmer	Barmer
Location with respect to water supply sources	5 tail end of the village 3 in the middle	2 tail end of the village 3 in the middle 3 within village
Water supply sources	Borewell	Borewell, Open Wells, Canal

Insight on water sources and supply in study habitations as per field findings		
	Jaisalmer	Barmer
Local water sources	Naadi, Kuis	Beri, Naadi, Open Wells, Kuis
Storage system at community level	GLR	GLR, Community Tanka,
Storage at HH level	Tanka, Tanklis	Tanka, Tanklis (RWH) Normally 2 separate storage tanks (drinking and other domestic purposes)
FHHT	1 habitation (12.5% of habitations) of which 29% HHs connected (a few illegal connections) 2 habitations– distribution network not functioning	2 habitations (25% habitations) of which: <ul style="list-style-type: none"> • 1 habitation with 17% HHs connected • another with 35% HHs connected
Quality of water in piped water supply	3 habitations – high fluoride in water supply 2 habitations – high TDS in water supply	1 habitation with high TDS in water supply
Regularity of piped supply	4 habitations with year-round supply, 1–2 times a week 2 tail end habitations with irregular supply, once a month 2 habitations get supply except in summers	4 habitations including 2 tail end habitations do not get water supply 2 habitations get adequate water supply all year-round 2 habitations get water supply 6–9 months a year, 1–2 times a week
Adequacy	Mostly inadequate	Mostly inadequate except two villages

Secondary water storage

- At the household level, rain water harvesting tanks (roof top/agor, surface catchment) constructed under various government programs or through civil society organizations are also a major source of drinking water and secondary storage in Barmer district. However, in Jaisalmer, they are simply used as storage tanks due to the community's negative perception of the quality of harvested water.
- Cluster-level rain water harvesting tanks have also been supported by PHED/other government programs in the region, of which 1 successful case was found in Ramzan ki Gafan, Chohtan Block, Barmer.

Water supply availability and adequacy

- Water supply to the GLRs is often erratic and unreliable due to multiple reasons including lack of water availability from the source, lack of accountability, mismanagement on the supply side, negligence at local level, illegal water connections, lack of maintenance of pipes, faulty designs, breakages in distribution lines due to theft/ wear and tear and technical issues like lack of pressure in tail-end villages or in places located at a higher elevation, etc.
- Of the total 16 villages/habitations studied, water is made available through PHED managed sources to only nine villages. In four, where the source is within the village, supply is regular and adequate for at least nine months a year (Aakore, Sanwlore and Trishuliya in Barmer District and Dangri in Jaisalmer district).
- Due to irregular water supply, communities rely on multiple local sources. In the majority of habitations seasonal fluctuations and lack of water adequacy generally are a major concern.

← Stages of water management →

Source	Primary storage	Distribution	Secondary storage	Treatment
Govt supply – largely based on ground water currently; new planning on IG and Narmada Canal	Mainly ESR for distant supply and GLR at community level.	Single point connection provided by external supply lines in habitation or village	Tanka, tanklis and other smaller utensils at household level.	Chlorination for bulk water supply
Community dependent on local sources where supply is unavailable or irregular		Internal distribution through pipelines and FHHT is minimal		Provision of RO and deflouridation plants at community level in some villages
		Private water tankers supply water from Naadis/ Kuis)		No effective treatment / purification method used at household (point of use). Only straining through cotton cloth

The above chart depicts key findings with respect to stages of water management from source to consumption. It is worth noting that even when the majority of families are dependent on local

unimproved water sources for their domestic use, and even for drinking purpose in some instances, use of water purification methods at household is virtually non-existent. Only straining of water through cotton cloth is carried out by households.

Paved catchment for cluster storage– Ramzan ki Gafan, Barmer



Cluster storage tank, Ramzan ki Gafan, Barmer



Rain water harvesting cluster tank, Ramzan ki Gafan, Chohtan Block, Barmer

Open wells are the main source of domestic water in this village. The water in wells has high TDS and it is not advisable to drink it.

In 2016–17, a cluster storage tank with a paved catchment for harvesting rain water was constructed by PHED in the village. In normal rainfall years, about 2.5 lakh litres of water is harvested and stored through this system.

About 250 HHS fetch drinking water from the cluster tank. People are allowed to fetch water manually as per their requirement and transport it by camel cart or carry it in utensils. However, no tanker filling is allowed.

The system is located near the gram panchayat building and water withdrawal is regulated by the panchayat.

The system has been functioning effectively for the past four years and the community is able to fetch adequate and safe drinking water.

Traditional water harvesting structures

- Discussions with elderly women indicate that traditional water harvesting structures like stepwells (baories) and constructed or lined ponds have become neglected after piped water supply became available in the region. Also, the use of these structures was minimized after several instances of contaminated water were reported. In Jaisalmer, it was evident in all villages that the use of beris/shallow open wells was reduced

significantly as tanker water supply increased. Lack of use and routine maintenance meant that gradually these structures deteriorated. Maintenance of naadis (ponds) by the community or panchayat, however, was evident in both the districts as tanker supply is mainly dependent on them.

Local traditional water bodies, both surface and ground water-based like naadi (village pond), beri/kuis/ open wells, act as supplementary sources and even as the principal source in both districts.

Village-level water management practices from a community source – The case of “Dabhar Naadi”

The Dabhar village pond (naadi) was constructed by the Dabh/Meghwal Community in Dabhar Bhatiya village, Ed Sindhari Gram Panchayat in Barmer block about 70 years ago. It has been wonderfully managed by the local community since then to meet the domestic water needs of surrounding villages. In earlier times, people from all communities including women participated in cleaning and deepening of this naadi, once a year. A special celebration was held in which all communities participated together without any discrimination as it was the only major source of water in the area. However, over the years the maintenance and upkeep of this naadi was neglected.



In 2010–11, cleaning and deepening of this naadi was taken up by Sahyog (a local NGO) under the Drought Proofing Programme funded by Oxfam India. The local community contributed up to 75 of the total expenditure of Rs. 1 lakh, which was a remarkable example of community ownership. A Naadi Committee constituting seven members from different communities was formed for looking after the maintenance of the naadi. This committee also had a representative from the GP and members were changed every five years. A caretaker with a monthly salary of Rs. 12,000 was hired to oversee maintenance on a day-to-day basis, which includes arranging picking up of animal dung in the catchment area, collection of charges from private tanker suppliers and depositing money in a separate bank account in Sindhari opened for this purpose. Only 4–5 private tanker water suppliers from among the surrounding seven villages under Ed Sindhari GP are allowed to fetch water from it, and only on payment of Rs. 200 / refill. Tanker supply is limited to these seven villages only. The number of refills is restricted to 8–10 tankers daily, while there is no restriction on fetching water in pots or on feeding animals from this naadi.

The water is mainly used for domestic purposes, including for cattle. Drinking water needs are mainly met through HH-level tanks which harvest rain water and are refilled from other sources as per need.

In 2016, this naadi was repaired, stone pitching was carried out on the sides and fencing was done under Mukhyamantri Jal Swavlamban Yojana (MJSA). This work has further helped in increasing its storage capacity and water is available for 6–8 months in a good rainfall year.

- It was interesting to note that in ranking for reliability of quality, the kuis in khadin were ranked as the topmost by the villagers in Khabia (Sam, Jaisalmer), followed by the village pond (as it was sweet water), while the piped supply was at the bottom due to salinity and fluoride. But when it comes to availability in the context of seasonal variations, piped water (where there is regular supply) is ranked higher

than the local pond, as most of the ponds do not have water for more than 3–4 months after the rains. Here again, the perennial wells (kuis) are ranked at the top, but the fetching from these wells is limited to drinking water only. Thus kuis (which are perennial and have sweet water) are considered almost sacred and are protected by the owners and beneficiary groups.



Jasery Naadi– Boon for dry lands in Sam

Jasery Naadi is located in Dedha village, Sam block in Jaisalmer. It was constructed by the community more than 50 years ago with local knowledge. The structure is not pitched with any pucca lining, but water is available round the year even in times of lean rainfall. This Naadi acts as major source of drinking and domestic water. For the past 10–15 years, water has been supplied through tankers from this water body in 6–7 villages in its vicinity. About 40–50 tankers per day (more than 12,000 litres/day of water) are supplied to 10 private tankers at Rs. 200/tanker. In summer, in good rainfall years about 80 tankers per day are supplied. Currently there are no regulations laid on tanker suppliers by the gram panchayat. The sarpanch says “ Water is for everyone and this naadi is a boon in the dry lands of Sam”.

Household tanka– A game changer

- It is notable that household water harvesting tanks have been a game changer in these districts. In the past decade and a half, there has been a major focus on constructing them through various government programs

like MGNREGS, MJSY, etc. Though there is no specific data on the percentage of households that have HH tankas, the field study reveals that the majority of HHs in all villages possess individual HH tankas either at home or in their agricultural fields, covered under various government and NGO programs. Some have even been self-financed.



We have to shell out money, but at least we do not have to carry pots now.

– Pathani Devi, Mokla village, Jaisalmer on the construction of HH tanka at her home

- These tankas have not only provided enough safe storage for water, but have also been pivotal in reducing the discriminatory practices in access to water, in reducing the drudgery borne by women, and in enhancing the overall sense of security among family members. The daily chore of fetching water and the stress related to it have been reduced to a great extent. The reduction in the time spent by women and girl children in fetching water has resulted in improving their health, productivity and increasing their educational activities. A detailed analysis of social and opportunity costs that the tanka have been able to offset is presented in section 4.4
- In many households there are two separate tankas; one for drinking purpose (harvested rainwater) and another for domestic purposes (more as storage tank and refilled through local/external sources) specifically in Barmer district. The sizes of HH tankas range from 15,000 litres to about 50,000 litres. Apart from harvesting water, these tankas also act as household water storage units, giving a sense of security to people. Smaller units called “Tanklis” (3,000 litres) are also found in many households. The practice of harvesting rainwater through ground-level paved catchments (sometimes unpaved also) called agors was more prevalent in Barmer; whereas in Jaisalmer, most of the tankas were used as storage units only, except the houses which had flat concrete slab roofs, from which a pipe was connected to a tanka to harvest rainwater. As a result of the lack of awareness

and the perception that harvested water from surface/roof catchments was contaminated, the reluctance to use it was evident in many instances in Jaisalmer district.

Private water market

- With a storage facility available in the majority of households in the form of tankas, people fetch water from local sources through tankers to avoid the drudgery of bringing it from distant sources. Tanker water is gaining more acceptance and private suppliers have already emerged as serious players in the water market in rural areas, especially in the two districts studied by us.
- Regulatory measures on private tanker water supply, in terms of fetching fees, quality of water supplied, cap on cost, etc. are likely to be the issues that government or local administration have to deal with in the near future. Also, conventional water sources must be conserved and developed further, so that dependence on these commercial players may be limited and equity issues addressed, as not all families can afford the high cost of tanker water.



My daughter in law is lucky not to have to carry water on her head now as we have tanka at home and get it filled through a tanker. So she has long hair, see, my all hair is gone fetching water for years

– Suni Devi, Bhilon ki Dhani, Sanwlore Village, Barmer

- On average, a family spends anything between Rs. 300–1200 per month on buying water. The field study also reveals that more than 80 of the households need to buy water from private tankers. This indicates that even

on a conservative estimate, the total market value of tanker water supply is more than Rs. 100 crore per year²⁷ in Barmer and Jaisalmer districts combined.

Water quality, testing and treatment

Based on discussions with panchayat officials and community members, it is evident that there are instances of high fluoride content (at least one habitation in Jaisalmer) and high TDS (one habitation in Barmer and two habitations in Jaisalmer) in piped water supply from tube wells. IMIS data also reveal the presence of nitrates in a few habitations in these GPs. Due to mixed use of most of the naadis, these unprotected surface sources are also prone to bacteriological contamination. The officials at the GP level do not have these test reports and hence are not aware about the severity of the contamination. The GPs neither have testing kits, nor are they trained for conducting tests on their own.

Water treatment for bacteriological contamination in bulk supply is done by PHED, while there are water treatment plants like RO and defluoridation at distribution points (at GP level). At the



Why should we spend on buying treated water if we can fetch it from the naadi?
- women from Lala (Khorada) village

household level, there is no major treatment done in either of the districts, except straining through cloth in a few cases, which is indicative of a lack of awareness.

Out of the 16 GPs covered in the study, water treatment units were installed in 4 GPs. Treated

water was made available at Rs. 2–5 /20 litres. However, these units were functional in two GPs only. It was observed in both districts that many RO and defluoridation units were not operational.

The major reasons that these units were not functioning are:

- Location– Normally these units are located in the core habitation areas or near the water source. In the absence of a home delivery mechanism, currently people have to fetch water from the unit.
- Cost and quantity–A psychological barrier against paying for water and also the requirement of daily fetching of limited quantities of water discourage people from using this source when other easier options of bulk storage and free water are available.
- O & M mechanism–The majority of the treatment units were installed by government or part-CSR funding, for which the responsibility of operation and maintenance was given to private agencies for five years or longer periods. However, there were several technical and managerial issues (like the need for frequent repairs; outsourcing of the operations) which made this business model unsustainable.
- Lack of demand–Awareness about the direct health impacts of water quality is still low and people do not like to spend on treated water, resulting in low demand for it.

It should be noted that treated water is fetched through tanker and supplied in HH storage tanks in Bhatala Kharwa village in Gudamalani GP in Barmer district (managed by Cairn India Ltd.). With this mechanism, there is increased demand from this unit with at least 1 tanker (3,500 litres) supplied every alternate day.

²⁷ Calculation based on the consideration that 50 of households spend on average Rs. 500 per month on tanker water

Figure 12: Water treatment plant at Dedha village



Table 8: Water treatment plants in study villages

Village	GP	Block	District	Type	Who installed	O & M agency	Current status
Kharantiya	Kharantiya	Sindhari	Barmer	RO	PHED	Cairn India Ltd.	Closed (no demand; non-payment of salary of operator)
Khabia	Dedha	Jaisalmer	Jaisalmer	Flouride Treatment Unit	PHED	PHED	Not functioning, parts not replaced
Dedha	Dedha	Jaisalmer	Jaisalmer	RO with ATM	PHED	GA Infra Pvt. Ltd	Working, but low demand
Mokla	Mokla	Fatehgarh	Jaisalmer	RO	PHED	Private company	Working, but low demand
Additional RO plants studied							
Bhatala Kharwa	Sara	Gudamalani	Barmer	RO with ATM	PHED & Cairn India Ltd.	Cairn India Ltd.	Working (used to fill tankers)
				RO	PHED	PHED	Working (water fetched by 30 HHS)

Changes in community water management practices over time

Discussions with elderly women revealed that there has been a sharp increase in consumption

patterns in past 10–15 years, due to availability of HH tankas and provision of tanker supply. The life stories of women revealed that water consumption of an average household has increased from 15–20 lpcd earlier to 45 lpcd at present – meaning that in the last decade the

increase has been 2.5–3 times compared to 30–40 years ago.

The disparity in consumption pattern is clear, as families from economically weaker sections consume 30–35 lpcd (even 15–20 lpcd in some cases), compared to the average consumption of 60–70 lpcd by economically well-off families. Instances of the use of clothes washing machines in a few homes in Khaba and Bhadasar villages in Jaisalmer indicate the rising trend of water consumption. On other hand, there are families that compromise on personal hygiene, washing

clothes and daily bathing needs due to limited resources. In Mokala and Bhadasar there were instances where utensils were still cleaned with sand first in order to save water. Also, there are instances where water is reused after washing clothes, cleaning utensils (without soap), etc. and given for drinking to cattle. Soap water is also used for mopping the house. However, these practices of reuse are the result of compulsion and lack of options in marginalized communities, rather than awareness and sensitivity regarding water conservation in well-off communities.

Table 9: Changes in community water management practices over time

	>30–40 years before	20–30 years before	Last 10–15 years
Source	Fetching from local or external sources outside village Use of traditional water bodies prevalent	Fetching from government GLR/stand posts and traditional sources (within or outside villages)	Fetching from household tankas and community tankas refilled by private tanker supply Limited fetching directly from village water sources.
Mode of transport for fetching water	Walking with pot/vessel, camel cart mounted drums	Walking with pot/vessel, camel cart mounted containers	Camel cart mounted drums. Motorized trailer mounted containers and tanker
Typical distance from source	1–5 km or more	1–3 Km	0.5–2 km
Water consumption in summer/ monsoon per day	90–105 litres (6–7 pots per household)	120–150 (8–10 pots per household)	330–350 litre (2 tankers per month plus harvested rain water)
Water consumption in winter per day	60–75 litres (4–5 pots per household)	95–105 litres (6–7 pots per household)	150–200 litres (1 tanker per month plus harvested rain water)
For: average family size of 5–6 people per household of average economic condition			

Figure 13: Glance at changes in water management over time

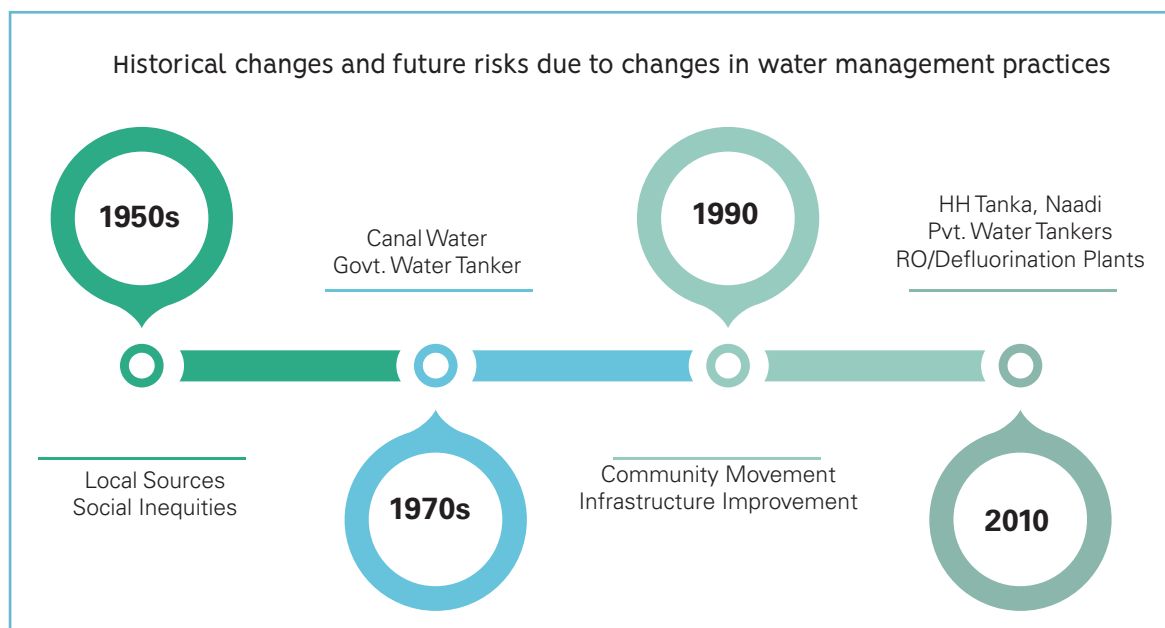


Table 10: Historical changes and future risks with changes in water management practices

Aspect	Current practices and norms	Historical changes and future risks
Source – maintenance and conservation	Groundwater-based water supply is inadequate, irregular and of poor quality	Local resources have been depleted over the years Traditional water harvesting structures like stepwells are neglected and abandoned
Fetching	Most of the houses now refill <i>tankas</i> by tanker water	Availability of household tankas has reduced the drudgery of fetching water to a great extent. Water tanker vendors have been functional in almost all villages. Increase in fetching water from common resources like ponds and GLR by tankers can increase the vulnerability of poor and marginalized families The future risk is of exploitation of both marginalized communities and natural resources by unregulated private water vendors

Aspect	Current practices and norms	Historical changes and future risks
Quality and treatment	<p>Dependence on unimproved local water sources (<i>naadi, kui</i>)</p> <p>Untreated water supplied by ground water-based schemes</p> <p>Minimal household filtration or treatment</p> <p>RO plants and defluoridation plants have been of little use due to various reasons</p> <p>People reluctant to buy treated water where surface water from pond is available, even if it carries with it health risks</p>	<p>Surface water (canal)-based new water supply schemes will increase dependence on external sources and neglect of local water resources.</p> <p>Scarcity of water can increase the vulnerability of marginalized families manifold</p> <p>Lack of community and household-level treatment may put a large population at risk</p>
Storage and upkeep	<p>Naadis and kuis have been maintained by communities to some extent</p>	<p>Neglect of local water sources and traditional water harvesting structures can increase the risks for vulnerable populations in times of scarcity</p>

3.8 Mapping Inequity

Inequity and discrimination in access to water has been recognized globally. Many patterns of discrimination, such as those based on gender, age and disability status, are consistent across the world. Other inequalities, such as those based on minority status or caste, vary across countries, but structural causes and patterns for these inequalities can be identified. “Post 2015–Tool Kit on WASH” by Water Aid, highlights the fact that access to drinking water varies by wealth inequities and location–rural/urban. Market economies prioritize the most advantaged and governments typically focus on providing access to those who are easiest to reach and those with influence –the better off and the politically powerful. Poor and marginalized people usually have least control over water resources, and are frequently last in

line, despite the fact that both the cost of lack of access and the benefit from improved access is greatest for the poorest people, and those in the most vulnerable situations. Social inequities like caste hierarchies only aggravate the problem. This seems to be true in the context of Barmer and Jaisalmer where poor people, especially those living in fringe habitations (*dhanis*) and remote locations have to pay more to get water from private suppliers, in the absence of a reliable government water supply.

The Study on Social Assessment of Rajasthan Livelihood Project by the Institute of Development Studies reveals that caste and gender-based discrimination, exclusion and subjugation are the most important social constraints that prevent inclusion of the poorest. The major vulnerable groups are the scheduled castes, scheduled

tribes and certain OBCs. Caste hierarchies and discrimination determine access to social services and infrastructure as well.²⁸

In the context of Jaisalmer and Barmer, the above-mentioned social analysis is applicable to some extent, with sporadic instances of subjugation and conflict over access to water. Access to and control of water resources is still dominated by people at the higher end of the caste hierarchy or the predominant population near the source. This is particularly true when the fetching of water is required by individuals coming in contact with the water source, like fetching directly from a pond or well. On other hand, access to government supplied water through GLR or other means is largely open and free from any exclusions. However, the supply and distribution of water may be controlled by influential people of the village/region, which indirectly creates barriers to access

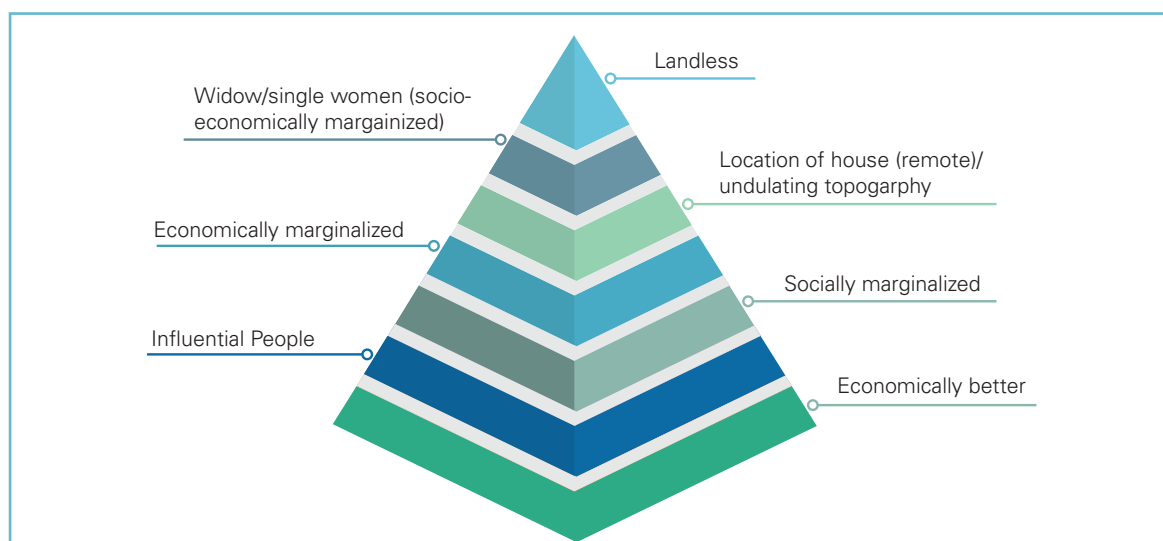
and availability of water to marginalized families. The location of a habitation and the topography of the area also play important roles in the water supply mechanism.

As mentioned earlier, it is interesting to note that construction of household tankas has not only reduced drudgery for women, but also social discrimination in access to community water sources. The tradition of 'begar' – where women had to give their labour, without payment, in lieu of drinking water has almost disappeared because of tankas. This facility has instilled a sense of security by removing the burden of fetching water daily from distant sources. For those families that can afford to buy water, the drudgery of women fetching water is now a thing of the past. However, in some villages, women from marginalized communities still have to bring water from the community tanka/ distant sources.

The study reveals that some of the most vulnerable people in terms of access to water, as well as distribution, are the people lacking physical and financial resources along with the lack of a community support system.

“ We can now at least buy water and reduce physical drudgery. By spending money on buying water we are at ease
 – Chagni Devi from Mokla village,

Figure 14: Vulnerability matrix for water access



²⁸ 2010, Social Assessment, Rajasthan Rural Livelihood Project by Institute of Development Studies for Department of Rural Development and Panchayati Raj, Government of Rajasthan.

- Landless population – Families without landholding, like nomadic tribes or squatters do not have household access to water as they neither have tanka nor piped water supply. There have been some instances where people have constructed community tankas at their own expense and have gotten it refilled through tanker supply. In the absence of landholding and proper documents for their household assets, the Kalbelia community in Sindhari, Barmer has to depend on community resources.
- Widows or single women, especially young women with limited family and community support, juggle between fetching water or spending money for tanker refilling, which eventually affects their livelihoods. However, there have been a few instances where women have not been able to get the benefit of HH tankas as they could not contribute physically or monetarily under the available schemes/programs.
- People with disabilities and without a support system may also be in a vulnerable situation in relation to accessing water. However, the study did not come across significant instances of this kind.
- Seasonal migration of families also puts them at risk for deprivation when they return to their villages.
- Location of habitation – The location of a habitation and its topography play important roles in the water supply mechanism. Remotely located houses, far away from water sources as well as those with an undulating topography, or located on a higher elevation, face challenges in water availability, mainly due to technical issues connected to water supply. Difficulties in transporting material in

No access to water for landless in Sanpa Village, Barmer District

Some “Kalbeliya” families, that are part of a traditionally nomadic tribe and performed folk dances, settled in “Gauchar” (grazing land) in Sanpa village over 50 years ago. They are now mainly involved in sorting and sale of dry waste.

Being landless, these 30 families do not have access to tap connections or household tankas under any government program. They also face discrimination while fetching water from common village resources. With no source nearby, they fetch water from Sanpa village GLR or naadi, about 500–750 metres away. Women here report that the hard labour of fetching water often leads to chest pain and hair loss.

Realizing the importance of rain water harvesting and having storage facility near their houses, they have constructed a tanka nearby and get it refilled with tanker water after collected rain water is used up. They spend Rs. 6,000–10,000 per family per year for water.

Figure 15: Kalbeliyas of Sanpa Village, Barmer



elevated sandy regions have also resulted in limiting the construction of household tankas in a few instances. Tail-end habitations like Lala (Khorada) in Jaisalmer; and Dabhar Bhatiya and Arbi ki Gafan do not get regular PHED water supply. Fringe habitations are more depended on local water sources like naadis and kuis rather than external piped water supply. Similarly in Mokala village, for the habitation of Nath, Mingriliya and others, the GLR in the village seems to be too far away to fetch water; whereas people from the closer habitations of Rajput and Meghwal fetch water from GLRs, even when the quality of water is not suitable for drinking. In Sanwlore village, water supply is limited due to issues of low pressure on high elevation. So, water supply is often not available in dhanis.

- However, well-off families do help from time to time and provide water from their tankas to others in need.
- Socially marginalized communities – Access to and control of water resources is still dependent on the caste hierarchy or predominant population near the source. This is particularly true when water is required to be fetched by individuals who then have to come into direct contact with the water source, like when it is taken directly from a pond or well. On other hand, access to government supplied water through GLR or other means is largely open and free from any exclusions. For example, in Ramsar village, Barmer, different communities use separate kuis in the same naadi, allocated as per social norms.
- ▶ It was observed that generally villagers deny any form of explicit discrimination in relation to water, but tacit forms of discrimination still persist through deep

rooted social norms and engagement behaviours. In Khabia, where the majority of the population is Rajput, the families of Meghwal have not been able to get water supply connections in their habitations, while a few Rajputs families have acquired household connections through illegal means. In Aakora village piped connections were given to politically influential higher caste families on priority basis. Arbi Ki Gafan is a good case, where every community has its own well and social norms, which reduce conflicts. However, in times of scarcity, intra-community support in relation to water is also evident. In Bhadasar village in Jaisalmer, to avoid conflicts during fetching water, women group formed queues on first come first served basis addressing issue of social and geographical inequity between women staying near the GLR and women from socially marginalized groups staying away from the source.

- Economically marginalized – Poor families have to bear the brunt of the high cost of tanker water, even if household storage is available through tanka. Most of the tanker suppliers fetch water from common resources of the village without any cost, which leads to indirect exploitation of poor families.

It has been observed that vulnerability increases manifold when two or more parameters are combined. For example, a marginalized family living far away from the source is far more at risk than one living near the source; or a poor widow with no tanka and no money for tanker water can be doubly deprived compared to other individuals in the village. It has also been observed that vulnerability is also often compounded with overall scarcity of water in low rainfall years,

as the water in local resources dries up fast and people are forced to buy tankers from distant sources which are even more costly.

Sum up – Our key inferences from the field study on social inequities and vulnerabilities are as follows:

- Discrimination is still prevalent when water is fetched by individuals who have to come directly in contact with the water source (pond, well, etc.)
- Access to government supplied water through GLR or other means is largely open and free from any exclusionary practices or discrimination. Access to tanker supply is also largely available to all, but affordability is a major issue, and the cost can prevent the economically weak from getting enough water.
- Supply and distribution of water may be controlled by influential people of the village/region, which indirectly creates barriers to access and reduces the availability of water to marginalized families.
- Location of habitations and topography play important roles in the water supply mechanism.
- Decision-making is controlled by powerful individuals and communities; marginalized groups have little say. A few examples of social inequities that persist and benefit people who are socially and politically influential, as well as resourceful, are illegal water connections, skewed timings of water supply, forceful control of water sources, and subjugation of the weak in relation to access to water sources.

3.9 Gender roles

Women and girls are most often the primary users, providers and managers of water in their households and are the guardians of household hygiene. If a water system falls into disrepair, women are the ones forced to travel long distances over many hours to meet their families' water needs. Conversely, women and girls benefit most when services are improved.²⁹

Interactions with women's groups in Jaisalmer and Barmer reveal that, at the household level, women's role as managers of domestic water has remained the same over time. However, their role as water collectors has been reduced significantly after the advent of tankas within house premise. This development has significantly reduced the drudgery they used to undergo fetching water.

As per the Gaon Connection Survey, about 60.9% women have access to household tap water, 12.5% women fetch water from sources 500 metres away from their houses, 22.8% women fetch water from a distance of 200 metres, while the remaining walk 1–5 kms to fetch water. That means 39.1% women still walk outside of their homes to fetch water. (Gaon Connection conducted a survey in 19 states. We interviewed around 18,000 people)

According to a One India One People report, every year each woman living in rural India has to walk 14,000 kms to fetch water

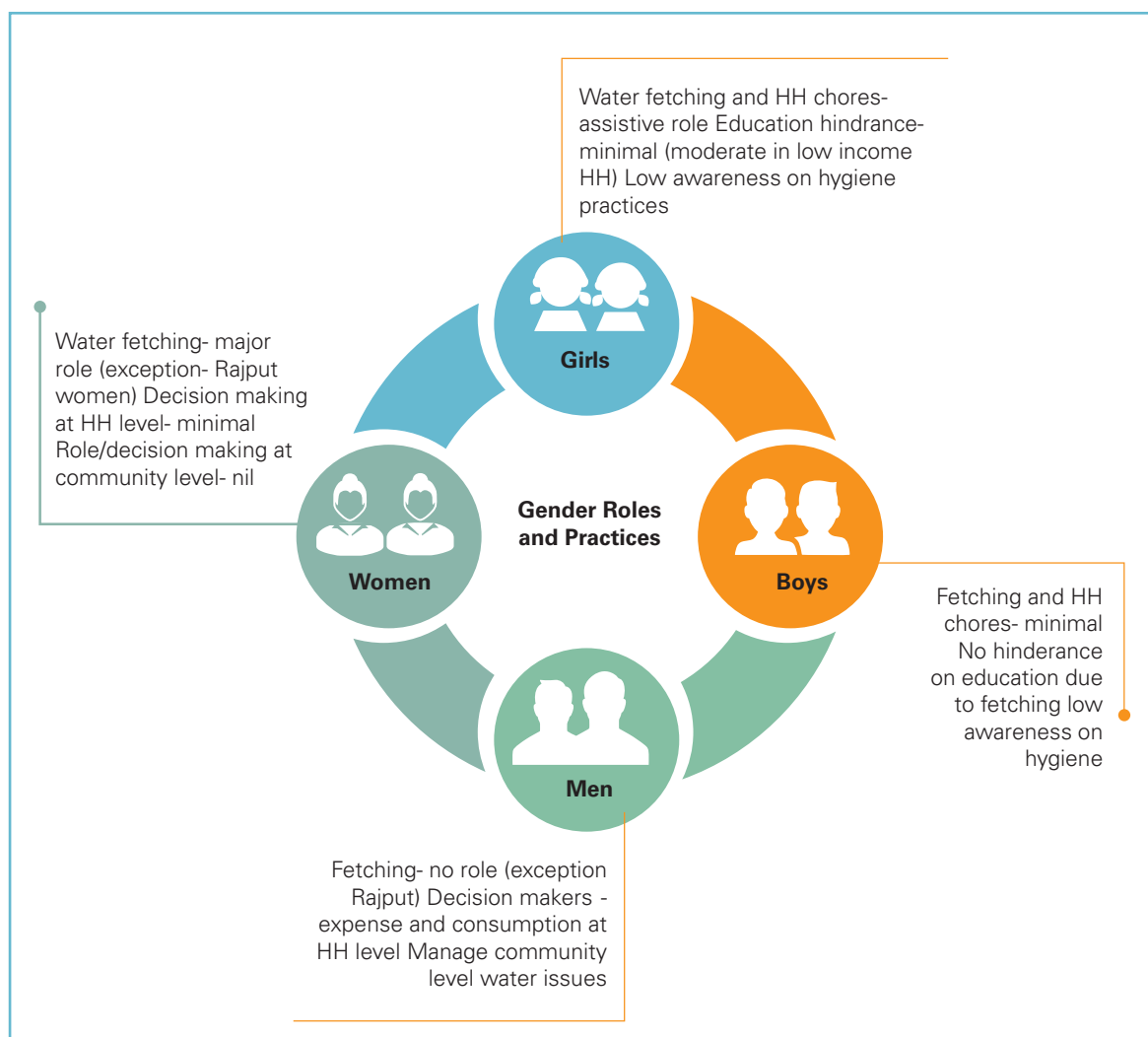
(Source: July 2019, Daya Sagar (<https://www.gaonconnection.com/gaonconnectionsurvey/women-have-to-walk-long-distance-to-fetch-water-which-affects-their-health-gaon-connection-survey--45331>))

²⁹ Nov 2010, Gender in Water and Sanitation, Water and Sanitation Program, World Bank

In the present context, contemporary modes of transport have led to changed gender roles in relation to the fetching of water. When the source is a long distance away, it is men who bring water using motorized transport. In some communities (Rajput in particular) where women are not supposed to go out of their houses, it is

men who fetch water— whether by tanker or from a nearby GLR. Generally in these communities, it is boys who collect water rather than girls. These circumstances also indicate that women face a lack of mobility and lack of access to training as drivers of vehicles, which in essentially makes them dependent on men for their water needs.

Figure 16: Gender roles in water management



Thus, gender roles in managing water may differ or change based on:

- location and distance of sources
- caste/ social norms
- severity of scarcity or immediate needs at household level

Shifts over time in water management and hygiene practices based on life cycle histories of elderly women			
	>30–40 years earlier	20–30 years earlier	Last 10–15 years
Source	Fetching from local or external sources outside village Use of traditional water bodies prevalent	Fetching from government GLR/stand posts and traditional sources (within or outside villages)	Fetching from household tankas and community tankas refilled by private tanker supply Limited fetching directly from village water sources.
Mode of transport for fetching water	Walking with pot/vessel, camel cart mounted drums	Walking with pot/vessel, camel cart mounted containers	Camel cart mounted drums. Motorized trailer mounted containers and tanker
Typical distance from source	1–5 km or more	1–3 km	0.5–2 km
Water consumption in summer/monsoon per day	90–105 litres (6–7 pots per household)	120–150 (8–10 pots per household)	330–350 litre (2 tankers per month plus harvested rain water)
Water consumption in winter per day	60–75 litres (4–5 pots per household)	95–105 litres (6–7 pots per household)	150–200 litres (1 tanker per month plus harvested rain water)
Water reuse practices	Reuse of water (cloth and utensil cleaning) for drinking by cattle ; soapy water for mopping house	Reuse of water (cloth and utensil cleaning) for drinking by cattle ; soapy water for house mopping	Reuse only by marginalized community.
Hygiene practices	Priority given to men for bathing; less frequency of clothes washing and repeated use of unwashed clothes; use of sand for cleaning cloth used as pads during menstruation	Priority given to men for bathing; less frequency of clothes washing and repeated use of unwashed clothes; greater availability of water for menstrual hygiene	Priority given to men for bathing; women opting for alternate day bathing in winters (mostly in marginalized community); increased availability of water for menstrual hygiene
Observations applicable to an average family of average economic conditions, consisting of 5 to 6 people per household			

The life histories of women (aged 50 years and more) in the villages studied reveal that both the time spent and drudgery undergone on fetching water have been dramatically reduced in the past two decades due to household tankas and tanker water supply. However, that is not the case for socioeconomically marginalized women, widows and single women heads of households. Single women heads of households/widowed women without any family support have to compromise

“I am happy, that with money now, I can buy water”

Varjudevi, resident of Meghwal Dhani of Dabhad Bhatiya village, Sindhari block, Barmer District explains her journey in relation to water fetching since her childhood. She is 55 and has been in this village for 35 years. Before her marriage, she stayed in Sanchore block, and never faced issues with water due to water availability in open wells at her farm.

However, her water fetching duties began with her marriage. With no other nearby source, initially, she managed to fetch water from a naadi, about 8 kms away. She used to spend 4–5 hours to fetch 2–3 pots daily, while taking her cattle for grazing. The family had to purchase additional water from camel cart water vendors at regular intervals.

For the past 12 years, she has had a 25,000 litre capacity household tanka at home. It is used for harvesting rain water as well as filling water from tankers.

She says that, “Up to just a few years ago, our lives revolved around water. However, with money, now I can at least buy water and avoid going far to fetching it”

on employable productive hours which results in reduced income and added economic vulnerability. In many instances such women are still found to be spending 2–3 hours daily, fetching water. As a result there are instances of increased fatigue, hair loss, back pain and other health issues among such women.

If opportunity costs were to be taken into account, it would be clear that in most rural areas, households are paying far more for water than their counterparts in urban areas.

Intra-household decision-making

Crucial decisions about matters like the timing of fetching water, the amount to be spent on water, construction or purchase of storage and filtration facilities are still made by men at the household level.

Varjudevi of Meghwal Dhani, Barmer



Intra-household priorities in the use of water

It is evident that there is a reduction in the drudgery of fetching water (from distant sources) with increased piped water supply in recent years and more importantly due to access to household-level storage in the form of tankas. However, intra-household the duty of fetching water from tankas as well as fetching from GLR/community sources (cases where HH tankas are not available and economic conditions prohibit tanker purchase) still lie on women/girls in most communities (excluding Rajputs). Moreover, the economic burden on households has increased due to the purchase of tanker water frequently,

which offsets other priorities of the family and particularly of women.

Decision-making at community level

There are no significant examples of women playing decisive roles in planning and/or managing water resources at the community level. Ironically women are managers of water, but do not have a say even in the timing for fetching it (if the job is done by the man of the house going on a vehicle) or in decisions on spending on water (if it has to be purchased). Gender roles within the house and at the community level adhere to traditions where men play dominant roles in decision-making.

Voices from Jaisalmer

Bhilon ki Dhani, Ramsar Village, Dengri Gram Panchayat

Gahera Devi

We have been living in Bhilwas for about 50 years. Earlier we had to walk more than three kilometers to fetch water in vessels carried on our heads; sometimes we brought 10 vessels in a day. Later, camels and donkeys were used to transport water. We were really stressed and exhausted with daily fetching of water, then going to the flour mill, to carry out farming tasks and so on. Today we have the tanker facility. So we are spared a lot of drudgery. It feels good. But it all also costs money. So the crux of the matter is "if there is money, we have all facilities and if not, we are constantly struggling to get water".

Pachani Devi

I was married when I was 19 years old and have been staying in this villages for about 50 years. I was widowed at a young age with three sons and two daughters in my custody. I had to mortgage all my ornaments to bring up my children and to make sure that there was adequate water and food for them. I was not able to buy back my ornaments and now I don't have any. I had 9 tolas of gold and 10 tolas of silver. Today I am living with one of my sons in a mud house. The other two have left the village in search of employment.

For 20 years I was compelled to fetch water from distant sources, using pots. I had never done this at my parents' house, so it was very painful and I used to cry. Now with the tanker facility, this drudgery has stopped. Even if it costs, it's OK, at least I don't have to go walking to fetch water.

Conducive environment

Without a conducive enabling environment created by policy-level directives that recognize women as rightful decision makers at all levels, it will be futile to try to bring about change while continuing to work only with communities. As we have seen earlier, some of the programmes do acknowledge and try to address the needs of women, but that does not necessarily lead to the empowerment of women automatically. This is where JJM can be differentiated from other programmes. It emphasizes that at the local level, programme approaches help to improve the suitability, sustainability, and reach of water and sanitation services, by focusing on women and involving them in all aspects of the programme – the design of facilities, implementation, as well as management. In this way there can be an effective introduction of gender ‘transformative’ governance in water sector guidelines. These issues are discussed further in the section on barriers and enablers later in this chapter. But it must be noted that sensitization and capacity building of all stakeholders (PRI, community leaders, government officers) will be necessary before policy directives can be incorporated effectively in the implementation of the programme.

Roles of boys and girls

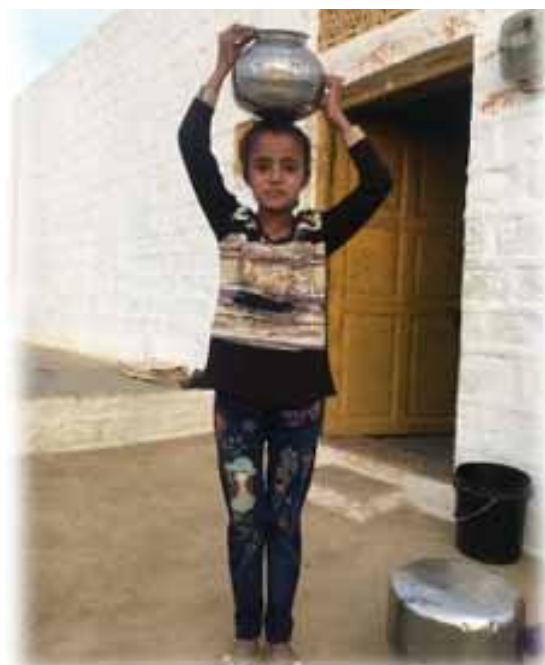
Interactive exercises with boys and girls aged 6–14 years in both districts indicate that the girls still do more household chores and water fetching (intra-household and outside) as compared to boys. The Rajputs are an exception as among them fetching from outside the home is done by boys or men. This practice is particularly visible among poor households that either don't have tankas at home or cannot afford the cost of frequent tanker refills.



We can now at least buy water and reduce physical drudgery. By spending money on buying water we are at ease

– Meghwalon ki Dhani, Arbi ki Gafan village, Barmer

Figure 17: Young girl fetching water and supporting the household in Moklasar Village, Jaisalmer



Most of the boys and girls are aware of the condition of water sources, and issues related to timing of supplies, quality of water and so on. This fact indicates their close involvement in water management at the household level.

If we look at an average or typical routine of boys and girls (8 years up) in the chart ahead, it is apparent that the study and playtime of girls are compromised due to time spent on household chores and fetching water. However, most of girls deny having any difficulty in terms

of their education (school work) or inconvenience in relation to playtime. This shows that the household chores have been integrated into their routines without much resistance from them.

Interaction with school teachers indicates that dropout rates and absenteeism have dropped

significantly in the past decade even for girls. This can be attributed to the availability of household tankas and tanker supply. Occasional absenteeism for a few days in a month can be observed for girls from poor backgrounds and marginalized communities.

Table 11: Typical routine of boys and girls (8 years up)

Time	Boys	Girls
6 a.m.	Wake up and morning routine, breakfast	Wake up and morning routine, breakfast
7 a.m.	Playtime; Rajput boys help in fetching water	HH help to parents, fetching water when needed
8 a.m. – 10 a.m.	Homework and study, playing	Homework, household work
10 a.m. – 4 p.m.	School	School
4 p.m. – 6 p.m.	Playtime and study, guiding cattle to pond	Household help, fetching water, play
6 p.m. – 9 p.m.	Household help if needed, play time	Household help
9 p.m. – 10 p.m.	Study	Study
10 p.m.	Bedtime	Bedtime

Gender roles summed up:

- Household tankas have not only reduced drudgery for women, but also reduced social discrimination in access to community water sources
- Crucial decisions about the timing of fetching water, spending on water, construction or purchase of storage and filtration facilities, are still made by men at the household level
- There has been a reduction in the drudgery of fetching water (from far distances) because of increased piped water supply in recent years, and more importantly, also, due to access to household-level storage facilities in the form of tankas
- No significant examples of women playing decisive roles in planning or managing water resources at community level.
- Irregularity of water supply and other O & M issues do put some stress on women as their routines are disturbed. But most women do not complain because the tanka storage facility has granted them perhaps their most longed for wish, that is respite from the previously unavoidable and most arduous task of daily fetching of water.

3.10 Socioeconomic and opportunity cost

In a 2016 estimate, UNICEF calculated that around the world, 200 million women and girl hours are spent every day on collecting water, which is a colossal waste of valuable time. In the context of Barmer and Jaisalmer, the opportunity costs of collecting water are high, with far-reaching effects for women in poor and vulnerable families. The time they spend on fetching water considerably shortens the time they have available for their families, child care, other household tasks, or even leisure activities. For both boys and girls, water collection can take time away from their educational pursuits and sometimes even prevents their attending school altogether. Fortunately with the advent of the tanka, boys and girls do not have to spend much time fetching water any more.

Expenditure on water

The major expenditure on water is on the purchase of tanker supply, which varies according to the economic conditions of households. Spending on water purchase ranges from 10–18 of annual expenditure of households and 5.5–11 of total annual income. The cost of full tankers ranges from Rs. 200–1,200 for about 3,500 litres. The variation is due to actual distance from the source, location of the household, and seasonal availability. While actual expenditure on water may be low even for economically weaker households, the percentage of their income spent on water is higher as compared to well-off households. Of their total expenditure also, the percentage used for water is greater than that spent by the well-off. Ironically for poor households, the opportunity cost in terms of loss of employment is higher compared to the cost of buying water from tankers. Hence, they prefer to buy tanker water rather than spending time on fetching water.

Table 12: Expenditure on water purchase

Expenditure on water purchase					
Type of HH based on economic condition	Average Annual Income	Average Annual Expenditure	Average annual spending on water*	% Annual spending on water in proportion to income	% Annual spending in proportion to annual expenditure
Poor households	Rs. 50,000–80,000	Rs. 30,000–50,000	Rs. 6,000–8,000	11	18
Average Household	Rs. 1,50,000–3,00,000	Rs. 1,00,000–1,50,000	Rs. 12,000–15,000	5.5	11
Financially well-off household	Rs. 3,00,000–5,00,000	Rs. 2,00,000–2,50,000	Rs. 20,000–25,000	5.5	10
*mainly on tankers					

Impact on health

Health issues related to the quality and availability of water can be seen through two different prisms. One is the perception about the importance of safe drinking water, i.e. awareness regarding its quality and on the other hand, the actual impact on health due to quality issues and scarcity.



I cannot afford to buy treated RO water. I use tanker water to bathe my children, although it may not be of a very good quality.

– Madhu Meghwal from Mokla village

It was observed that awareness about health issues connected to safe water and hygiene is low among men, women and children in both districts. This was evident from individual, household and community practices like

- no use of water purification methods for drinking water, at the household level, not even the basic ones like boiling;
- no regulation of usage of surface water sources used for fetching drinking water; and
- open defecation near the water sources at some places.

However, the actual impact of the quality of water was evident in sporadic cases where excessive salinity (TDS) in ground water lead to minor to major stomach related problems like gastrointestinal discomforts, kidney stones, etc. Excessive TDS was found in Trishuliya in Barmer; Bhadasar and Mokala in Jaisalmer. Excessive fluoride, specifically in Jaisalmer district has led to joint degradation and joint pain (skeletal fluorosis) and spotting on teeth (dental fluorosis). High nitrate and fluoride content in water is found in Khabia, Khaba and Dedha in Jaisalmer. However, people largely denied that there were major problems or widespread or endemic diseases related to water quality and scarcity.

It was also observed that poor families were not willing to pay for treated water from community RO plants, as they fetched water from the local ponds/naadis. For them the cost of treated water weighed over the quality of water, or in other words, when resources are scarce, quality becomes secondary. Indirectly this is the opportunity cost they pay for unaffordable safe drinking water.

“My life revolves around water”

Chagni Devi (age 40) is a widow with a 10-year-old son, residing in Bhilo ki Dhani of Sanwlore village. Being illiterate and with no agricultural land or other employment opportunity, she has to rely on the sale of goats and a widow pension to take care of her and her son's expenses. Even though her income is a meagre sum of Rs. 15,000–20,000 per year, she got a small storage tank constructed at her home— a tankli (of about 2,500–3,000 litre capacity). Now, she fetches water from the community tanka about 400 metres away and also pays Rs. 4,000 annually for refilling the community tanka from tankers as part of her share. She spends about 2–3 hours daily to get water for her family and livestock.

Chagni Devi of Sanwlor village, Barmer



Impact on education

As noted in earlier sections, with the availability of tankas and tanker supply, the cases of dropouts and absenteeism among girls in the school have declined dramatically. Interactions with boys and girls also reveal that they spend much less time on fetching water compared to earlier times. However, it was noted that girls now spend more time on household chores like cleaning and cooking than the boys. The only exception to this was in the Rajput community, where boys were involved in outdoor activities related to water, as girls were not allowed to move outside for work.

Safety issues connected to fetching water

Many instances that pointed to the existence of safety issues especially for elderly women, young children, girls/boys fetching water from naadis, open wells and household tanks. Slippages while fetching water leading to bruises, bone damage and even death due to drowning of elderly women and children have been reported in a few villages. Injuries due to falling off from household tankas and open wells and even death of children have been reported. However, no instances of sexual harassment were reported in these villages, probably owing to the fact that normally girls and women go in groups of 4 or 5 to fetch water and generally only during day light.



3.11 Barriers and enablers

To address all the issues discussed in the previous sections, we need to understand the enabling and hindering factors behind them. This section discusses barriers and enabling factors, both present and future regarding the three focus areas of water management, gender and social inequities.

A. Water access and management

Barriers

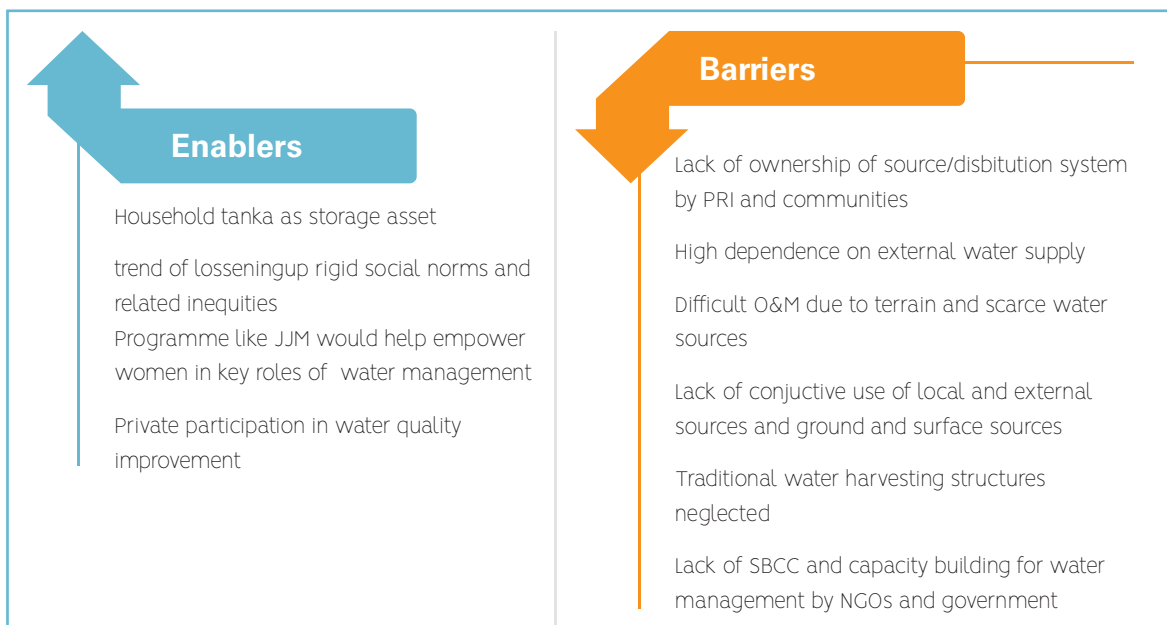
Barriers to the accessing and management of water in this area can be categorized into three broad parts :

- 1) Demand side:
 - a. Lack of effective processes by government and CSOs which inculcate a sense of

“ I am not aware of any such committee. It may be only on paper. I don't know of any VWSC which is active.
 - Village Sarpanch in Jaisalmer

- ownership among PRI and communities
 - b. Deeply entrenched social customs and hierarchy which prohibit effective community processes
 - c. Dying wisdom and motivation for conservation of traditional water harvesting structures
- 2) Supply side:
 - a. Lack of process and performance indicators for monitoring effectiveness and efficiency of water supply and distribution at various levels
 - b. Lack of initiatives from CSOs and Government on revival of local water sources and their management
 - c. Conjunctive use of external and local sources as well as ground and surface water sources
 - 3) Conducive environment: Lack of an appropriate SDM and institutional mechanism for achieving the common goal of water security

Figure 18: Enabling and disabling factors in water access and management



Enabling factors

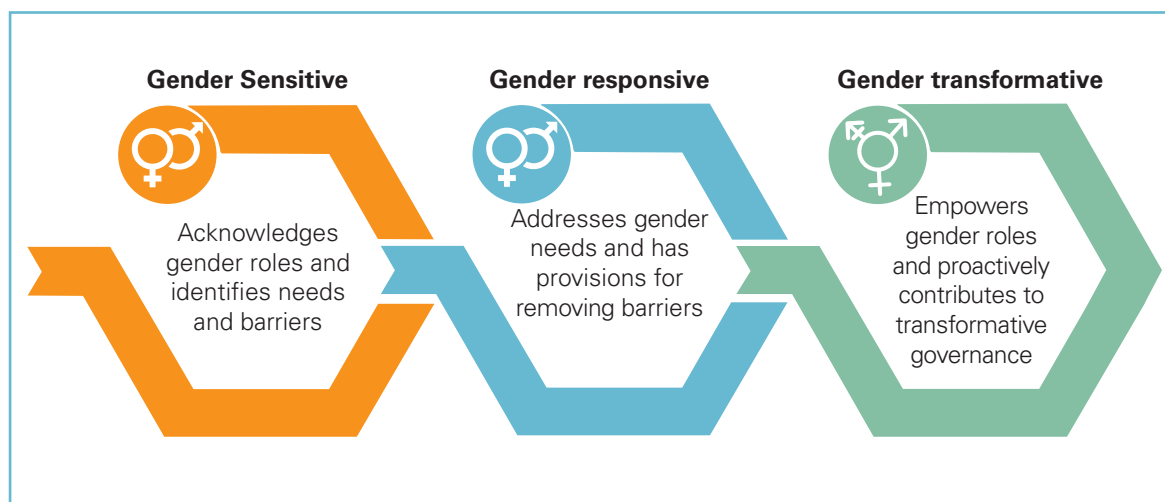
- a) Universal adoption of tanka and *tanklis* as household storage units have made it them valuable asset for all households.
- b) Awareness regarding water management, harvesting, and the importance of judicious use was already present and has helped communities to adapt to scarcity. Low incidence of health problems related to water can be attributed to this awareness.
- c) Implementation of JJM will help to leverage the effective role of communities, to revive local institutions like VWSC and legitimize works of CSOs in improving water management in a just and equitable way. It will also enable stakeholders to recognize their role in achieving common goals and to

seek clarification regarding processes to be adopted.

B. Gender-transformative water governance

In our study we found no evidence of any significant role played by women in water management. However, there are a few cases outside the study area (in Rajasthan) where NGOs/CSOs have been engaged in awareness and capacity building of women's groups or individuals in connection with water issues. Largely, water management is dominated by men at the community level, and decision-making at household level. The analysis of provisions of various programmes and policies, both central and state, indicate that the involvement of women in 'water governance' will take some time to come on the agenda at the highest level.

Figure 19: Gender-transformative water governance



At the policy level, JJM can be considered as having a built-in mechanism to bring about gender-transformative water governance, as it has a provision for key roles to be given to women in the VWSC. Both NRWDP and MGNREGA along with JJM have provisions that address women's needs

at the planning stage and thus they can be termed as gender-responsive. MGNREGA, NWDRP and JJM all acknowledge gender roles, making them gender-sensitive in nature. Other policy directives are either gender-neutral or plainly gender-blind. Similarly, only JJM differentiates community needs

according to vulnerability and socioeconomic hierarchy, while other programmes take the community as a homogeneous block and do not address prevailing inequities.

At the community and PRI level, there is no platform or institutional mechanism that can lay emphasis on gender roles in water management. VWSC is supposed to have women members in committees, but the institution itself is defunct in villages.

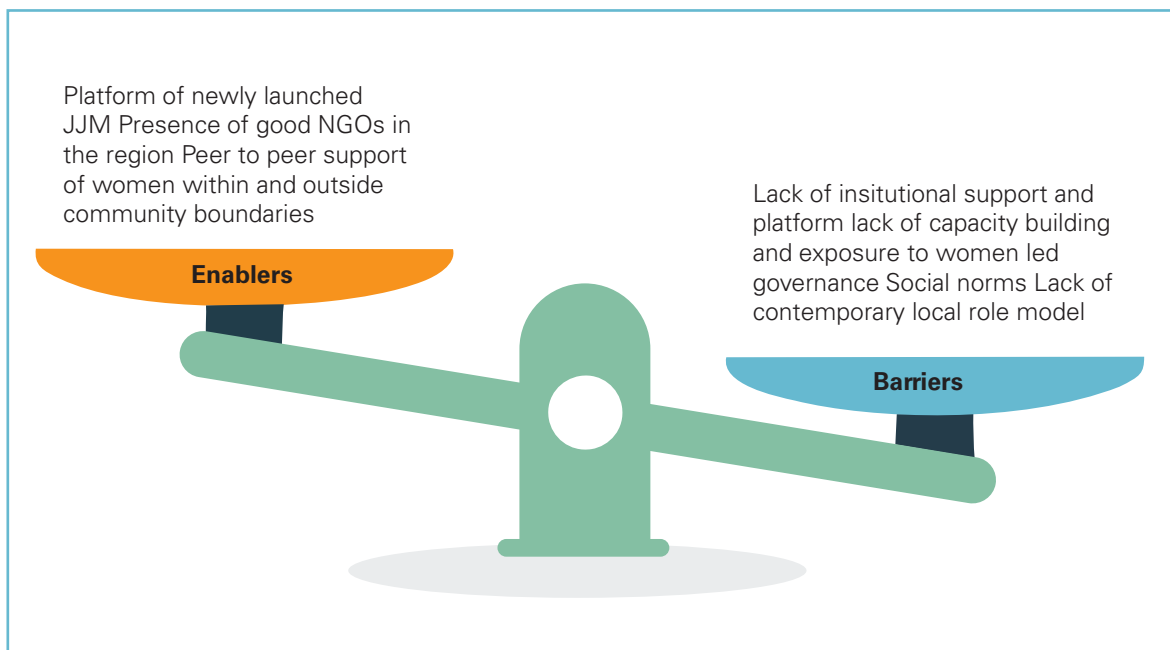
Intra-household decisions are largely dependent on individual sensitization, but in the study no cases were found where women acknowledged that they played a decisive role in household water management. No single community displayed this virtue. In the Rajput community women are not allowed to go outside and hence men fetch water when needed, but this arrangement is hardly empowering as women live under severe restrictions and are dependent on men for their water requirements as well.

Key barriers

It must be acknowledged that there is a lack of an integrated SBCC strategy and capacity building programme to tackle decision-making roles in water management at the community and institutional levels. The Drinking Water Advocacy and Communication Strategy Framework (DWACS, 2013–2022) was developed by UNICEF in collaboration with the Department of Drinking Water and Sanitation, but it has been abandoned. The insights in DWACS are relevant and pertinent for adopting a comprehensive SBCC strategy as discussed in the Recommendation section

None of the villages have women leaders playing important roles in water management. There is also no handholding to support women members of communities to boost their confidence about participating in water governance. In the absence of an institutional mechanism for capacity building opportunities for women to help them excel in water governance, there is little hope of turning around the situation rapidly.

Figure 20: Enabling and disabling factors in gender-transformative water governance



- Lack of institutions working for gender empowerment with a focus on water management, especially in Jaisalmer. GRAVIS, SURE, Unnati and a few others have their programmes in Barmer and in a few pockets in Jaisalmer, which need to be scaled up and mainstreamed with government programs.
- Lack of support system within the family and community to enable women to move up the ladder of leadership
- Lack of regional and contemporary women role models who can inspire and motivate other women to take up, or aspire to, leadership positions.
- Good groundwork by a few NGOs in a few pockets in social mobilization and gender issues, which can be capitalized and scaled up. As noted earlier, the good work of NGOs can be capitalized to create a focused programme on gender empowerment in water governance.
- With JJM, the role of women in VWSC may get boosted and which may ultimately enable greater female leadership in water management.

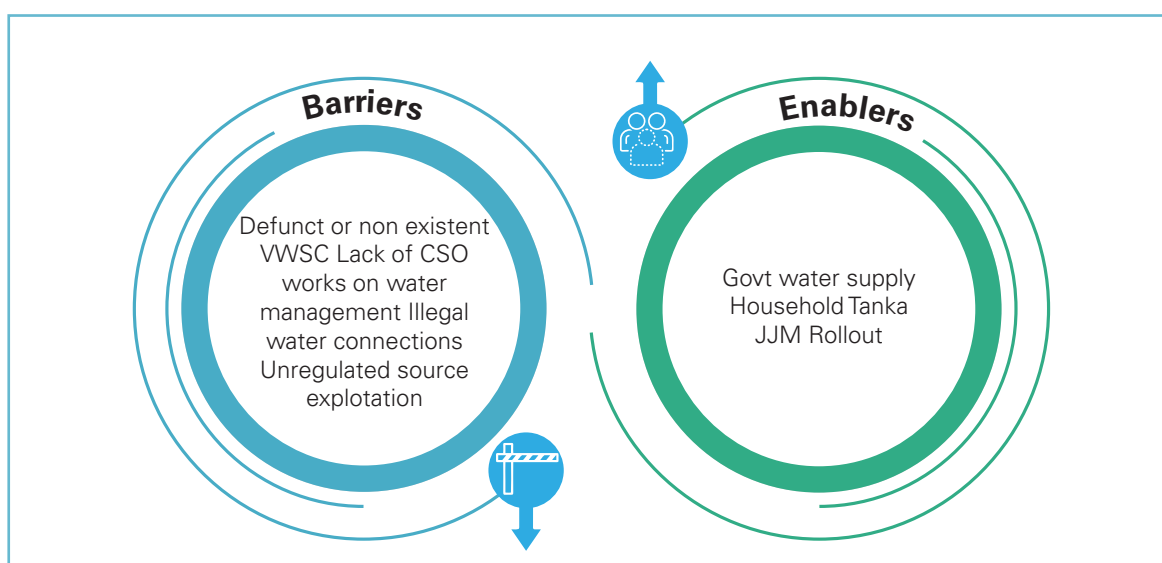
C. Social equity

As discussed in earlier sections, the lack of institutional mechanisms to ensure equitable planning of water supply and management at the village level has been the prime barrier that prevents marginalized families from accessing water as others do. In the absence of local platforms like VWSC, which can ensure representation of all sections of society in local planning of water distribution, the decisions on water management often lie with the influencers of the village. This situation can effectively deprive a marginalized

Enablers

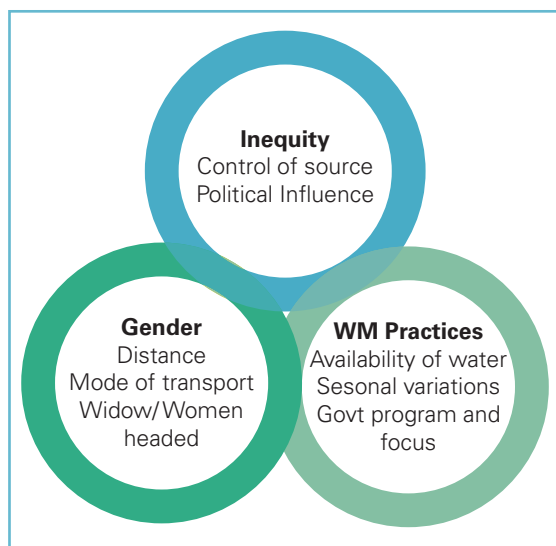
- Peer to peer support within the community for women (and some instances of intra-community cooperation also). In most villages, the differences among women across social strata were found to be less rigid. There were also indications that the women themselves were more accommodating with each other as compared to men.

Figure 21: Gender-transformative water governance



community of its right to access water. Lack of credible work by CSOs on water management at the PRI and community level has also hindered the cause of equity. Increase in tanker water supply has resulted in increased exploitation of natural resources at the expense of the poor, because the business benefits only well-off people, who can afford to acquire tankers (and tractors) to fetch water from common resources without any cost. So the poor are doubly deprived, firstly because they cannot access the common resources and secondly they pay a high price to get water.

Figure 22: Overlapping issues of equity, gender and WM practices



4.6 Summary

To summarize the issues identified using the three different lenses of inequity, gender and water management practices, it is important to understand that there are several overlapping

issues. The most common one, and which is relevant in all circumstances, is the economic condition of the household. The inescapable conclusion is that without physical and social assets (support system), the family or individual is vulnerable to discrimination and deprivation.

In villages, where the dependence on local sources like naadi is very significant as compared to government managed supply, issues of inequity in access are widely seen. Marginalized families face double deprivation by having to buy tanker water which is fetched from common resources without any payment, and sold to them at a high price. Thus, the well-off and influential people have a double undue advantage in that they have access to common resources, but indirectly also control their exploitation.

The location of habitations also plays a major role in water management practices and in the control of sources. The social norms and decision-making at household or community levels adds to the inequities and gender issues regarding water management. Interactions with women's groups have revealed that gender roles in fetching water also depend upon the distance of the source and mode of transport required, besides the caste-based norms. The social and opportunity cost for women of managing water at the household level increases in times of scarcity when the purchase cost of water goes even higher than usual. The decision-making on water use and expenses is always skewed in favour of men.

(Some of the major community voices and their inferences are listed as annexure 7)



श्रीमान जी.पी. शीखा
श्रीमती शीखा

श्रीमान अभियान
पौधे काटने का कार्यक्रम

5

Recommendations

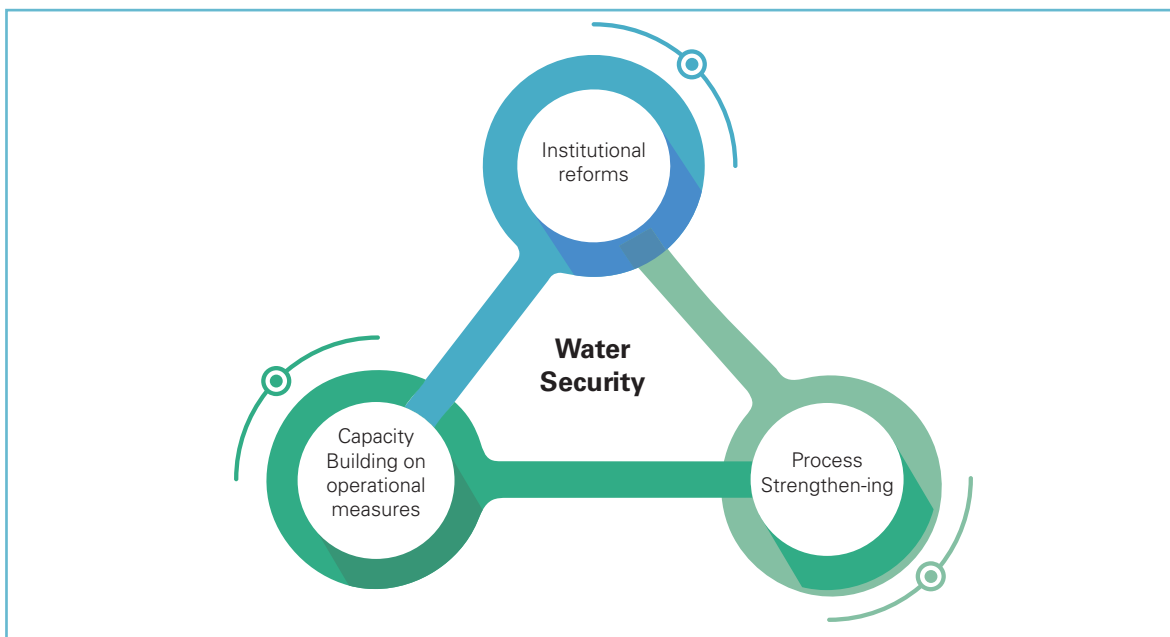
It is evident from the literature review and insights gained from field visits that, in spite of multiple schemes and large amounts of resources spent by the government, in general the water security situation in the state and particularly in the study districts, still remains bleak. On the other hand, there are a few examples of success both in government and NGO schemes which indicate that a lot can be done to change the situation completely. What is very clear is that no single source or technology will suffice particularly in the western districts. Hence a combination of sources and technologies will need to be deployed in an integrated manner.

What is missing is a concrete plan for orchestrating different departments and agencies, and ensuring

that they function in an integrated manner. It is important to 'co-evolve' solutions with the local communities themselves, which calls for sector wide collaborations of all stakeholders. Also needed are innovative mechanisms to make government departments and contractors accountable. The review provides some examples from outside the state also, where certain processes and systems have been used successfully in achieving many water security goals.

Key findings on the aspects of gender, inequity and water management practices reveal that working on three factors simultaneously can contribute to water security in the project region: Process Strengthening, Institutional Reforms and Capacity Building on operational measures.

Figure 23: Suggestive framework for water security



4.1 Internalizing the paradigm shift:

With the rollout of JJM, it is evident that there has been a major paradigm change in the way water management is looked upon. The focus is now on water security rather than just management. But to bring about the desired goals, this change has to trickle down from the national level to the state and further to district, block, PRI and community levels. And hence the processes of planning and implementation of water supply schemes have also to be seen with changed lenses. Some tasks that can initiate such a change are:

- Creating mass awareness on objectives and methodology for implementing JJM
- Involving qualified women at critical decision-making stages, including planning, procurement, accounting, technical and financial sanctions, monitoring and O&M
- Sensitization towards the core principles of "equity" and "water for all" at all levels. Making it mandatory to prioritize marginalized families in the planning and implementation of water supply schemes.
- Adopting a demand driven process which places the onus of responsibility and accountability for fulfilling the objectives of the Mission, and adhering to the core principles, on PRIs. The idea here is not to burden them with additional tasks. The point is to ensure the sustainability of the system where investment is made by empowering PRIs with required skills along with assured funds.
- Integrated planning of water resources and conjunctive use of water may be included in the core principles

In the future, the concept of the "right to water" can give a better framework for adopting and

institutionalizing the paradigm shift. States like Madhya Pradesh consider water as a basic right of citizens and have adopted this approach to address water security issues.

Water rights legislation

Madhya Pradesh is planning to implement a water rights law in the state very soon. According to the guidelines on the Right to Water Act, 55 litres of water per day/person is proposed as the standard with stringent provisions for preventing wastage of water. Madhya Pradesh will be the first state in the country where a right to water law will be enacted.

Source: <https://www.indiatoday.in/india/story/55-litres-of-water-per-person-per-day-madhya-pradesh-to-enact-right-to-water-act-1554399-2019-06-23>

4.2 Overhauling institutional mechanisms for greater transparency and accountability

It is clear that a mission as ambitious as JJM will need new and improved institutional mechanisms and perhaps overhauling of the existing ones. The role of PHED and WSSO will be crucial in this matter. While it is foreseen that PHED will be the bulk water provider up to the GP level, the mechanism of internal distribution and management of water is still a matter which needs attention. In this light, WSSO has to be strengthened and expanded to the block level to take on the responsibility of reviving WVSC and to build its capacity for managing water supply within the village/ GP. This will help WVSC, PRI and communities to take ownership of infrastructure created for water supply at the local level and ensure sustainability. JJM

proposes to engage communities in planning, implementation, management, and O&M of the water supply system. It proposes that the GP or its subcommittee like VWSC function as a legal entity to carry out the responsibilities of water supply management in the village. Subcommittees are advised to comprise 10–15 members with 25 elected members, 50 women members, 25 from the weaker sections of the village (SC/ST representatives) proportional to the population. This inclusion is very much needed for effective representation of all socioeconomic strata and women in these committees. Also, considering the scattered location of dhanis and in-village distances, formation of such institutions

at the village level or even at habitation level as against centrally at revenue village of GP can ensure effective governance, specifically in districts such as Barmer and Jaisalmer, which has scattered population

Overhauling institutional mechanisms is a monumental task which will need major institutional reforms. We have a case of successful SDMs like WASMO in Gujarat, which ensure engagement by CSOs as implementation support agencies (ISA) to handhold local water committees till project completion and beyond. Likewise, a detailed road map for revival of VWSC through a carefully selected ISA commissioned by WSSO needs to be prepared.

Listed below are some features of successful SDMs for water management in India.

Lessons from various service delivery models in India

Maharashtra

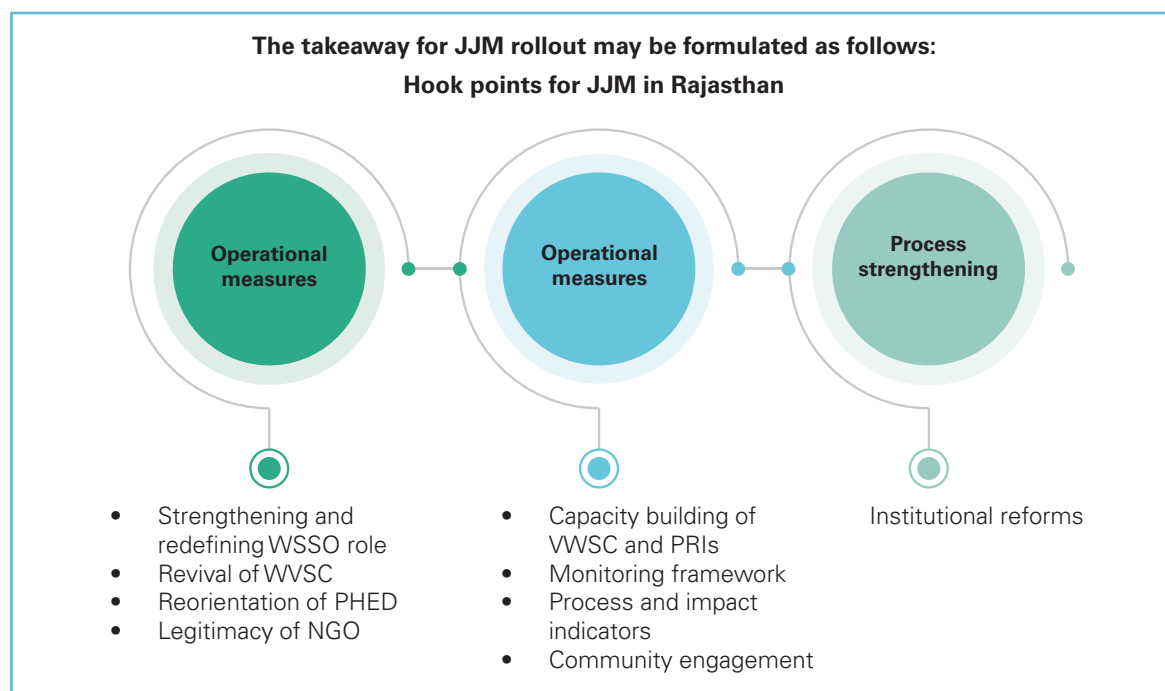
1. Demand driven approach and participation are critical to the sustainable delivery of RWSS
2. Initial capacity building is an important activity to prioritize before the formation of local committees
3. Sustainable operation and maintenance (O&M)
4. Special needs of quasi urban and peri urban areas
5. Integrated village development and the need for coordination among different sectors at different levels
6. Aquifer management and multi-village collaborations
7. Integrated M&E system and monitoring cycle
8. Adaptation of fiduciary requirements to the demand driven approach and large scale intervention approach

Kerala

1. Decentralized service delivery approach for RWSS has the potential for scaling up access.
2. Need for enabling environment
3. Community demand driven is certainly the most appropriate approach for providing sustainable and high quality WSS services in rural areas
4. Active participation of local governments is also critical to ensure greater accountability and long-term sustainability
5. Improved assessment of cost estimates

The takeaway for JJM rollout may be formulated as follows:

Figure 24: Hook points for JJM in Rajasthan



The takeaways for JJM rollout may also be understood by focusing on institutional roles in water delivery. For this purpose the governance

model may be represented with reference to institutions:

Table 13: Institutional matrix – roles and functions

Institution	Role	Process improvisation	Structural reforms
PHED	Water infrastructure and bulk supply	Developing and following performance indicators	Prioritize recruitment of women at decision-making levels
WSSO	Gender-transformative water governance	Developing and following process and performance indicators Collaboration with NGOs and private players	Strengthen at state level, expand at district level
District committees	Bridge between VWSC and state for support and MIS Capacity building of VWSC members on technical matters	Making conducive environment for women members in VWSC	New formation Inclusion of 50% women members

Institution	Role	Process improvisation	Structural reforms
PRI	Maintenance of water assets at GP level Facilitating smooth functioning of VWSC	Making conducive environment for women members in PRIs and Gram sabha Coordination with district committees	Revival of VWSC and orientation for new water paradigm Following norms of JJM on representation of women and marginalized sections
VWSC	Grievance redressal Equity and inclusion	Meeting and resolution charter Prioritizing needs of vulnerable groups Coordination with NGOs	Revival and execution of core functions Representation of women Representation of marginalized communities and remote habitations
NGO	Capacity building and sensitization on gender, inclusiveness, and transparency	Coordination with VWSC and PRIs Engagement with community	Partnership role with government
Ombudsman or Joint committee	To address water conflicts and grievances	Legal mechanism to ensure performance, grievance redressal and conflict resolution Right to water legislation	<ul style="list-style-type: none"> • Appointment of Ombudsman • formation of committee with 50% women members

Process and performance indicators should be evolved for each stakeholder involved in the operation and management of water supply. The indicators should be monitored by an independent agency. In order to promote good governance and efficiency in the system, positive outcomes on the indicators should be incentivized. A robust grievance redressal system should be put in place to address all issues regarding water supply and management. It can be in the form of an Ombudsman or a Joint Committee with the involvement of senior government staff and the judiciary.

4.3 Capacity building and enhancing social capital

It must be acknowledged that civil society organizations have been successful in building social capital and in helping to reduce gender bias and social inequity issues. There are a number of such instances from Gujarat, Karnataka and elsewhere. There is also growing evidence that the empowerment of women and marginalized sections through targeted capacity building and social processes has actually improved water management at the local level. Hence the third

set of initiatives recommended is building capacities of institutions (PRIs, NGOs, VWSC, SHGs, etc.) and individuals (like para workers, Bhujal Jankars, Jaldots, operators, etc.) to bring about a culture of transparency and efficiency in project implementation.

Enhanced social capital has the potential to ultimately lead to gender-transformative governance in water management practices. In this context, building the capacities of women—making them confident enough to have an opinion and to assert it, and enabling them to play a functional role in decision-making—becomes very important. For such a scenario to be translated on the ground, it is imperative that authorities recognize the significance of the role of women and nurture women leaders across the organogram and functions of all institutions involved in domestic water security.

Bhujal jaankars – para hydrogeologists

Under the action research study on Participatory Ground Water Management, a cadre of 20 trained para hydrogeologist locally known as bhujal jaankars for the project villages was developed by Development Support Centre (DSC). The hydrogeologists were trained to map changes in surface and ground water using simple tools and also to communicate the importance of the conjunctive use of water with communities in a relatable manner. These hydrogeologists have the potential to become real change agents for arresting the ground water depletion locally. If provided proper guidance and opportunity, they can fill the gaps that the planners and the implementers face, by acquiring knowledge of the local geography and geology as well as the capabilities to communicate the importance of necessary changes to communities and so to get their cooperation.

³⁰ Adapted from WASMO model of Gujarat

It is also important to set out the role of women upfront in all policy, strategy and operational documents. This includes components of:³⁰

- a) Capacity building on gender and equity
- b) Sensitization of all relevant departments and nodal agencies in the very beginning of the rollout of the project
- c) Gender strategy in the guidelines at all stages of project cycles
- d) Emphasis on gender segregated data and reports by all agencies
- e) Formulation of strategies to enhance participation of women members

Meaningful associations with NGOs and CSR projects should be explored for integrated interventions, ensuring effective community participation and avoiding duplication of effort. To ensure transparency, NGOs must be partnered directly with WSSO, rather than with subcontractors by the Civil Contractor/ Service Providers .

SBCC strategy

It is evident that to bring in sustained improvement in water governance, capacity building of institutions and sensitization of individuals would play important roles. However, it will need a well-defined integrated strategy for social and behavior change on the ground. Extensive capacity building is needed at multiple levels, right from decision makers to individuals in the community, to strengthen water governance with a focus on gender and equity. JJM can very well achieve this end by involving various stakeholders



We don't have TV, we are not literate and so can't read posters. We like skits and street dramas.

– Aged man from Khabia

under an integrated strategy.

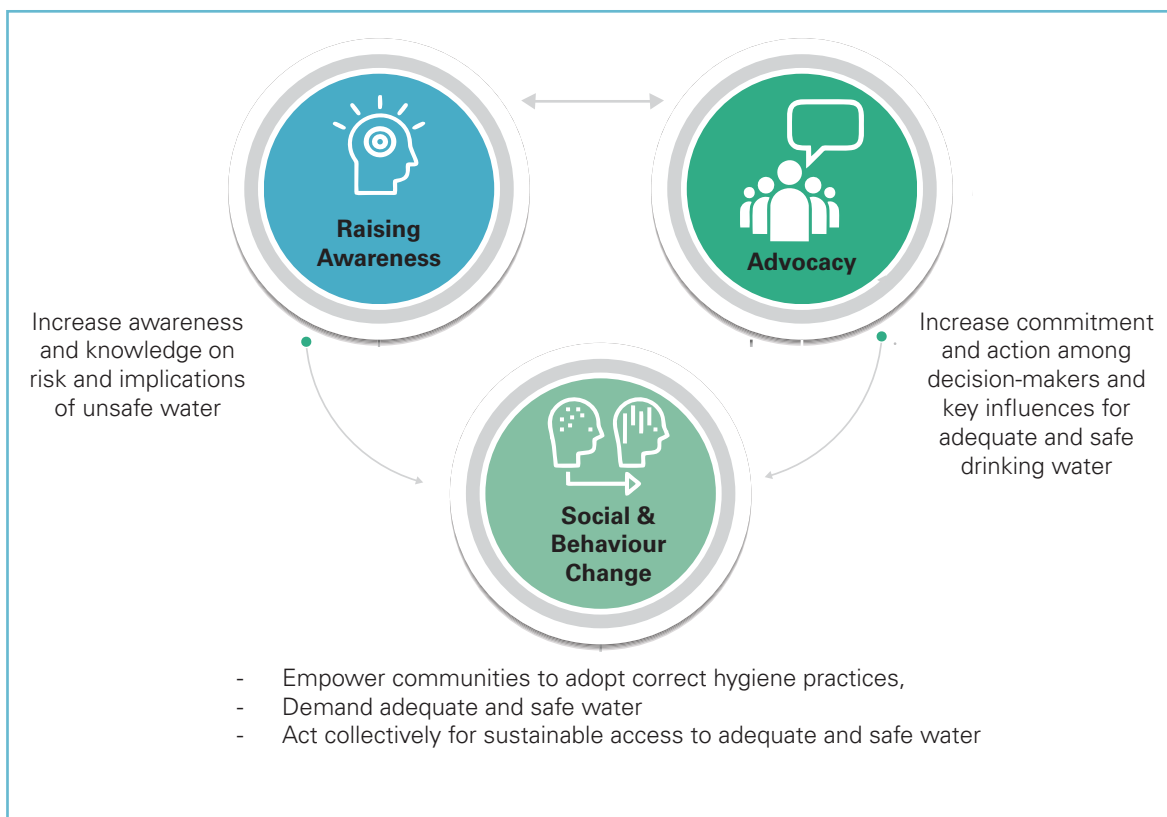
DWACS developed by the Government of India and UNICEF presents the road map from 2013 to 2022. However, there has been little progress and adoption on its recommendations by state governments till now, and there is a need to revamp this strategy to suit state and district conditions. Some of the pointers from this document which may be helpful in the JJM rollout are explained below:

1. Phases of behavior change³¹

The three phases of the strategy could be: Raising awareness, Advocacy, and Behaviour change. However, they are not sequential and there will be a degree of overlap in activities carried out during

implementation. The division has been created to facilitate strategy design and implementation at the macro level in a logical sequence. However, when working at the micro level, that is, at the level of families/communities, state implementers will need to understand which phase the families/community is in to make the communication more relevant to their needs. For example, there are families in a community that are not aware of the risks of not safely storing and handling drinking water, whereas others could be aware, but not doing anything about it, and others could be in the process of adopting some of the key desired behaviours. Therefore, it is important to first analyse and understand in which phase individuals or communities are before communicating with them.

Figure 25: SBCC– Phases of behaviour change

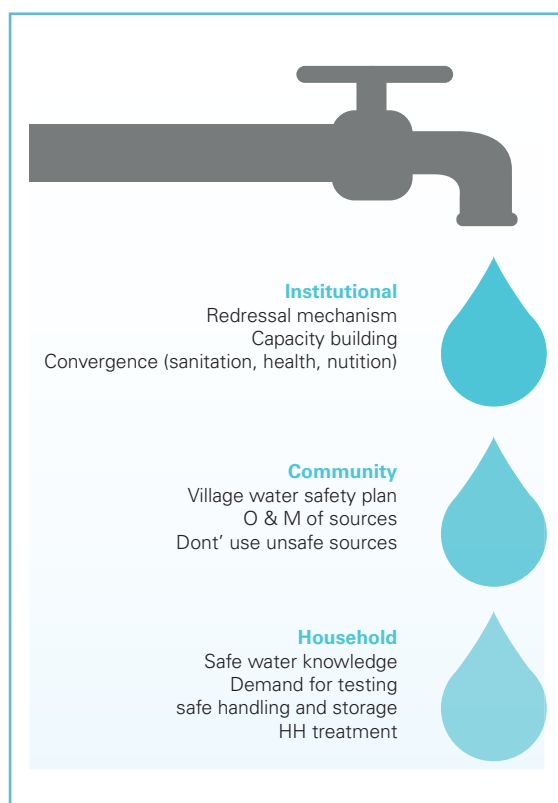


³¹ Drinking Water Advocacy and Communication Strategy Framework (DWAC) 2013–2022, GOI, UNICEF

2. Activities to enhance enabling practices for safe water

Figure 26 lists the range of activities, knowledge and interventions needed at different levels to ensure the attainment of safe and sustainable water sources. The framework entails influencing change at different levels including family, immediate social networks, the broader community, responsible government institutions and key stakeholders creating an enabling environment that supports this change.

Figure 26: SBCC– Activities for enhancing enabling practices for safe water



3. Stakeholder segmentation

For any communication strategy to be effective it is important to identify key stakeholder groups (also referred to as participants) so that the

strategy can be tailored to suit their needs. Only then will it actually succeed in helping them to practice and sustain the desired behaviours. Different communication approaches, messages and content are needed for each of the participant groups. Identification of key influencers and participant groups allows for better designed, more focused and clear messages. For this purpose it is useful to segment the participants into primary, secondary and tertiary groups.

Primary stakeholders/participants

Those who are being addressed directly to change their behavior

- Household– men, women and children
- Community including VWSC/VHSC members

Secondary stakeholders/participants

Those who influence the behavior of primary stakeholders

- PRI, school teachers, frontline workers– Aanganwadi workers, ASHA, SHGs
- Community leaders, religious leaders, local NGOS

Tertiary stakeholders/participants

Those with whom advocacy for creating an enabling environment would be required

- Policy makers, programme managers, media, opinion leaders, youth, academia, private sector bodies

Table 14 summarizes the key messages and recommended channels required for the propagation of SBCC activities. Recommendations are based on the interest of local people (particular audience) and the access and popularity of various channels in the community. For example, television can be a very effective method of mass

communication, but in villages access to, and popularity of, TV is very low and hence channels like street dramas or video shows may be more appropriate. Women and youth have a special role to play, as the recipients of key messages, communicators, as well as instigators of change.



Young people use smartphones and internet extensively. May be any kind of audio video on phone may help

- young man from Bhadasar

Table 14: Key messages for SBCC

Key messages	Audience	Most appropriate channels*
VWSC takes lead role in water management in the village/GP Importance of functional VWSC	Community, PRI and administration	Interpersonal meetings, trainings, workshops
Restrict fetching of drinking water by tanker vendors from GLR	Community and PRIs	Community-based meetings, workshops
Support landless and women-headed families that do not have tanka	PRI and administration	Inter-personal meetings, workshops
Women should play decision-making role in water management	Women, PRI, community	Interpersonal and community-based – skit/drama, exposure visits, sensitization workshops
Women and youth form community monitoring groups	Women and youth leaders	Interpersonal and community-based – skit/drama, exposure visit, sensitization workshops
Importance of conservation and development of local water sources	Community, PRI	Community-based– digital media– video shows, video over internet, exposure visit
Importance of awareness about conservation and management of traditional water harvesting structures and related local practices	Community, PRI	Community-based, interpersonal– exposure visits
Importance of awareness about water recharge structures	Community, PRI	Community-based, digital and mass media

*Here we are talking about four main types of channels for communication:

- **Interpersonal communication methods are those that involve person-to-person** or small group interactions and exchanges. Examples include meetings, counseling, peer education, hotlines, support groups. This method may be by far the most appropriate for sustained change in this region. It can be facilitated by NGOs with relevant expertise.
- **Digital or social media**– digitized content, such as video, text, images, and audio, that can be transmitted over the internet, or mobile networks. With penetration of smart phones and internet in the remotest areas, this method is useful for targeting the youth. Examples include websites, vlogs, blogs, social networking sites, online games, eLearning, software, and applications.
- **Community-based** channels are those that are designed for/with and carried out in communities. They could include local theatre, songs, community radio or television, community events, community dialogue, community mobilization or advocacy, outreach, or sports. In remote dhanis and close-knit communities, these channeled work well in building social capital.
- In field areas, the popularity of TV, radio and newspapers is very low and so is access to them. However, video shows may be a good way of communication.

4.4 Improving operational measures:

There can be a number of recommendations for improving operational measures and bringing in good water management practices. Most relevant to JJM are :

Source sustainability: While achieving household water connections through piped supply is the major focus for rural drinking water supply, source sustainability should be given more attention. Decentralization through augmenting local resources through traditional knowledge of the community should be considered vis-à-vis improving the water infrastructure. Rainwater harvesting systems with storage tanks should be taken up on priority basis for households which are yet not covered, particularly the vulnerable groups. Considering land availability and the rising pattern of rainfall in the study region, more efforts can be made to harvest rainwater from roofs or other surfaces.

Rain water harvesting cluster tank, Ramzan ki Gafan, Chohtan Block, Barmer

The major source of domestic water in this village is open wells. The source is limited and has high TDS content, and the water is not good for drinking.

In 2016–2017, a cluster storage tank was constructed by PHED in Ramzan ki Gafan Village, Chohtan block, Barmer District with a paved catchment for harvesting rainwater.

In normal rainfall years, about 2.5 lakh litres of water is harvested and stored through this system.

The system is located near the gram panchayat building. Water fetching is regulated by the panchayat. About 250 HHs fetch drinking water from it. People are allowed to fetch water manually as per their requirement and to transport it by camel cart or to carry it in utensils. However, no tanker filling is allowed.

The system has been effectively functioning for the past 4 years and the community is able to fetch adequate and safe drinking water.

In households/clusters, where piped supply may not be feasible due to isolated locations and elevated topography, increased sizes of HH tanka or cluster-level storage tanks based on rainwater harvesting should be considered. Massive efforts should be made in the region for augmenting local resources through artificial

recharging in suitable soil conditions. Projects for desiltation and deepening of ponds done under MGNREGA can be strengthened by using geospatial tools for field investigations to identify appropriate locations for rainwater harvesting and groundwater recharge structures. The help of the National Remote Sensing Centre (NRSC)³² can be sought for this purpose.

Rural Drinking Water Enterprise (RDWE) has emerged as a response to water quality and scarcity problems in villages in India. Initially limited to some pockets, they are now widespread in some states. Such enterprises are entirely community owned, some privately driven and most in the middle with a mix of social and business objectives.

Pani samitis, subcommittees of gram panchayats, supported by the Water and Sanitation Management Organization (WASMO) in Gujarat represents the devolution of drinking water planning responsibility to the village level. Activities undertaken by pani samitis were demand-driven and with community participation. The RDWE was one such activity which went ahead with full community participation.

Even 5–10 years after the installation of treatment units, they have been operative with high coverage of 70–80%. The Government of Gujarat plants set up much later in 2008 under BOOT model were performing with much lower coverage and efficiency. Certain parameters like reject water and source sustainability, choice of technology, power availability, demand for treated water and viability of recovering operation and maintenance costs should be considered for sustainability of the system.

Source: 2018, "How Sustainable are Rural Water Enterprise" Synthesis of ITP-INREM Studies from Six States by International Water Management Institute (IWMI)

Paved catchment for cluster storage



Cluster storage tank



³² Reference from <https://www.indiawaterportal.org/articles/facing-water-crisis>

Water reuse and recycling: Waste water should be considered as a resource. With the plan to increase piped water supply and household tap connections, waste water disposal issues are likely to increase. Small systems and affordable technologies can be taken up along with piped water supply at household level as well as near community water sources. Soak pits or recharge pits can be made near stand posts, cattle troughs, also soak pits for greywater management at household level. Recycling of waste water through reed beds (grey water) as well as some simple technologies like the Decentralized Waste Water Treatment System (DEWATS) for black and grey water can be taken up. If needed, such activities can be dovetailed with other programs in this direction. JJM operational guidelines also focus on recycling and reuse of treated water for gardening, toilet flushing, etc. Reuse of treated water has a huge potential for generating kitchen gardens or fruit and other trees like neem in this dry region.

Improved water quality: Dysfunctional RO and defluoridation treatment plants must be revived. A more sustainable management mechanism needs to be ensured. Promoting entrepreneurship-based models through SHGs or youth groups can also be explored as to their sustainability. Demand generation in the community for good quality water for better health needs to be carried out. Awareness on a large scale about household water treatment like simple filtering and removal of biological contamination through boiling or chlorination/alum is needed.

Water Qualitytesting: Village-level water quality testing kits can be provided to GPs for regular testing of drinking water for chemical and microbial contamination. PRIs/SHGs or para workers can be trained for regular water testing of various sources in the village. This will also

create awareness and demand for quality in drinking water.

Equitable supply and access to all: Improved access to diverse sources of drinking water at household level should be developed, particularly focusing on the vulnerable sections in the community. Achieving tap water supply for all would be an ideal condition for equitable access. However, there may be topographical constraints for achieving it specially in isolated dhanis in desert areas. Alternatives like cluster-level water storage at dhanis (5,000–20,000 litres capacity for 5–20 houses based on density and topography) can be explored. These tanks can also be used to harvest rainwater. Moreover, disadvantaged groups such as landless and marginalized communities should be covered under the JJM umbrella by applying a differentiated approach to their needs. This entails all sections of society being meaningfully consulted in the design, implementation and monitoring of future policies and actions that address inequalities, so that all those who use the services are accountable for them. However, the authorities should not remove existing public facilities just to ensure payment (participation) by all households. Such an action goes against the concept of social equity, as poor households cannot contribute and may like to rely on public stand posts.

Based on the field study, it is evident that major issues like breakage of pipelines, theft, low pressure in higher elevation or tail-end villages (in terms of water supply network), etc. are major reasons for lack of sustained water supply and increased water leakages. These issues should be addressed technically and administratively during planning and maintenance. As stated by JJM operational guidelines, use of Hydro-Geo-Morphological (HGM) maps for location of ground water sources, GIS to find locations of existing

water sources, and 3 D contour maps for location of drinking water infrastructure can be used while planning new infrastructure. Moreover, use of sensors for monitoring water levels, discharge and SCADA (Supervisory Control and Data Access) to monitor parameters like pressure, flow rate, etc. can be planned.

Design of facilities for people facing barriers:

Water supply infrastructure must be located and built in such a way that it is genuinely accessible, with consideration given to elderly people and people with disabilities.

Water tariff: The 14th Finance Commission (2015–2020) defines sustainable drinking water supply systems as 'those being operated under a formal management model, have 100 household meters installed and whose net revenues from water tariffs and subsidies are sufficient to cover at least the O&M costs of the system'. Interactions with communities in study villages indicate that people are willing to pay water tariff if the services are metered and billed on the basis of unit cost,

like electricity. Considering annual household spending on tanker water supply, communities may agree to pay anything between Rs. 3,000–10,000 per year on water.

Convergence: Dovetailing of various programs within government departments, like watershed, forestry must be considered for integrated intervention and Integrated WRM. To address waste water drainage issues, convergence of solid and liquid waste management programs under Panchayati Raj, Swachh Bharat Mission, etc. must be considered. Any one department can take the lead in convergence and a detailed DPR can be prepared at district, taluka and even up to village level.

In a nutshell, there are four broad sets of initiatives that may be considered in order to address the issues of gender, social inequities and water management practices– the aspects which are core to this study. The following change matrix shows four initiatives set against the change parameters

Table 15: The change matrix

Initiatives vs change parameters	Common	Gender-transformative governance	Addressing social inequities	Promoting good WRM practices
Internalizing the paradigm shift on water governance	<ul style="list-style-type: none"> Focus on Water security rather than only supply Sensitization and orientation on new approach among all stakeholders 	<ul style="list-style-type: none"> Representation and involvement of women for crucial decision-making 	<ul style="list-style-type: none"> Sensitization regarding “water for all” Differential approach for landless and other marginalized communities in order to prioritize their needs 	<ul style="list-style-type: none"> Adopting demand driven processes Integrated planning for conjunctive use of water

Initiatives vs change parameters	Common	Gender-transformative governance	Addressing social inequities	Promoting good WRM practices
Capacity building and enhancing social capital along with social and behavior change	<ul style="list-style-type: none"> Engage reputed NGOs as support (partner) agencies Develop integrated SBCC on lines of DWAC (2013–2022) 	<ul style="list-style-type: none"> Sensitization and capacity building of PRIs and VWSC Include role of para workers such as Jal doots (water messengers) and Bhujal Jankars (for mapping local geohydrology) 	<ul style="list-style-type: none"> Facilitating cross community engagements for building social capital 	<ul style="list-style-type: none"> Use of new and improved technologies Water testing kits for VWSC
Improving operational measures	<ul style="list-style-type: none"> Women and community groups to monitor implementation of water related plans 	<ul style="list-style-type: none"> Strengthening community monitoring processes along with performance indicators 	<ul style="list-style-type: none"> Dhanis and scattered habitations to be covered in phased manner Facilities for drawing water designed free of barriers for safe use by elderly and differently abled persons 	Focus on <ul style="list-style-type: none"> Source sustainability Water conservation Treatment–reuse of wastewater RRWHS Traditional WHS Water treatment
Overhauling institutional mechanisms for better transparency and accountability	<ul style="list-style-type: none"> Community monitoring, robust grievance redressal (Call centre model, App–based, closing the feedback loop) 	<ul style="list-style-type: none"> Reviving VWSC and making it lead in implementation 50% women members in VWSC Multilayered monitoring (of execution and O&M) and informati 	<ul style="list-style-type: none"> 25% members from marginalized sections Use of social media 	<ul style="list-style-type: none"> Role of water provider and external infrastructure to be played by PHED Strengthening of WSSO at state level and expansion at district and block levels PRI and VWSC to play critical role in GP–level water management

Table 16: Institutional reorientation for JJM

Institution	New Role for JJM	Process improvisation and structural reforms for alignment with JJM
PHED	Water infrastructure and bulk supply	Enhancing water quality and improvement of source sustainability measures
WSSO	Work for socially equitable and gender-transformative water governance	<ul style="list-style-type: none"> • Collaboration with NGOs and private players • Strengthening at State level, expansion at district level, more human resources to be provided at block and village levels
District water committees	<ul style="list-style-type: none"> • Focus on demand generation for water infrastructure • To provide assistance to PHED on source sustainability measures • Bridge between VWSC and state for support and MIS • Capacity building of VWSC members on technical matters 	<ul style="list-style-type: none"> • New formation • Inclusion of civil society members, and experts, along with PRI members in district committees
PRI	<ul style="list-style-type: none"> • Maintenance of water assets at GP level • Managing distribution • Facilitating VWSC 	<ul style="list-style-type: none"> • Coordination with district committees • Revival of VWSC and orientation for new water paradigm
VWSC	<ul style="list-style-type: none"> • Nodal unit for water management at habitation and village level • Focus on equitable and gender-transformative water governance • Day-to-day management of water supply • Grievance redressal 	<ul style="list-style-type: none"> • Meeting and resolution charter • Prioritizing needs of vulnerable • Coordination with NGOs • Representation of women, marginalized communities and remote habitations
Grassroot water entrepreneurs	<ul style="list-style-type: none"> • Development of new models for O&M, water treatment • Evolving market ecosystem for sustainable water management • Co-opting vendors for formalizing the service 	<ul style="list-style-type: none"> • Association with PRI and NGOs • Legitimate role and participative regulation over water vending

Institution	New Role for JJM	Process improvisation and structural reforms for alignment with JJM
NGO	<ul style="list-style-type: none"> Capacity building and sensitization of PRIs, VWSC for gender, inclusiveness, transparency Implementation of integrated social and behavior change communication 	<ul style="list-style-type: none"> Coordination with WSSO, PRIs, and VWSC Engagement with community
Ombudsman or Joint committee	To address water conflicts and grievances	<ul style="list-style-type: none"> Legal mechanism to ensure performance and address grievances and conflicts Water rights legislation Appointment of Ombudsman or formation of committee

Table 16: Sequential steps – Action points

Action points	Q1	Q2	Q3	Q4
Comprehensive action plan for WSSO and PHED for JJM	■			
WSSO human resources to expand in district	■	■		
Appoint district wise NGOs	■	■		
Appointment of District Committees		■		
Revival of VWSC		■	■	
Process and impact indicators for water security			■	
Capacity building of VWSC and district committees by NGO			■	
Village-level water security plans			■	
Design and implementation of Integrated SBCC			■	
Community monitoring mechanism				■
Institutional grievance redressal system at district level				■

Next:

Development of water micro-enterprises (for quality, supply, upkeep)

Legal mechanisms or rights-based approach

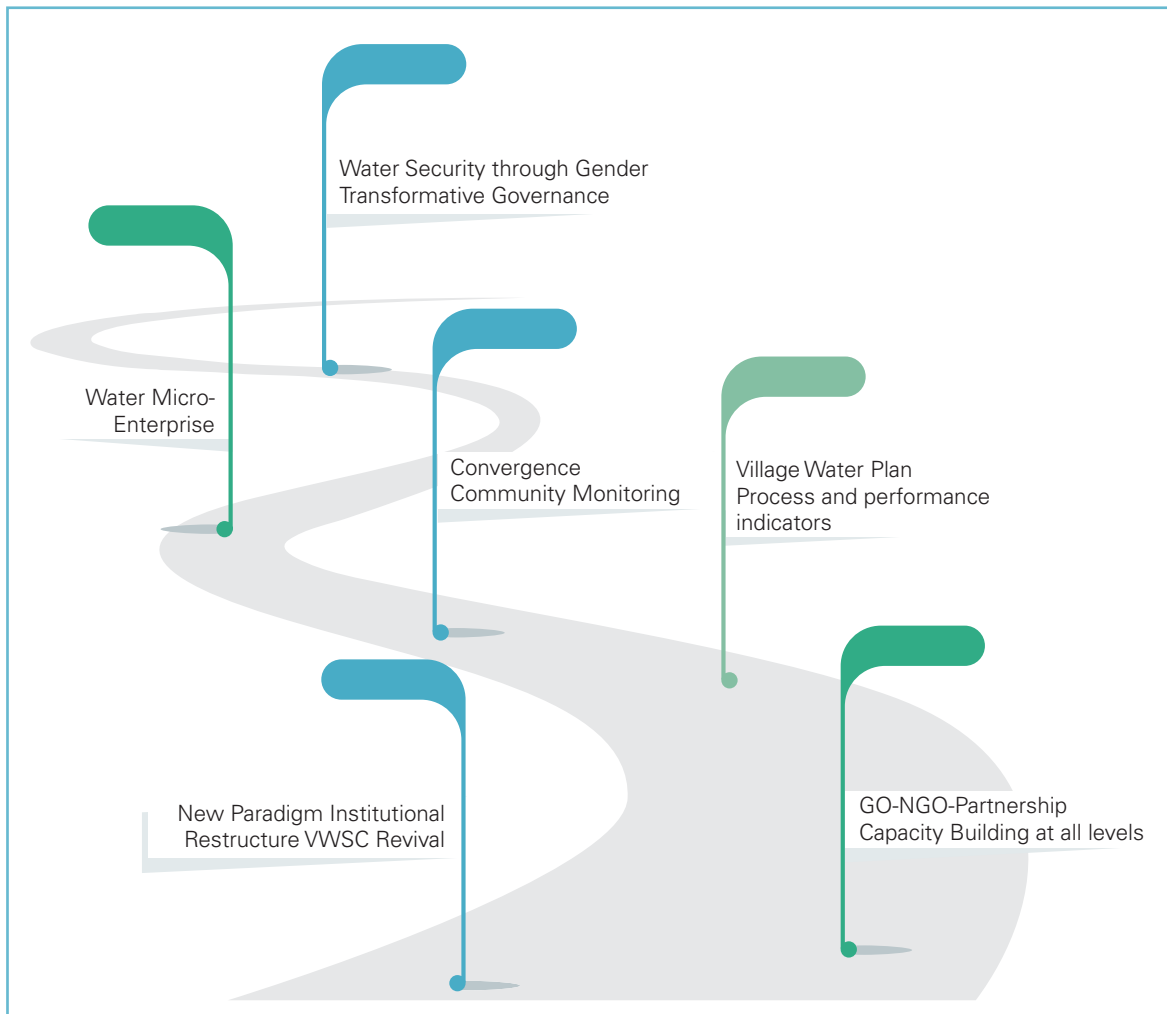
Gender-transformative water governance

4.5 Road map

Achieving water security along with social equity and gender-transformative governance

is an enormous task and needs a gradual and incremental approach to sustain the reforms. The following is a suggestive road map for achieving this:

Figure 28: Phase-wise road map



Phase 1:

- Revive VWSC and plan capacity building programmes to increase demand-side interventions
- Develop an appropriate service delivery model under JJM and if required, restructure PHED as a bulk supplier for external (remote) sources and WSSO as a nodal agency for the distribution network within GP along with community mobilization
- Bring in reputed NGOs as partner agencies to assist WSSO in capacity building and social mobilization about water governance.
- Develop differentiated approach for landless and vulnerable communities to ensure equity in service delivery
- Develop integrated SBCC and capacity building programmes on social equity and gender governance and water management practices

- Develop water quality testing facility in all blocks.
- PRIs to have water quality testing kits and to be trained to use them
- All VWSC to be trained for taking water samples and carrying out water quality tests.
- Dovetail processes of all stakeholders under JJM to achieve set parameters and fulfill indicators for ensuring accountability
- Prepare village-level plans for conjunctive use of water (local/external, ground /surface)

Phase 2:

- Develop process and performance indicators for all institutional stakeholders at all levels (habitation, GP, district)
- Develop a robust monitoring and grievance redressal system that empowers community members by improving transparency and accountability
- Focus on gender-transformative water governance by incentivizing the role of women in key decision-making posts among all stakeholders



Annexure

1

Details of stakeholder consulted

Details of scale and type of works of NGOs consulted:

Table 18: Details of NGOs consulted

Organization	Work geography	Main work areas (activities)
Vasudev Vikas Sansthan	Barmer – Deda block	Awareness on government schemes
Gramin Vikas Vigyan Samiti (GRAVIS)	1,500 villages – in western Rajasthan, Bundelkhand, Gujarat	Water resources, rain water harvesting, drinking water, livestock, agriculture, drought mitigation, revival of traditional rain water harvesting, WASH in schools, pasture development, capacity building in government, preparation of resource materials related to water harvesting
Sahyog	Barmer – 3 blocks –35 villages, mainly Sindhari	Health, drinking water, rain water harvesting – <i>tanka, nadins</i> , etc.
Jay Bhim	8 districts mainly Shergadh and <i>dhani</i> (fringe areas)	Dalit rights Community mobilization, women rights, utilization of government schemes, water issues and rights. awareness and advocacy
Gramin Vikas Sansthan (GVS)	Dhorimama, Barmer	liaison with government for water supply, rain water harvesting structures
Society for Upliftment of Rural Economy (SURE)	All blocks of Barmer district and Jaisalmer/Sam block in Jaisalmer district	Water, natural resource development, livestock, agriculture
Nehru Yuva Mandal	Pakistan border	Water resources, rain water harvesting
Nehru Navyvak Mandal	Barmer, Pakistan border Gadhada, Ramsar	Training and community mobilization, construction of tankas, advocacy on <i>Beri</i> in MGNREGS to district collectorate , information centre on government schemes for women and villages

Organization	Work geography	Main work areas (activities)
All India Institute of Local Self Government	Jodhpur	Co-ordination with Government and other partners to address queries on local governance including water issues particularly during the planning phase, training of partners on issues of local self Governance including issues of water
Dhara Sansthan	Barmer, Jaisalmer, Jaipur	Health, education, nutrition, Nandghar, NRM, RO plant, tankas construction
Unnati Organization for Development Education	Barmer, Jodhpur, Barmer – sindir and patuadi 150 villages, 10 other districts with partners	Water Governance, gender, advocacy, Marudhar Project – revival of traditional water resources through governance, especially through women
His Highness Maharaja Hanwant Singhji Charitable Trust (HHMHSCT)	Jodhpur, Falaudi, Barmer – just started for livelihood	Water resource, water security, toilets construction, 200 tankas, 600 toilets, education for Dalit kids, women empowerment, science centre in Jodhpur including mobile units, initiation of Digital Outreach programme in 25 villages to raise awareness on water security and sanitation

List of people consulted – Government department

Table 19: List of people consulted – Government organizations

Shri Anshdeep, IAS	District Magistrate, Barmer
Mr. Anil Kumar Jain	Additional Chief Engineer (Special Projects), Jaipur, PHED
Mr. R. K. Sharma	Executive Engineer, Project, Jaisalmer, PHED
Mr. Jeraram	E.E. Jaisalmer City, PHED
Mr. Hemant Chaudhary	Executive Director TM, Barmer, PHED
Mr. Sohanlal Jatav	AEN Chohtan, PHED
Mr. Roshanlal Mathur	AEN, Sindhari, PHED
Mr. Anupram	JEN, Chohtan, PHED
Mr. Shivji Ram Chaudhary	E.E. Project DN, Dhorimanna
Mr. Pratap Singh	E.E. Project DN=1, Barmer
Mr. Jogeshwar Chaudhary	E.E. Project DN, Balotra

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Annexure

Checklist for field study tools

A. FGD with men groups

Methodology: FGD with 8–10 adult male members. Separate FGDs for marginalized community members will be done where required.

Main probing points

- Understand the role of men in various functions related to water at the household and community levels
- Understand the status of water sources (including traditional water harvesting), its quality, access and control, and the change in quality and availability of water over the last two decades. (also verify the insights taken from the transect walk)
- Understand the institutional mechanism of water management/supply, its challenges and way forward
- Understand the socioeconomic dynamics of water management, conflicts and its resolution at the community level

Checklist for discussion

- What water-related responsibilities do you, as men, take up and how much time do you spend on fulfilling them?
- Do gender roles change depending on the distance of source, type of source and its control/accessibility? How? Are these changes reflected in a particular caste?
- How have the roles/ functions of men and

women changed over time, with respect to water related activities? Are these changes reflected in a particular caste?

- What are the most pressing issues related to water in your community/habitation? How do these issues differ across caste and class? Discuss the source, access, quality, distribution and supply, health impacts and vulnerability.
- What are the changes in quality, availability, seasonal variations and accessibility of local water sources over the last three decades?
- How are the differences of opinions of men and women over decision-making (related to spending/ priority) in a family addressed? Whose decision prevails?
- What are the norms or barriers that commonly trigger conflict at the household level and community levels? How is the conflict resolved?
- Are there any norms within the community for fetching water, control and use of certain sources or sharing water with others?
- Are there instances of water-related quarrels and conflicts within the community and with other communities? When? Does it have relation to any season/ scarcity or during tankered water supply (unorganized distribution) or any other pattern such as gender/age/influence?

- Is there any institutional mechanism for grievance redressal and conflict resolution related to water management? What corrective measures are taken and how effective is it?
- How is traditional water harvesting structures used and maintained? Is the age-old wisdom of water harvesting declining? What can be done to restore it?
- Is water used for following purpose reused or recycled? How?
- What is the impact of household tankas on water security? How have water consumption and expenses on water changed after building tankas?
- How do poor households continue filling tankas? Has their vulnerability reduced or just changed in form?
- Are there any NGOs working for water management in your habitation? How do you perceive their activities? Can you describe any major changes that can be attributed to their efforts?
- How do you rate the work of Panchayat and WVSC? What measures do you suggest to improve it?
- Is there any increase in private tanker supply in the village/habitation? How much does it cost? How do poor families deal with this cost of water?
- What is the most effective means of mass communication in your community? How do different age groups relate to different communication media, including folklore, radio, TV, mobile and print media?

B. FGD with women groups

Methodology: FGD with 8–10 adult female members. Separate FGDs for marginalized community members will be done where required.

Main probing points

- Understand the role of women in various functions related to water at the household and community levels, and the challenges and barriers that they face
- Understand how the role of women in water management affects other aspects of a family's well-being (such as health, education and productivity)
- Understand the institutional mechanism of water management/supply, its challenges and way forward in context to gender issues
- Understand the socioeconomic dynamics of water management, conflicts and their resolution at the community level with respect to gender issues

Checklist for discussion

- What water-related responsibility do you, as women, take up and how much time do you spend on fulfilling them?
- Do gender roles change depending on the distance of source, type of source and its control/accessibility? How? Are these changes reflected in a particular caste?
- How have the roles/ functions of men and women changed over time, with respect to water-related activities? Are these changes reflected in a particular caste?
- What are the most pressing issues related to water in your community/habitation?

How do these issues differ across caste and class? Discuss the source, access, quality, distribution and supply, health impacts and vulnerability.

- Are women consulted at critical decision-making points? If yes, at which stages of water management cycle?
- Is there any specific dominant caste/class of women who are involved in water governance?
- Which institutions and systems (formal or informal) have been most supportive in water-related issues?
- How frequently do women attend the Gram Sabhas? Are there women from any specific class/caste in the Panchayat Samiti? How effectively do women raise their voices and opinions in these meetings?
- How are the differences of opinions of men and women over decision-making (related to spending/ priority) in a family addressed? Whose decision prevails?
- What are the norms or barriers that commonly trigger conflict at the household level and community level? How is the conflict solved?
- Are there any norms within the community for fetching water, control and use of certain sources or sharing water with others?
- Are there instances of water-related quarrels and conflicts within the community and with other communities? When? Does it have relation to any season/ scarcity or during tankered water supply (unorganized distribution) or any other pattern such as gender/age/influence?
- Is there any institutional mechanism for grievance redressal and conflict resolution related to water management? What corrective measures are taken and how effective is it?
- How is traditional water harvesting structures used and maintained? Is the age-old wisdom of water harvesting declining? What can be done to restore it?
- Is water used for following purpose reused or recycled? How?
- What is the impact of household tankas on water security? How have water consumption and expenses on water changed after building tankas?
- How do poor households continue filling tankas? Has their vulnerability reduced or just changed in form?
- Are there any NGOs working for water management in your habitation? How do you perceive their activities? Can you describe any major changes that can be attributed to their efforts?
- How do you rate the work of Panchayat and WVSC? What measures do you suggest to improve it?
- How many families are dependent on tankered water supply (or have to purchase water from a private party)? What is your opinion on cost and quality?
- What is the most effective means of mass communication in your community? How do different age groups relate to different communication media, including folklore, radio, TV, mobile and print media?

C. FGD with VWSC and Panchayat Samiti members

Methodology: FGD with 5–8 members, including past and present members

Main probing points

- ✓ Understand the role of VWSC and Panchayat in managing water vis-à-vis the role of women members
- ✓ Understand the status of water sources, water supply and water quality monitoring and discuss the major challenges regarding these aspects
- ✓ Understand the socioeconomic dynamics of water management, conflicts and their resolution at the community level. Discuss how equity is ensured in water supply and what are the major challenges for that

Checklist for discussion

- Which state and central water-related schemes (drinking and domestic) are implemented in the village/Gram Panchayat?
- Is there any mechanism of convergence (finances, human resources, activities) of these schemes at the GP level?
- How active is VWSC? How many women members are there in the Panchayat Samiti and VWSC? What is the frequency of the meetings? Do women members take part actively?
- What are the main sources of water in the GP? Are they regulated by some community norms for usage and consumption? How is the quality of these sources? How does seasonal variability affect these sources?
- Are there any traditional water harvesting structures in the GP? What is the condition of these structures?
- Are any of the sources controlled by a particular caste/community? Is there any misuse of water by a dominant caste for other purpose like irrigation ?
- What are the changes you observe in the availability of water and quality of water in these sources over the last three decades?
- What is the storage and distribution mechanism for domestic water in the GP? What standards or norms are followed for determining the capacity and location of storage and distribution points?
- How is equity ensured in water supply? Are the needs of vulnerable communities (differently abled/ women-headed) taken care of?
- Which are the communities or habitations that are left out from the water supply system (or have to travel more than 500m to fetch water? Is there a pattern to social dominance in distribution system?
- Who looks after the operation and maintenance of water supply? What are the common technical and managerial issues in water supply? How are grievances addressed?
- Are there any water charges levied? How much? What is the ratio of collection?
- Are women consulted at critical decision-making points such as design, planning, procurement, execution and monitoring? How?
- Have you undergone any trainings related to water management? What were the broad topics? Who facilitated it? What is the frequency of such trainings?
- What are the future challenges you envisage for sustainable water supply? What kind of support do you expect from PHED/State for capacity building and improvement in water management?

D. Interaction with women for life history analysis

Methodology

One-on-one informal discussion with women, preferably over 60 years old to note the changes in water management and role of women in it over several decades.

Checklist for discussion

- a. What changes do you see in the role of women in water management (right from fetching to storage, filter/purification, consumption) over the decades?
- b. Has drudgery for fetching water reduced over the years? What do you attribute this change to (augmented source, better water supply mechanism, better transport system/ accessibility, etc.) ?
- c. Are tradition water harvesting structures still used in the village? If no, what are the reasons for abandoning these structures? What is the condition of these structures?
- d. Are you paying for tankered water? How much? In your opinion, is the increased cost (if applicable) of water availability justified to offset the drudgery of fetching and ensuring water security?
- e. How has water management at the household level affected the health and education of women and girl child? Do you see any changes in this condition over past decades?
- f. Have gender roles in water management at the household level and community levels changed over years? What are these changes and its reasons?
- g. Are women invited to the community/ VWSC meetings on water management

in the village? Are there any reservations, restrictions from family and/or community? Have you seen any changes on women participation in water governance?

- h. Is there any example of a successful initiative led by women on sustainability of water supply and ensure water security at the household or community level?

E. Interaction with children using photo story

Methodology

Interaction with group of 8–10 boys and girls (separately) from age group 8–14 years, using photo cards to get their perception on water management practices and their role in water management. Photo cards include figures, sketches and photographs of various water-related activities and practices (behaviour of children and adults) .

Checklist for discussion

- Role of boys and girls in water management and variation based on factors like poverty, caste, type and distance of sources, physical vulnerability, etc.
- Knowledge on water sources at the village/household/cluster level, water quality and treatment in the village at the household level/school level
- Time spent, opportunity cost and impact on schooling/work due to water fetching and water management
- Safe handling of water and hygiene practices, as well as water reuse practices, if any.

F. Transect walk

Methodology: Walk through primary sources, storage and distribution points in the village/ habitation with a mix group of men and women (8–10 people)

Main probing points

- Identify and map primary sources of water, their use, control and accessibility
- Understand the status of water sources (including traditional water harvesting), their quality, access and control; and change in quality and availability of water over the last two decades
- Locate and map primary and secondary storage points and distribution points such as standposts and distribution line to households
- Understand the challenges and opportunities in water supply and its management
- Understand the gender roles in water management at the community level

G. KII

Methodology: KII with government officers at state and district levels

Main probing points

- Understand the status of water source, quality issues and coverage of water supply in project areas
- Understand the process of implementing programmes/schemes and institutional structures related to domestic water supply and its management
- Understand the norms of government programmes that address domestic water supply and availability, including storage and distribution network
- Discuss the water management practices at the community level and the challenges to water security
- Discuss capacity building needs of implementing agencies and local authorities for ensuring efficient and accountable water supply



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Annexure

IRB approval letter

unicef  for every child

Research Ethics Approval

13 December 2019

Shilpa Vasavada, *et al*
Centre for Integrated Development (CID), Ahmedabad
1-AB, Shyam Gokul Flat, Vijay Cross Road, Drive In Rd
Ahmedabad, 380009, India

RE: Ethics Review Board findings for: *Study of domestic water security from lens of gender, social inequities and water management practices in Barmer and Jaisalmer districts of Rajasthan, India*

Dear Ms. Vasavada *et al*,

Protocols for the protection of human subjects in the above study were assessed through a research ethics review by HML Institutional Review Board on 03 – 13 December 2019.

This study's human subjects' protection protocols, as stated in the materials submitted, received **ethics review approval**. You and your project staff remain responsible for ensuring compliance with HML IRB's determinations. Those responsibilities include, but are not limited to: 1) ensuring prompt reporting to HML IRB of proposed changes in this study's design, risks, consent, or other human protection protocols; 2) investigators will conduct the research activity in accordance with the terms of the IRB approval until any proposed changes have been reviewed and approved by the IRB, except when necessary to mitigate hazards to subjects; 3) and to promptly report any unanticipated problems involving risks to subjects or others in the course of this study.

HML IRB is authorized by the U.S. Department of Health and Human Services, Office of Human Research Protections (IRB #1211, IORG #850), and has DHHS Federal-Wide Assurance approval (FWA #1102).

Sincerely,



D. Michael Anderson, Ph.D., MPH
Chair & Human Subjects Protections Director, HML IRB

cc: Maaïke Bijker, Penelope Lantz, JD

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Annexure

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Source and adequacy of drinking water

Table 20: HH-wise source and adequacy of drinking water (as per NSSO)

Source and adequacy of drinking water – % HHs					
		Source type		Adequacy from each source	
		Rajasthan	India	Rajasthan	India
Bottled		0.5	4.0	0.0	1.3
Piped water in dwelling		19.2	11.3	27.4	15
Piped water to yard/plot		10.2	10.3	34.9	14.3
Piped water from neighbour		0.7	1	28	15.3
Public tap/stand pipe		12	10.3	21.7	18.1
Tubewell		21.3	10.9	9.8	8.3
Hand pump		18.6	42.9	24.3	9.3
Well	Protected	19	2.9	13.9	20.3
	Unprotected	4.3	4.4	29.1	25.3
Tanker/Truck	Public	0	0.1	0.0	37.6
	Private	2.6	0.4	15.6	9.6
Spring	Protected	0	0.3	0.0	15.6
	Unprotected	0	0.3	0.0	32.7
Rain water collected		3.5	0.2	63.5	65.1
Surface Water	Tank/pond	3	0.4	46.2	29.5
	Other surface water	0.3	0.3	100	25.7
Other (cart with tank/drum, donkey carts, motorized vehicles, etc.)		2	0.2	20.8	28.3
Household with no supplementary source		57	63.7	–	–
All		–	–	24.5	12.4

Source: Drinking Water, Sanitation, Hygiene and Housing Condition in India, NSS 76th round, July–Dec 2018, Ministry of Statistics & Programme Implementation, National Statistical Office, Government of India

Annexure

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Water supply coverage status in study districts as per

IMIS (as per 1/4/2019)

Table 21: Water supply coverage as per 40 LPCD in Rajasthan and study districts as per IMIS

Water supply coverage – as per 40 LPCD										
	Total habitation	No. of partially covered habitation	% of partially covered habitation	No. of fully covered habitation	% of fully covered habitation	No. of water quality affected habitations	% of water quality affected habitations	% of habitations with PWS	% of population with PWS	% HH tap connection (18/10/2019)
Rajasthan	121526	42539	35%	61641	50.7%	17346	14.37%	34.63%	51.75%	12.38%
Barmer	11434	1353	11.8%	917	8%	9164	80%	28.1%	49.37%	5.08%
Jaisalmer	3840	2692	70.1%	854	22.2%	294	7.65%	32.97%	59.15%	2.8%
SC-dominated										
Rajasthan	10345	3996	38.63%	4867	47.05%	1482	14.33%			
Barmer	1182	160	13.54%	114	9.64%	908	76.82%			
Jaisalmer	377	254	67.37%	86	22.81%	37	9.81%			
ST-dominated										
Rajasthan	21818	6596	30.23%	14108	64.66%	1114	5.11%			
Barmer	382	53	13.87%	49	12.83%	280	73.30%			
Jaisalmer	129	80	62.02%	34	26.36%	15	11.63%			
Minority blocks										
Rajasthan	9352	5085	54.37%	3297	35.25%	970	10.37%			
Barmer	725	54	7.45%	67	9.24%	604	83.31%			
Jaisalmer	3127	2297	73.46%	628	20.08%	202	6.46%			

https://ejalshakti.gov.in/IMISReports/NRDWP_MIS_NationalRuralDrinkingWaterProgramme.html

Table 22: supply coverage as per 55 LPCD in Rajasthan and study districts as per IMIS

Water supply coverage – as per 40 LPCD										
	Total habitation	No. of partially covered habitation	% of partially covered habitation	No. of fully covered habitation	% of fully covered habitation	No. of water quality affected habitations	% of water quality affected habitations	% of habitations with PWS	% of population with PWS	% HH tap connection
Rajasthan	121526	84141	69.2%	20039	16.2%	17346	14.30%	34.63%	51.75%	12.38%
Barmer	11434	1952	17.1%	318	2.8%	9164	80.10%	28.1%	49.37%	5.08%
Jaisalmer	3840	3272	85.2%	274	7.1%	294	7.70%	32.97%	59.15%	2.8%
SC-dominated										
Rajasthan	10345	6856	66.27%	2007	19.40%	1482	14.33%			
Barmer	1182	243	20.56%	31	2.62%	908	76.82%			
Jaisalmer	377	317	84.08%	23	6.10%	37	9.81%			
ST-dominated										
Rajasthan	21818	18290	83.83%	2414	11.06%	1114	5.11%			
Barmer	382	83	21.73%	19	4.97%	280	73.30%			
Jaisalmer	129	97	75.19%	17	13.18%	15	11.63%			
Minority blocks										
Rajasthan	9352	7186	76.84%	1196	12.79%	970	10.37%			
Barmer	725	115	15.86%	6	0.83%	604	83.31%			
Jaisalmer	3127	2751	87.98%	174	5.56%	202	6.46%			

https://ejalshakti.gov.in/IMISReports/NRDWP_MIS_NationalRuralDrinkingWaterProgramme.html

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Annexure

Study village – Coverage status as per IMIS and field findings

Table 23: Status of water supply coverage of habitations as per 40 LPCD (IMIS)

Status of water supply coverage of habitation (as per 40 LPCD) – 2019–20 as per IMIS						
GP	Block	District	Total habitation	Water quality affected	Partially covered	Fully covered
Kharantiya	Sindhari	Barmer	24	16	3	5
Ed Sindhari	Sindhari	Barmer	53	52	1	0
Aakora	Chohtan	Barmer	44	35	2	7
Ramzan Ki Gafan	Chohtan	Barmer	36	22	7	7
Dedha	Sam	Jaisalmer	11	0	5	6
Dangri	Sam	Jaisalmer	115	1	113	1
Rasla	Sam	Jaisalmer	87	10	41	36
Mokla	Jaisalmer	Jaisalmer	20	4	12	4

Source: IMIS (<https://ejalshakti.gov.in/IMISReports/MIS.html>)

Status of water supply and source as per field study

Table 24: Status of water source and supply in villages/GP studied

Village	Block	Water supply source from PHED				Other sources in use
		Type of source provided by PHED	Storage / distribution structure	Village location from source	Status and adequacy	
Barmer District						
Dabhar Bhatiya	Sindhari	Ground water – borewell	GLR with tap	Tail End	Nil (lack of water availability form main source)	HH water harvesting tanks, naadi

Village	Block	Water supply source from PHED				Other sources in use
		Type of source provided by PHED	Storage / distribution structure	Village location from source	Status and adequacy	
Ed Sindhari	Sindhari	Ground water – borewell	GLR with tap	Middle	Nil (lack of water availability from main source)	HH water harvesting tanks, naadi, hand pump, cluster water harvesting tanks (MJSA)
Kharantiya	Sindhari	Indira Gandhi Canal	GLR with stand post	Middle	Available (1–2 times/week) – not adequate in summers, potable	Naadi, open well, HH rain water harvesting tanks
Trishuliya	Sindhari	Open well	GLR	Within village	Available 6–9 months. Not adequate in summer, high TDS	4 other open wells, naadi within and outside village, HH rain water harvesting tanks
Arbi Ki Gafan	Chohtan	Tubewell	GLR	Tail end	Nil (no water supplied till now – lack of water from main source)	7 open well within village (installed by Panchayat/ few by PHED) connected to UG storage tank each (constructed by PHED), village naadi, HH rain water harvesting tanks
Ramzan Ki Gafa	Chohtan	Tubewell	GLR	Middle	Nil (lack of water from main source)	1 open well, 3bBer, 1 rain water harvesting tank – 2.5 lakh litres (provided by PHED), HH rain water harvesting tanks

Village	Block	Water supply source from PHED				Other sources in use
		Type of source provided by PHED	Storage / distribution structure	Village location from source	Status and adequacy	
Aakora	Chohtan	Open well	GLR with tap	Within village	Available year-round – adequate and potable	Naadi, HH rain water harvesting tanks
Sanwlore	Chohtan	Open wells – 3	GLR with Tap	Within village	Available year-round – adequate and potable	Community taanka – 35,000 litres (other government programme), HH rain water harvesting tanks

Village	Block	Water supply source from PHED				Other sources in use
		Type of source provided by PHED	Storage / distribution structure	Village location from source	Status and adequacy	
Jaisalmer District						
Khaba	Sam	Borewell	GLR with tap	Tail end	Available year-round, high fluoride (1–2 times a week), not adequate	1 kui, naadi, 7 community rain water harvesting tanks (MJSA), HH rain water harvesting tanks
Khabia	Sam	Borewell	GLR with tap	Tail end	Available year-round, high fluoride (1–2 times a week), not adequate	7 naadis within and outside village, HH rain water harvesting tanks
Dedha	Sam	Borewell	GLR with tap	Middle end	Available year-round, high fluoride (1–2 times a week), not adequate	Jesari naadi, HH rain water harvesting tanks

Village	Block	Water supply source from PHED				Other sources in use
		Type of source provided by PHED	Storage / distribution structure	Village location from source	Status and adequacy	
Bhadasar	Jaisalmer	Borewell	GLR with Tap	Tail end	Hardly available , once a month (Line breakages and low water availability in main source), high TDS	HH rain water harvesting tanks, village naadi
Mokla	Jaisalmer	Borewell	GLR with Tap	Middle	Year-round, high TDS	HH rain water harvesting tanks, naadi
Lala	Sam	Borewell	GLR	Tail end	Once a month (tail end, double intermediate pumping, high elevation, leakages in GLR)	HH rain water harvesting tanks, naadi
Ramsar	Sam	Borewell	GLR (abandoned)	Tail end	No supply and GLR broken and no water in main source	HH rain water harvesting tanks, naadi
Dangri	Sam	Borewell	GLR with tap	Middle	Available year-round, potable, but not adequate in summer	Naadi, HH rain water harvesting tanks

Status of FHHT as per field study

Table 25: Status of FHHT in study villages

Village	Block	Communities	HH tap connection and functionality
Dabhad Bhatiya	Sindhari		Nil
Ed Sindhari	Sindhari	Jat, Meghwal, Goswami, Suthar, Bhil, Rajput	Nil
Arbi Ki Gafan	Chohtan	Rajputs, Muslims, Meghwals, Suthar, Bhil	Nil
Ramzan Ki Gafan	Chohtan		Nil

Village	Block	Communities	HH tap connection and functionality
Juna Kharantiya	Sindhari	Meghwal, Rajput, Bhil	Nil
Tirsuniya	Sindhari		Nil
Aakora	Chohtan	Rajput, Meghwal, Luhar, Suthar, Swami, Harijan, Bhil	30 HH of Rajput and 1 HH of Meghwal), Functional
Sanwlore	Chohtan		Done in Nohrio Ki Dhani about 20 HHs , issues in availability in 10 HHs due to pressure issues. Pipeline also given to Bhil Dhani, but no water due to pressure
Khaba	Jaisalmer	Rajput, Meghwal	None
Khabia	Jaisalmer	Rajput, Meghwal	Few illegal connections , all functional
Dedha	Jaisalmer	Rajput, Meghwal	None
Bhadasar	Fatehgarh	Minganiyara, Rajput, Meghwal,	50–70 HHs, not functional a pipes broken
Mokala	Fatehgarh	Rajput, Nath, Meghwal, Mix	None
Ramsar	Pokhran	Bhil	None
Dengri	Pokhran	Rajput, Meghwal, Jat Muslim	None
Lala Khorada	Pokhran	Rajput	None



Annexure

7

Community voices and inferences

Temporal shift on drudgery reduction due to HH tanka and tanker supply, but increased economic burden

"My daughter-in-law is lucky not to have to carry water on her head now. We have a tanka at home and get it filled through tanker. She has long hair but all my hair is gone."

- Suni Devi, Bhillon ki dhani, Sanwlore village, Barmer

Offsetting hygiene and prioritizing men due to seasonal fluctuations in water availability

"Sometimes when there is low water availability, men bathe daily as they have to go out for work. We compromise by bathing on alternate days."

- Women from Khaba village, Jaisalmer



Vulnerability in water access for single headed women, drudgery and opportunity cost on fetching water

"My life still revolves around water."

- Chagni Devi, a widow in Bhilo ki Dhani, Sanwlore village.

Improved hygiene due to water availability over time drudgery reduction due to HH tanka and tanker supply

"We used sand for menstrual cleaning earlier and had lot of skin rashes due to it. But now we are have water instead"

Temporal shift on drudgery reduction due to HH tanka and tanker supply, but increased economic burden

"We can now at least buy water and reduce physical drudgery. By spending money on buying water, we are at ease."

- Pathani Devi, Mokala village, Jaisalmer

Lack of importance and demand for water quality/treated water

"Why should we spend on buying treated water if we can refill our tanka through tankers from the naadi?"

- Men from Dedha Village, Jaisalmer

Lack of community involvement and participation

"I am not aware of any such committee. It may be only on paper. I don't know of any VWSC which is active."

- Village Sarpanch in Jaisalmer



Offsetting girls' education on fetching water in economically weaker communities

"We are offsetting our girls' education to fetching water as we cannot afford tankers."

- Meghwalon ki dhani, Arbi ki gagan village, Barmer

Compromise on hygiene due to poor economic conditions

"I can't buy sweet water. I bathe my kids with tanker water, even if it feels a little allergic to use that."

- Madhu Meghwal from Mokla village

