



Water and Livelihoods in Maharashtra

JAL KAUSHAL: WATER, LIVES, AND LIVELIHOODS

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STATE REPORT

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Abbreviations

CRP	Community Resource Person
CSOs	Civil Society Organisations
DIP	District Implementation Partner
DPMU	District Project Management Unit
FHTC	Functional Household Tap Connection
GP	Gram Panchayat
JJM	Jal Jeevan Mission
JJN	JustJobs Network
MGNREGS	Mahatma Gandhi National Rural Employment Guarantee Scheme
MJP	Maharashtra Jeevan Pradhikaran
MMISF	Maharashtra Management of Irrigation System by Farmers Act, 2005
NGOs	Non-Governmental Organisations
PGWMC	Participatory Groundwater Management Committee
ISA	Implementation Support Agency
ISRA	Implementation Support Research Agency
IWRM	Integrated Water Resource Management
O&M	Operations and Management
PMKSY-IWMP	Pradhan Mantri Krishi Sinchayee Yojana- Integrated Water Management Programme
SC	Scheduled Caste
ST	Scheduled Tribe
VWSC	Village Water and Sanitation Committee
WUA	Water User Associations

Executive Summary

In India, the world's largest user of groundwater, there are several government and civil society interventions that promote water management with the goal of making India's villages water secure.¹ Most interventions, whether initiated by state and central governments or by civil society, are decentralised, emphasising the role of community members in their implementation and management.² They build on the understanding that water is an essential component of rural economies and is necessary to create and maintain jobs across sectors.³ Integrated water management, which includes managing the source, infrastructure, and water services, is both a job creator as well as a job enabler.

However, despite the understanding that water and water management are job creators and enablers, there is little record of community members' or frontline workers' tasks, responsibilities, training, skills, remuneration, and working conditions. This is further complicated by the fact that water management work at the local level is often part-time, voluntary, or unpaid. Thus, despite consensus that community members perform critical water management tasks, there remains a gap in knowledge about the work they do and the conditions they work in.

To address this, JustJobs Network (JJN) and Arghyam launched Jal Kaushal, a project that examines the jobs-tasks-skills nexus of rural water management. JJN hypothesises that an investigation and understanding of livelihoods engendered by the sector can enhance the sustainability and success of water management. This project draws from both secondary and primary

research conducted in five states of focus.

This is a state-level report of Maharashtra, one of the five states studied as part of the Jal Kaushal project, that helps ground secondary data through primary research and maps the "who" of the water management sector. It also helps examine whether jobs, tasks, and skills in the water management sector align with aspirations and perceived value of employment in the sector. In Maharashtra, where water security is increasing, offers many compelling examples of participatory governance vis-à-vis irrigation management. With a focus on irrigation and household water management, JJN's research in Maharashtra reveals the following:

- There are significant asymmetries in water management across the state. While surface water, channelled and stored in dams, is effectively managed for both irrigation and household needs, groundwater management is only partially undertaken in Maharashtra. This leads to a stark imbalance in water security – while water security is high in areas in which dams exist and surface water is abundantly available, areas that rely solely on groundwater suffer from seasonal water insecurity. This is because frontline worker roles are concentrated around surface water management, limiting community involvement in managing groundwater.
- Integrated water management – source, infrastructure, and services – happens only in areas that are surface water dependent. In places

that are largely dependent on groundwater, water management interventions are piecemeal or only now beginning to be implemented. As a result, water management is skewed in favour of surface water-dependent areas.

- Irrigation management is effectively undertaken by Water User Associations (WUAs) but support from their associated government body, the Water Resources Department, is waning. The WRD is becoming increasingly reliant on WUAs to perform most irrigation management tasks in the command area without proportionately building WUA's financial capacities or its members' skills.
- While watershed-level management is popular in Maharashtra, it is only beginning to be undertaken in the districts visited. CSOs have constructed farm ponds, *bandharas*, and continuous contour trenches with some departmental support. However, these structures are prone to disrepair as no frontline workers have been identified for their maintenance and repair.
- Household water and irrigation are viewed as competing priorities by government officials and community institutions. This can be addressed through convergence between departments, institutions, and frontline workers. However, this rarely happens in the current water management ecosystem.

CRPs and NGOs help bridge these gaps but their interventions are not sustained beyond the project's completion. The entire ecosystem falls apart if the water cadre they nurture is not integrated with Panchayati Raj Institutions.

- Water management is ignored in favour of temporary water security. In Gram Panchayats experiencing water insecurity, both village residents and government purchase water from farmers well-endowed with groundwater. This legitimises the privatisation of a community pool resource, posing additional challenges to water management.

This report's findings are supported by primary research conducted in five Gram Panchayats (GPs) each in Nashik and Osmanabad. The GPs were selected based on ongoing government and NGO interventions, demography, infrastructure provisions, status of water security, and availability of respondents. Research methods and selection criteria for GPs in both districts is detailed in Annex 2.

Chapter 1: Asymmetrical Water Management

Rural water management is especially vital in Maharashtra, comprising over five regions, namely Marathwada, Nashik, Pune, Konkan, and Vidarbha.⁴ The third largest state in the country, around 53 percent of the population is engaged in agriculture and allied sectors. The availability of water varies greatly across the region, demonstrating the need for water management practices that are informed by the unique needs of each region.

In line with Jal Kaushal project’s objectives, this report focuses on water management for household use and irrigation. Since water exists as part of an integrated ecosystem, researching household and irrigation management in conjunction allows an understanding of convergence or divergence in the two needs, and helps devise solutions to promote the social and economic welfare of all rural residents.

Maharashtra’s State Water Policy 2019 highlights several challenges for water management in the state: imbalance between demand and supply, uncertainty in availability, limitations in access to available water, lack of assured access to allocated quota of water to farmers, and depleting groundwater resources, among others.⁵ The state has attempted to address these by empowering Water User Associations (WUAs), regulating water resources, launching several small- and medium-scale water supply schemes, and ensuring equitable and adequate supply of groundwater within the state.⁶ As a result, Maharashtra offers many successful models for household and irrigation management, even receiving the Best State Award in 2018 for its excellent work in water management.

However, JustJobs Network (JJN) researchers noted significant asymmetries in water management across the state. While surface water, channelled and stored in dams, is effectively managed, groundwater management is only partially undertaken in Maharashtra. This leads to a stark imbalance in water security – while water security is high in areas in which dams exist and surface water is abundantly available, areas that rely solely on groundwater suffer from seasonal water insecurity. This dysregulation and lack of management is seen despite the implementation of Atal Bhujal Yojana (ABhY) – a centre-sponsored mission that aims to improve the management of groundwater resources in water stressed areas – in both Nashik and Osmanabad, the two districts of focus.

In addition to ABhY, several central and state schemes and missions make up the water management ecosystem in Maharashtra. Some of these include Jal Jeevan Mission (JJM), Jalyukta Shivar Campaign, Integrated Watershed Management Program, and Pradhan Mantri Krishi Sinchayee Yojana amongst others. The table below maps the various water management initiatives undertaken by Government of Maharashtra’s several departments.

Prior to exploring household and irrigation management in the state, it is critical to understand that Maharashtra relies on small, medium and large dams to store surplus water more than any other state in the country. Home to 1845 total dams, Maharashtra’s success in its successful water management, whether for household purposes or irrigation, hinges upon these structures. Beyond the

Table 1
State Departments Involved in Rural Water Management

S No	State Departments	Dimensions of Rural Water Management		
		Source	Infrastructure	Services
1	Maharashtra Jeevan Pradhikaran (MJP)			
	MJP plans, designs, and implements water supply and sewerage schemes with a budget of over 5 crore. The MJP currently offers technical assistance to implement the Jal Jeevan Mission.			
2	Rural Water Supply Department (RWSD), Zilla Parishad			
	RWSP implements rural water supply schemes with a budget of less than five crores and offers administrative support for the Jal Jeevan Mission.			
3	Water Resources Department (WRD)			
	Also known as the irrigation department, WRD manages the planning and development of irrigation facilities in the state. WRD works closely with the WUAs in the state, offering them technical support as needed.			
4	Water Conservation Department (WCD)			
	The WCD is responsible for construction of water harvesting structures and promoting their maintenance. It constructs and maintains all minor irrigation structures below 250 hectares and works on capacity building in soil and water conservation. WCD also offers training support for PMKSY-IWMP, and implemented the Jalyukta Shivar Abhiyan.			
5	Groundwater and Survey Development Agency (GSDA)			
	Established in 1972, GSDA engages in the exploration, development, and augmentation of groundwater resources in Maharashtra through various schemes. It also assists the MJP and Zilla Parishad in demand forecasting, and implements the ABhY.			
6	Vasundhara Watershed Development Agency			
	This is a state level nodal agency led by the Department of Agriculture and Department of Planning that implements PMKSY-IWMP.			
7	Planning Department			
	Planning Department is responsible for preparing annual plans for the development of the state and is responsible for implementing the MGNREGS.			

common critique of dams as causing displacement, loss of land and ecological devastation, successful models from Maharashtra must be accepted with the caveat that these models likely cannot be entirely replicated without dams or some assured source of abundant water supply.

Household Water Management

The central government's Jal Jeevan Mission (JJM) that aims to provide functional household tap connections (FHTCs) to all rural households has been active in both Nashik and Osmanabad since 2019, according to the mission's dashboard. However, in GPs surveyed by JIN across Nashik and Osmanabad, researchers found that the mission had either not arrived yet or was just beginning to.

Household water supply, then, was provided by the Maharashtra Jeevan Pradhikaran (MJP) and Zilla Parishads through various multi-village and single-village schemes, which are being integrated into Jal Jeevan Mission on a state- and district-level. In Nashik, three of the five GPs surveyed received water from a nearby dam and were extremely water secure; while the other two, which did not directly fall under the command area of any dam, were highly water insecure. Similarly, water insecurity is prevalent in Osmanabad, where most GPs rely on groundwater received either through the public water supply system or through private borewells. This is both the result of over extraction from aquifers, which contributes to drought-like conditions in the summer months, as well as operational issues like inconsistent and sporadic electricity supply.

Irrigation Management

Maharashtra's WUAs, formed and maintained by farmers, are illustrious examples of participatory irrigation management (PIM) in the country. WUAs have played a key role in improving the efficiency of irrigation systems and ensuring equitable distribution of water since the early 1990s. They do this by creating a sense of ownership among farmers and facilitating their participation in the operation and maintenance (O&M) of the canal network.⁷ The existence of WUAs precedes the enabling policy mechanisms, which came about well over a decade later. In 2005, the Government of Maharashtra enshrined the WUAs' roles through the Maharashtra Management of Irrigation System by Farmers (MMISF) Act 2005 to facilitate the implementation of PIM.⁸ In a state where 53 percent of its population is engaged in agriculture – a sector battered by erratic rains and changing weather conditions – WUAs perform an urgent and critical role in irrigation management.⁹

The state also implemented the first edition of PMKSY-IWMP to promote watershed management. As part of this programme, several structures such as farm ponds and continuous contour trenches were built, which enhanced the irrigative capacity of some GPs in Osmanabad. This programme was also emulated by CSOs such as the Paani Foundation.

However, JIN researchers found that despite governmental and CSO presence, water is not equally distributed amongst farmers and there are no frontline workers dedicated to the operation and maintenance of this infrastructure. This makes clear that these interventions are not integrated with the larger irrigation management ecosystem led by WUAs.

Integrated Water Management

On a composite level, water management is more prevalent in Maharashtra than most states in India, but there is significant variation within the state. JIN researchers observed that both household and irrigation water security is higher in villages that fall in the command area of a dam, while communities outside the area suffer since they rely solely on groundwater, which can diminish in the summer months. As a result, in places where water is predictably available, all three components of integrated water management are present, namely source management, infrastructure management, and water services management. This is true for both irrigation and household water.

However, the universe of integrated water management is fragile in GPs in Sinnar block in Nashik and Gorewadi GP in Osmanabad, areas that do not have a functional public water supply system and rely either on private tankers, private borewells, or community standposts and taps. There are no sub-committees like VWSC or PGWMCs to manage source or services, and rarely any frontline workers, because public water supply infrastructure is non-existent. Similarly, not all components of integrated water management are visible in areas where farmers practice rain-fed agriculture or rely on groundwater for irrigation in the absence of canal water.

While the policies and schemes in the state seem to impress upon the need for integrated water management and community ownership in achieving it, there is a significant gap in focus on, and investment in, local people who can ensure the sustainable operationalisation of these policies and schemes.

Over the years, however, CSOs have made significant interventions to bridge this gap in both Nashik and Osmanabad. For instance, in Osmanabad, ACWADAM helped appoint Jal Doots – frontline workers responsible for promoting participatory groundwater management. The next chapter details their efforts and maps government and private actors who enable integrated water management.

Chapter 2: Water Management – whose responsibility?

Maharashtra's Management of Irrigation System by Farmers (MMISF) Act 2005 and the State Water Policy 2019 are crucial tenets of the water management ecosystem which entreat local communities to plan, manage, operate, and maintain water infrastructure and services. To this end, WUAs and Panchayati Raj institutions (PRI), under the guidance of block- and district-level government officers, play a critical role in managing water.

However, as mentioned earlier, stakeholders involved in water management are present and empowered only in areas where surface water is abundantly and predictably available. This means that integrated water management – source, infrastructure, and services – is seen in villages that fall in the command area of a dam. All other GPs across Nashik and Osmanabad continued to encounter problems relating to inadequate source, dilapidated infrastructure, and inconsistent services.



Waghad Dam in Nashik

By cataloguing the variety of water management interventions and the actors involved in delivering them, this chapter aims to demonstrate that water management in Maharashtra is skewed in favour of surface water-rich areas. This is not to argue that groundwater management does not exist, as both Nashik and Osmanabad are ABhY districts, but that those interventions are either piecemeal or only beginning to emerge. To offer a brief overview of the water management ecosystem in Maharashtra, the table below details relevant acts, missions, schemes, and programs and the roles frontline workers and community members play in implementing them.

Table 2

Community Involvement in Water Management Initiatives¹

Act/ Mission/ Scheme/ Program	Department/ CSO	Relevant purpose	Community's role	Frontline actors
Maharashtra Management of Irrigation System by Farmers (MMISF) Act, 2005	Water Resources Department	Participatory Irrigation Management	Manage water allocation, collect user fees, operation and maintenance	Water User Associations – president, vice president, secretary, members, <i>paatkari</i> , seasonal workers
Jal Jeevan Mission (JJM)	Water Supply Division, Zilla Parishad	FHTC provision	Planning, implementation, operations, and maintenance	Village Water and Sanitation Committee (VWSC), Pump Operator/ Jal Surakshak, GP members, GP officials
Atal Bhujal Yojana (ABhY)	Groundwater Survey and Development Agency (GSDA), Water Supply and Sanitation Department	Improve groundwater management in water stressed areas	Planning, budgeting, implementation, and behaviour change	Participatory Groundwater Management Committee (PGWMC), Community Mobiliser, Jal Doot
Pradhan Mantri Krishi Sinchayee Yojana – Integrated Watershed Management Programme (PM-KSY – IWMP) 2.0	Department of Agriculture/ Vasundhara Watershed Development Agency	Soil and water conservation	Planning, budgeting, implementation, and management	Watershed Committees, SHGs, User Groups, Gram Sabhas
Jalyukta Shivar Yojana	Water Conservation Department	Drought mitigation	Planning, budgeting, implementation, and monitoring	Water User Associations, MGNREGS workers, GP members
Mahatma Gandhi National Rural Employment Guarantee Scheme	Rural Employment Guarantee Scheme, Department of Planning	100 days of guaranteed employment per household	Natural resource management (NRM) asset construction including ponds, dug wells, check dams, embankments, farm ponds, soak pits, and compost pits	MGNREGS workers, GP members, GP officials
Drops of Hope	ACWADAM, GSDA, UNICEF, Bridgestone India	Strengthening institutional capacities for drinking water safety and security	Planning, budgeting and implementation	Jal Doot, Gram Panchayat, SHGs, VWSCs
Jal Samruddhi	Yuva Mitra, TATA Trusts	Reviving water bodies to ensure groundwater recharge	Implementation and monitoring	Water User Associations, Farmers, Village residents

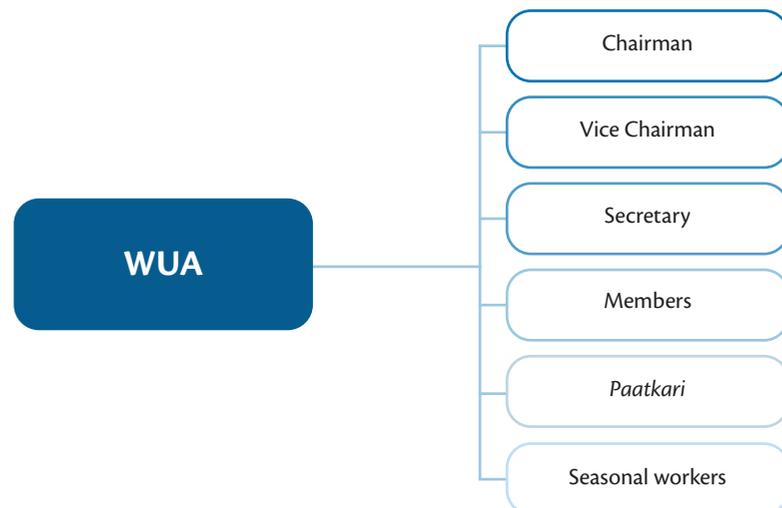
¹ This is not an exhaustive list of CSO interventions in Maharashtra. The two listed here were directly studied and observed by JIN researchers in Nashik and Osmanabad.

Managing Water for Irrigation

Of the ten surveyed, only three GPs, all located in Nashik, were dependent on surface water for irrigation needs. In all three GPs – which fell under the Waghad Dam Project – water user associations, with the support of WRD, were empowered and active in ensuring sustainability of the source, maintaining the infrastructure, and delivering timely services. The Waghad Dam Project has 24 WUAs with an apex WUA at the top, which look after the minor canals that emerge from the major canal, simply known as the canal. The WUAs comprise of members detailed in the figure below and handle important functions such as water budgeting, data collection, behaviour change, and operation and maintenance.

Of the positions listed above, chairman, vice chairman and members are leadership roles which are unpaid while secretary, *paatkari* and seasonal workers, hired to desilt and clean canals, are remunerated. Their remuneration differs according to the scale of the WUA and smaller WUAs sometimes share staff to minimise operational costs. The WUAs budget is dependent on their tax collection which, when collected, is transferred to the WRD. WUAs receive 50 percent of the tax deposited as a refund for operational and maintenance-related expenses, but this refund is sometimes delayed by years, causing financial difficulties.

Figure 1
Composition of the WUA



Box 1

Irrigation Management by Mahatma Jyotirao Phule Water User Association

“Irrigation is defined by the availability of water and not the availability of land”

Mahatma Jyotirao Phule Water User Association, established in 1990, is one of 24 WUAs managing the distribution of water from the Waghad Dam, located in Nashik. This WUA, which predates the 2005 Act empowering farmers to engage in participatory irrigation management, was established to address the distribution network’s inefficiencies. Despite the dam’s capacity of 2550 million cubic feet, farmers located on the tail of the canal network did not receive their fair share of the water because of over withdrawal by farmers located upstream (IWP). To create an egalitarian distribution and management system, Samaj Parivartan Kendra, a local NGO, galvanised the farmers and helped create three WUAs, one of which is the Mahatma Jyotirao Phule Water User Association.

The Mahatma Jyotirao Phule Water User Association comprises a chairman, vice chairman, and secretary, all of whom are elected by the general body which includes four members. In addition, the WUA has a full-time employee known as the *paatkari* who assists with tax collection, performs ad-hoc administrative duties, monitors rainfall, and supervises seasonal workers who are hired to clean the minor canals. Additionally, it is worth noting that all remunerative positions at the WUA were occupied by men. The few women members were rarely present during discussions and meetings.

Since 1990, effective management and distribution of water by the WUAs has transformed the lives of farmers situated in Waghad Dam’s command area. This work, however, has not been without challenges. In addition to operationalising the WUAs, the founding members had to convince farmers to buy into the concept of participatory irrigation management. While the WUAs’ role is largely operational now, they led several behavioural interventions in their early years to educate farmers on the intrinsic value of water and the importance of water management. The WUAs also helped manage demand in 1995 through water budgeting, which resulted in farmers moving beyond cultivating sugarcane, a highly water-intensive crop. At that time, water budgeting was a purely self-learned skill, which they were retrained on after 2005 by the Water and Land Management Institute in Aurangabad.

Over three decades later, demand and supply management of water for agriculture has benefitted all involved parties greatly. According to Govardhan Kulkarni, a long-term member of the Mahatma Jyotirao Phule WUA, farmer incomes have increased from INR 2800 per hectare to nearly INR 3.25 lakh per hectare. Where farmers could only receive water twice a year, the WUA’s effective management allows farmers to receive water five times a year. The predictability of water supply has allowed farmers to move from subsistence crops to cash crops such as grapes, which are now widely exported all over the world.

Over the years, financial difficulties have become more pronounced because the WUAs' responsibilities have increased several-fold. The Water Resources Department (WRD), which is supposed to handle the operation and maintenance of the main canal in addition to routinely supervising the work of the WUAs, has begun to step away from its responsibilities. A senior official from the WRD said,

"we have instructions from above to reduce hiring and rely completely on the WUAs for operation and maintenance work."

As a result, the WRD's workforce at the dam has shrunk and the canal inspectors who exist are hired on a contractual basis. According to the senior WRD official, Waghdam requires two canal inspectors for every five kilometres for optimum functioning, but the workforce currently employed is significantly smaller. This, in turn, has burdened the WUAs. Once only responsible for desilting and maintaining the minor and sub-minor canals, they are now called upon for the upkeep of the major canal. According to WUA members, who manage their limited funds with great precision and financial acumen, these added responsibilities can cause a financial crunch that can derail the WUAs.

In Osmanabad, where the terrain is hilly and plain, the GPs located in the plains depend entirely on groundwater while some GPs in the hilly areas receive water from the Terna Dam. Paani Foundation mobilised village residents in Walgud GP to donate their labour and create farm ponds, *bandharas* and continuous contour trenches that store and direct water from Terna Dam. They also appointed a Jal Surakshak,¹⁰ a strictly voluntary position, to maintain these ponds and release water for irrigation use.

Similarly, as a people-centred program, IWMP involves GPs and SHGs and creates user groups (UGs) and Watershed Committees (WCs). WCs are responsible for identifying the urgent needs of the community and formulating an action plan. With the support of the Project Implementation Agency (PIA) and Watershed Development Team (WDT), the WC also conducts a hydrogeological survey to map out zones of potential groundwater recharge, storage and sustainable groundwater utilisation, and engages in awareness generation activities.¹¹ However, no frontline worker is responsible for routine operation and maintenance of infrastructure once it is handed over to the WC for completion; the secretary remains the only remunerated role at the WC. The community deeply feels the need for such a worker, as does the GP, which cannot afford hiring someone independently.

In Osmanabad, then, irrigation management is largely through one-off interventions made by CSOs and through PMKSY-IWMP. Despite their ambition, the long term impact on groundwater security remains to be seen because these interventions are not embedded into the larger ecosystem of irrigation management. WUAs do exist where water is provided through dam or man-made ponds, with Jal Surakshaks channelising the water to individual farms. WUAs are formulated for two or three villages that get access to water from same source. It is also important to note that, unlike WUAs which are able to plan for future contingencies, long-term planning for groundwater sustainability is absent in Osmanabad. Once water becomes available, whether through pointed interventions or a favourable monsoon, any concern for aquifer recharge or managing demand diminishes. This reveals a rather myopic perspective on the part of the community, only corrected by long-term intervention.



A defunct irrigation canal

Managing Water for Household Use

Only Janori, Mohadi and Pimpalgaon Baswant in Nashik, the same GPs as described earlier, fell under the command area of a dam and received water predictably and reliably. While there were no VWSCs or PGWMCs in these GPs, they had at least one pump operator, also known as Jal Surakshak, plumbers, and GP members who were empowered enough to intervene if any household water-related challenges arose. The remaining seven GPs across Nashik and Osmanabad surveyed by JIN researchers were primarily dependent on groundwater, experienced seasonal shortages, and lacked the network of actors necessary to ensure integrated water management.

In Sunderpur and Kepanagar, GPs located in the Sinnar block of Nashik, MJP established water supply systems that sourced water from Kadwa Dam, located nearly 50 kilometres from the GPs. Once this network was established, it was handed over to the GPs for operation and maintenance. However, the electricity charges associated with pumping water from such a distance quickly became higher than the GPs' annual budget, forcing them to abandon this system and return to extracting water from community borewells, taps, and standposts. Without consideration of the source, then, infrastructure and service management became impossible in both GPs, consequently discouraging integrated water management.



A water meter in Janori, Nashik

Box 2

[Household Water Management in Janori, Nashik](#)

Janori village, located in Dandori block of Nashik, comprises 1025 houses that have consistent access to potable drinking water. By establishing, operating, and maintaining a water supply system as early as 2004, this village offers an authoritative example of successful household water management.

Home to over 50 percent of Adivasi residents, Janori village falls under The Provisions of the Panchayat (Extension to the Scheduled Areas) Act, 1996, establishing it as a PESA Panchayat village. This makes Janori's equitable water supply and effective water management systems even more crucial, demonstrating a departure from the trend JIN researchers have observed in Bihar and Karnataka where SC/ST/OBC communities are kept from adequate water supply and water management decision-making.

Janori village receives drinking water from the Palkhed Dam, an earthfill dam on Kadwa River, routed through a filtration plant established and maintained by Maharashtra Jeevan Pradhikaran (MJP). In the early 2000s, some Janori residents had household tap connections while others relied on community taps. To ensure equitable supply, the Gram Panchayat (GP) installed tap connections, provided against the payment of monthly water tax, but soon realised that households routinely engaged in water wastage and overuse, demonstrating a lack of sensitivity towards the value of water. To manage demand, the GP began installing water meters in 2004 which would calculate water usage and charge nominal water tax accordingly. Many households resisted this, but the GP-led sensitivity programs to educate residents on the value of water and convey to them the importance of limiting their usage of this scarce resource. GP leaders also helped residents understand that this would ensure households were charged in accordance with their usage and threatened to shut off supply in community taps if resistance continued.

In Osmanabad, where drought-like conditions prevail during summer months, village residents cannot rely on community taps, borewells, and standposts, and have to dig private borewells. This results in further depletion of the aquifers, heightening the district's precarious water conditions. Additionally, when water is available, electricity supply in the district is irregular, which prevents village residents from accessing water regularly. To circumvent this, many villages have built storage tanks to store water during electricity shortages. On occasion, however, water

arrives at night and if no one is available to shut off the taps, water is wasted.

This complete lack of adequate infrastructure, coupled with groundwater depletion, disables GPs and community members from engaging in integrated water management. To some extent, however, CSOs like ACWADAM intervene to strengthen and sensitise local institutions in participatory groundwater management and foster drinking water security in Osmanabad's villages.



Water budgeting exercise conducted by Drops of Hope

Box 3

Drops of Hope

Drops of Hope, implemented by ACWADAM in partnership with GSDA, UNICEF, and Bridgestone India, is a project that aims to strengthen institutional arrangements for drinking water safety and security at the village level. With a focus on groundwater management, the project was implemented in Osmanabad between 2018 and 2021 to build capacities and sensitise local institutions like Gram Panchayat and Village Water and Sanitation Committees, design IEC materials and behaviour change campaigns aimed at demystifying groundwater, and highlight the key elements from participatory groundwater management (PGWM), which can be applied in other parts of Maharashtra as well.

In Osmanabad, 95 percent of drinking water schemes are groundwater-based. This, coupled with agricultural dependency on groundwater, has depleted aquifers in the district, presenting an urgent need for participatory groundwater management. In addition, groundwater in the district is contaminated by iron and fluoride, posing many health risks to the rural population.

To promote PGWM, then, ACWADAM and Jnana Prabhodini, their local partner, helped GP members and officials build an understanding of aquifer as a resource base, estimate available supply and current demand, develop water budgets based on this understanding, and design and execute water resource (quality and quantity) monitoring and surveillance mechanisms. They achieved this by convening and empowering the Village Water and Sanitation Committees (VWSC), which were later integrated into the GPs, and hiring Jal Doots. Jal Doots, PGWM community resource persons, were trained in various aspects of water management such as water budgeting, community mobilisation, taking readings from the rain gauge, engaging with SHGs and impassionate farmers, and promoting crop rotation to match rain cycles. Now, even though the project has ended and Jal Doots no longer receive an honorarium, they continue to mobilise communities and take gauge readings which helps people farm accordingly. In conversation with JN researchers, a village resident said, "jal doot gaon ke aur humare bhale ke liye bohot zaroori hai", i.e. jal doots were necessary for the betterment of the village.

Box 4

Profile of a Frontline Worker

Nirmala Tai, a resident of Gorewadi, Osmanabad, was trained by Jnana Prabhodini to become a Jal Doot. Through this intervention, she learned valuable skills such as water budgeting, taking rain gauge readings, and promoting crop rotation. But even before she became a Jal Doot, Nirmala Tai was a fierce advocate for water management who understood the linkages between reliable water supply and livelihood security. She was instrumental in mobilising the community for *shramdaan* and getting the SHG group involved in this project. Being a Jal Doot has empowered her to the degree where the male farmers in her village approach her for advice. She is now planning to stand for the post of the Sarpanch.



Nirmala Tai (second from R), Jal Doot with Nidhi (second from left), JNN researcher

Chapter 3: Fostering Competition, Not Cooperation

As is evident from the previous chapters, Maharashtra has a robust network of actors in the water management ecosystem with MJP and ZP handling household water supply and management, WUAs and WRD handling irrigation management, and GSDA and CSOs attempting convergence between the two sub-sectors. However, interviews with government officials revealed that household water and irrigation are misconstrued as competing priorities in the state.

According to a senior WRD official, beyond an annual, collectorate-level inter-departmental consultation, the department is not consulted by the MJP or ZP as they develop water supply infrastructure. This obstructs the irrigation ecosystem especially when the MJP develops multi-village schemes, which rely on surface water, by sourcing water from the canals. Water released into the canals is meticulously budgeted against farmers' needs and precisely monitored by the WUAs, so when drinking water is

sourced from these canals, farmers receive less water than they are entitled to, leading to income loss and distress.

This sense of competition was echoed by members of Waghad dam's apex WUA. In 2015-16, when Nashik did not receive adequate rain, water had to be rerouted from Waghad dam to nearby villages to meet drinking water needs. While this is in line with the National Water Policy's principle of prioritising drinking water over irrigation, WUA members complained that they were not informed enough in advance, resulting in an inability to plan and manage irrigation needs adequately.¹²

Table 3 offers a non-exhaustive list of actors involved in household water management and irrigation management in Nashik and Osmanabad across levels. While the levels at which household water and agriculture water are managed are not comparable, there is little convergence between the two.

Table 3

Actors in Irrigation Management (L) and Household Water Management (R)

Level	Actor	Level	Actor
District	WRD	District	MJP, Zilla Parishad
Command	Apex WUA, Command Inspector	Block	Block Resource Coordinator, Water Quality Consultant, Community Mobiliser
Minor	WUA (members, secretary, <i>patkari</i> , vice president, and president) Jal Surakshak	Village	VWSCs, PGWMCs, Jal Doot, Jal Surakshak / Pump Operator

Figure 2
Household Water Management across all levels

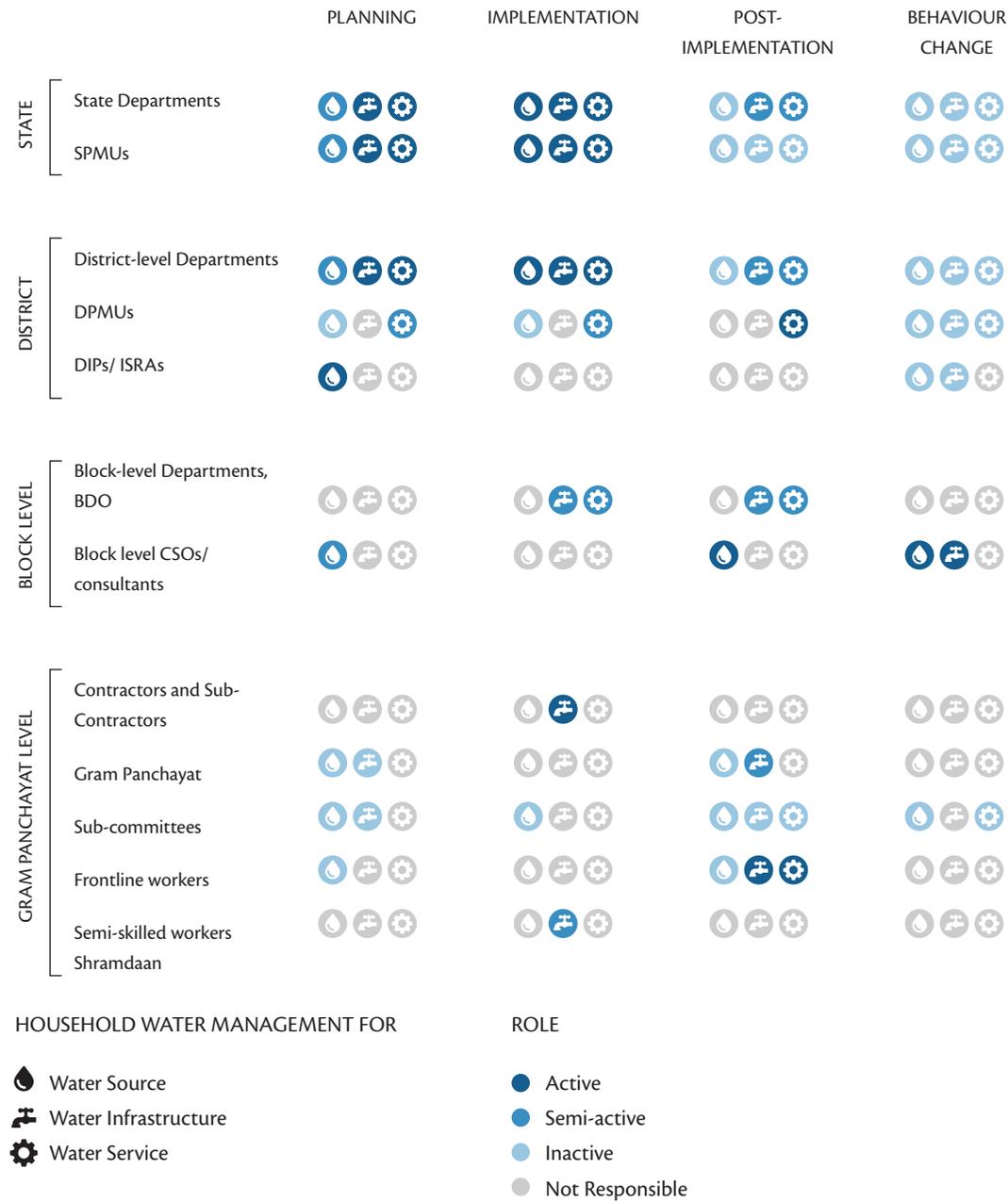


Figure 3
Water management for irrigation, across all levels



According to GSDA officials who oversee the implementation of ABhY, the department has strengthened VWSCs and capacitated them on groundwater management, but JIN researchers did not find any convened VWSCs in Nashik or Osmanabad. The team, however, did encounter community mobilisers and Jal Doots who mapped private wells and installed flow meters that assisted farmers in water budgeting. This further illustrates the singular, agriculture-oriented focus of groundwater interventions, with Drops of Hope being the only exception observed.

In the Sinnar block in Nashik where residents depend on groundwater for both agriculture and household purposes, Yuva Mitra launched the Jal Samruddhi program. As part of this program, Yuva Mitra desilted small dams and irrigation tanks, increasing the water

holding capacity of existing water bodies and helping with overall groundwater recharge. These were then handed to WUAs for upkeep and maintenance beyond the project cycle. However, JIN found WUAs in Sinnar were ineffectual and did not engage with the Jal Samruddhi program adequately.

Since WUAs in groundwater-dependent areas are consistently unsuccessful, a WRD-commissioned report by TISS recommends bringing all water resources under the purview of WUAs so they can “emerge as a single institution managing canal water, groundwater, and other water resources of the command area”.¹⁴ This, according to the report, will also allow for state-wide awareness generation around surface water-groundwater interaction and facilitate overall water security that heightens household water delivery as well.



Cement bhandhara in Osmanabad

Chapter 4: Findings and Call to Action

With integrated water management largely taking place in surface water-dependent areas, water jobs and tasks are also geographically concentrated. This, as is evident from previous chapters, can both cause and be a consequence of skewed attention in favour of surface water-rich areas. To manage water effectively, then, it is important to intervene uniformly and sustainably, heighten the emphasis on groundwater and aquifer management, and build a water cadre that can ensure water security. JIN recommends the following solutions:

- Pay renewed attention to groundwater management. While interventions from PMKSY-IWMP and CSOs are significant, there is a glaring need to address groundwater management. Some demand-led management measures are undertaken by the community, involving switching to less water-intensive irrigation practices, and changing the crop in seasons in which lower rainfall is predicted. However, these measures do not bring into play the narrative of holistic water management.
- Where WUAs exist, build upon their existing and successful infrastructure. Despite primarily working in agriculture, WRD and WUAs do not collaborate with the agriculture department, which is responsible for implementing watershed-based interventions. Collaboration is essential, both with the agriculture department, as well as others like the MJP, ZP, and GSDA. There is also potential to leverage WUAs to converge household and irrigation water management instead of viewing

them as competing priorities. In areas in which WUAs do not exist, they need to be convened and empowered.

- Empanel NGOs or CSOs to train WUA members on the principles of participatory irrigation management. Beyond a select few members, understanding of PIM was limited and needed enhancement. Women are overwhelmingly kept out of WUAs and pointed recruitment or leadership training is necessary to enable their membership.
- Government and civil society efforts have improved water security in both districts. On the one hand, this is a positive outcome that ensures productive livelihoods. However, on the other hand, once water becomes available, communities cease to pay adequate attention to the judicious use of that water. Their viewpoint becomes myopic, threatening future water security. This calls for awareness and education campaigns around demand management that go beyond project timelines.
- Changing cropping patterns to suit a location's water conditions is crucial. However, JIN researchers observed that without enabling conditions such as better rates for millets, wheat, groundnuts and other non-water-intensive crops, farmers are compelled to return to water-intensive crops like sugarcane which offer better market rates.

- Water management interventions and their associated cadre need to be resilient and agile. Climate change is a real issue being realised at Osmanabad. The water availability pattern has changed in the recent years and the district, despite being drought-prone, has received abundant rainfall. This implies that water management measures need to also respond to new climatic conditions. In discussion with NGOs, it was clear that the government needs to focus on reviving traditional tanks, farm ponds, and rain water harvesting measures, considering new climatic conditions. Water cadre, who can understand such peculiarities, need to be adequately trained and supported.
- A clear demand for a frontline cadre for water management was expressed both by officials and the community. This cadre needs to address demand management, operation and maintenance works, and help the community avail various government subsidies offered to switch to sustainable practices of irrigation and farming. These include drip and sprinkler irrigation, and the use of solar pumps.
- Conjunctive water management, for household water and irrigation water, is still lacking. This can happen through converging schemes such as ABhY. However, the impact of ABhY remains to be seen. The convergence of various schemes at the block and watershed level is essential, with adequately-skilled cadre trained for the same.

ANNEXURE 1: Jobs and Tasks in Water Management

Technical Water Jobs

S No	Job/Role	Formal/ Informal	Paid/ Unpaid	Work hours	Tasks	Skills and Training
DISTRICT LEVEL						
1	Executive Engineer, WRD	Formal	Paid	8 hours/ full day work		
2	Executive Engineer, WSD, ZP	Formal	Paid	8 hours/ full day work		
3	Assistant Engineer	Formal	Paid	8 hours/ full day work		
4	Deputy Engineer	Formal	Paid	8 hours/ full day work		
5	Canal Inspector	Formal	Paid, INR 15000 monthly	Full day work which increases during monsoon	<ul style="list-style-type: none"> Release water into the left and right bank canals Record and submit hourly rainfall reading during monsoon 	Trained by WRD
BLOCK LEVEL						
1	Junior Engineer	Formal	Paid	8 hours/ full day work		
2	Community Mobiliser, ABhY	Formal	Paid	8 hours/ full day work	<ul style="list-style-type: none"> Map private wells Install flow meters and take weekly readings 	Trained by GSDA
3	Water Quality Consultants	Formal	Paid	Sporadic work	<ul style="list-style-type: none"> Coordinate water quality checks across the block Submit to the lab 	Trained by ZP

S No	Job/Role	Formal/ Informal	Paid/ Unpaid	Work hours	Tasks	Skills and Training
VILLAGE LEVEL						
1	Pump Operator / Jal Surakshak	Formal	Paid	Sporadic work	<ul style="list-style-type: none"> Release water Conduct water quality tests Minor repair work 	Trained by former GP members
2	Paatkari	Informal	Paid, INR 3500 monthly	Full day work which increases during monsoon	<ul style="list-style-type: none"> Monitor rainfall Administrative work at the WUA office Tax collection 	Trained by former WUA members and the apex WUA
3	Seasonal Worker	Informal	Paid	Sporadic work	<ul style="list-style-type: none"> Clean and desilt minors Support the canal inspector in monitoring water discharge Support <i>paatkari</i> in monitoring rainfall 	
4	Jal Surakshak, Paani Foundation	Informal	Unpaid	Sporadic work	<ul style="list-style-type: none"> Release water from the ponds Maintain the ponds 	Trained by Paani Foundation
5	Jal Doot, Drops of Hope	Informal	Paid while the programme is ongoing	Sporadic work	<ul style="list-style-type: none"> Water budgeting Take rain guage readings Community mobilisation Awareness generation 	Trained by ACWADAM

Supporting Water Jobs

S No	Job/Role	Formal/ Informal	Paid/ Unpaid	Work hours	Tasks	Skills and Training
BLOCK LEVEL						
1	Secretary, WUA	Formal	Paid	8 hours/full day work	<ul style="list-style-type: none"> Maintain ledgers and undertake overall accounting Make financial investments on behalf of the WUA 	

Institutional/Administrative Water Jobs

S No	Job/Role	Formal/ Informal	Paid/ Unpaid	Work hours	Tasks	Skills and Training
DISTRICT LEVEL						
1	CEO, WSP, ZP	Formal	Paid	8 hours/ full day work		
2	Deputy CEO, WSP, ZP	Formal	Paid	8 hours/ full day work		
BLOCK LEVEL						
1	Block Resource Coordinator	Formal	Paid	8 hours/ full day work		Trained by ZP

Annexure 2: Survey Methodology and Selection Criteria

District Selection

JJN researchers shortlisted Nashik and Osmanabad districts for primary research. These districts were chosen due to their geographical location, distinct hydrogeological profiles, water security context, canonical water management practices, and active missions, schemes, programs, and resolutions.

Nashik

Nashik is the third largest district in Maharashtra, which has a total of 36 districts. The district comprises 15 blocks and falls under the drainage basins of Godavari and Girna rivers. The water quality of shallow aquifer and deeper aquifer in Nashik district is largely potable and good for drinking, domestic, industrial as well as irrigation purposes except in villages with high nitrate and fluoride concentration.¹⁵

The primary occupation in the district is agriculture with food grains, pulses, sugarcane, and oil seeds comprising the majority of crops sown. The larger eastern portion of the district, which lies on the Deccan Plateau, is open, fertile, and well cultivated.¹⁶ Nashik is also famous for its variety of table grapes exported across Europe and Asia and have brought prosperity to many farmers in Nashik. This has also resulted in Nashik being known as the “Wine Capital of India”.

Osmanabad

Osmanabad is an aspirational district in the Marathwada region, with eight blocks, namely, Osmanabad, Tuljapur, Umerga, Lohara, Bhum, Kalamb, Paranda and Washi. Until very recently, it faced water-drought situations that resulted in farmer suicides caused by a decrease in agriculture productivity.

It lies on the Deccan plateau, has a varied topography consisting of hills, plains and undulating topography near river-banks, about 600m above sea level. Parts of the Sina, Manjira and Terna River flow through the district. The average annual rainfall in the district is about 600-780mm with large variations across the summer months, with even less than 350mm rainfall seen in some talukas, leading to drought conditions. However, in the last two-three years, the district saw above average rainfall.

Agriculture is the predominant occupation. In rabi season (winter), jowar, soybean, mung, wheat, and gram are cultivated. In kharif season (summer), sugarcane, jowar, grapes, soyabean, moong, and tur dal are cultivated.



A well used to extract household water in Nashik

Ground water is major source of irrigation and accounts for 74.50 percent of the net irrigated area in the district. Most farms have borewells and open wells. Ground water exploration reveals that the ground water quality has deteriorated due to contamination by fluoride and nitrate. The district

also has sugar factories, and their discharge water with high Biological Oxygen Demand (BOD) is further contaminating groundwater.

Dams, ponds and systems of check dams and farm ponds also provide water for agriculture purposes

Primary Research Methodology

Nashik

JJN researchers visited seven GPs and five WUAs where they conducted one-on-one interviews and focus group discussions. The FGDs were attended by 63 respondents including WUA members, Gram Panchayat members, village residents, and frontline workers. In addition, JJN researchers conducted in-depth interviews with frontline workers such as the WUA secretary, canal inspectors, *paatkari*, seasonal workers, and pump operator. These discussions were conducted in Hindi, a language the researcher is fluent in, and Marathi.

On a block- and district-level, JJN researchers met with a Canal Inspector, Community Mobiliser, Executive Engineer of WRD, Assistant Engineer of MJP, Executive Engineer of ZP, Deputy CEO of ZP, and Chief Geologist, GSDA.

In Nashik, access to all WUAs and three GPs was facilitated by Mahatma Jyotirao Phule Water User Association and the Apex WUA. Access to two GPs was facilitated by Yuva Mitra, a social development organisation based in Sinnar, Nashik. JJN researchers express their deepest gratitude to Govardhan Kulkarni ji and Balasaheb ji for their assistance and company.

Table 4

Sample size, criteria, and methods – Nashik

Sample	Sampling criteria	Methods
NGO/CSO members (N=3)	Criterion sampling	Scoping Interviews
WUA members (N=17)	Criterion sampling	Focus Group Discussions
Village residents (N=35)	Criterion sampling (adults living in the village); Snowball sampling	Focus Group Discussions
Frontline workers (N=11)	Criterion sampling (technical and supporting workers, as defined by the study)	Semi-structured Interviews and Focus Group Discussions
Block- and District officials (N=7)	Criterion sampling	Semi-structured Interviews

Table 5

Profiles of GPs visited

S No	Gram Panchayat	Block	No. of HHs	% of households with FHTC ²	Source of Water
1	Janori	Dindori	1628	71%	Surface water
2	Lakhalgaon	Nashik	906	87%	Surface water
3	Pimpalgaon Baswant	Niphad	12623	86%	Surface water
4	Sunderpur	Sinnar	205	54%	Groundwater
5	Kepanagar	Sinnar	304	45%	Groundwater

Osmanabad

JJN researchers visited five GPs of Osmanabad where they conducted one-on-one interviews and focus group discussions. The FGDs were attended by 25 respondents, including PGWMC and SHG members, Gram Panchayat members, village residents, and frontline workers. In addition, JJN researchers conducted in-depth interviews with frontline workers such as Jal Doots trained by the local CSOs, Police Patil, Jal Surakshaks, and Jal Doots under ABHY. These discussions were conducted in Hindi, a language the researcher is fluent in, and Marathi.

On a block- and district-level, JJN researchers met officials of ABHY, the District Implementation Partner, GSDA, officials from the agriculture department, and block development officer.

JJN team was supported by a local NGO called Jnana Prabodhini, which shared their project Drops of Hope and extended support in all other meetings with officials and gram panchayats.

² As obtained from the JJM dashboard (<https://ejalshakti.gov.in/jjmreport/>). However, JJN researchers found FHTC access to vary significantly and not always correspond with the reported figures.

Table 6

Sample size, criteria, and methods – Osmanabad

Sample	Sampling criteria	Methods
NGO/CSO members (N=5)	Criterion sampling	Scoping Interviews
WUA members (N=3)	Criterion sampling	Focus Group Discussions
PGWMC members (N=7)	Criterion sampling	Focus Group Discussions
Village residents (N=20)	Criterion sampling (adults living in the village); Snowball sampling	Focus Group Discussions
Frontline workers (N=12)	Criterion sampling (technical and supporting workers, as defined by the study)	Semi-structured Interviews and Focus Group Discussions
Block- and District officials (N=6)	Criterion sampling	Semi-structured Interviews

Table 7

Profiles of GPs visited

#	Block	GP	village	No of HH in village	Source of water for domestic	FHTC status
1	Osmanabad	Kawalewadi	Kawalewadi	214	Groundwater	According to JJM dashboard – 90%, but it was much lesser
2	Osmanabad	Gorewadi	Gorewadi	380	Groundwater	80%
3	Kalamb	Khamswadi	Khamswadi	1,488	Groundwater	40%, JJM work hasn't yet started
4	Osmanabad	Junoni	Walgud	212	Groundwater	50%, JJM work hasn't yet started
5	Osmanabad	Chilwadi	Chilwadi	460	Groundwater	60%, JJM work hasn't yet started

Notes

- ¹ World Bank, "India Groundwater: a Valuable but Diminishing Resource," March 6, 2012. <https://www.worldbank.org/en/news/feature/2012/03/06/india-groundwater-critical-diminishing>
- ² Government of India, *Community participation in water related programmes*, Press Information Bureau, 2021. <https://pib.gov.in/PressReleaseframePage.aspx?PRID=1703211>
- ³ United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), *Economic and Social Survey of Asia and the Pacific 2016: Year-end Update*, 2016. <https://www.unescap.org/sites/default/files/2016-year-end-update.pdf>
- ⁴ Government of MH, *Economic Survey of Maharashtra 2021-2022, 2022*, <https://bankofmaharashtra.in/writereaddata/documentlibrary/74de861a-a869-47a0-b1f7-456f32e976ee.pdf>
- ⁵ Water Resources Department, *Maharashtra State Water Policy*, 2019, <https:// wrd.maharashtra.gov.in/Site/Upload/PDF/State%20Water%20Policy%2005092019-pages-32-55.pdf>
- ⁶ Ibid.
- ⁷ Tiwale et al., *Reviving Participatory Irrigation Management in Maharashtra*, Centre for Water Policy, Regulation and Governance, School of Habitat Studies and School of Rural Development Tata Institute of Social Sciences, 2021, https:// wrd.maharashtra.gov.in/site/upload/pdf/ TISS_PIM_Report_March2021_compressed.pdf?MenuID=1449
- ⁸ Ibid.
- ⁹ Government of MH, *Economic Survey of Maharashtra 2021-2022, 2022*.
- ¹⁰ Jal Surakshaks appointed by the Paani Foundation are distinct from Jal Surakshak / Pump Operators who work in household water management.
- ¹¹ Government of Haryana. <https://haryanarural.gov.in/en/pardhan-mantri-karishi-sinchayi-yojnapmksy-erst-while-iwmp>
- ¹² Central Water Commission, *National Water Policy*, Government of India, n.d. <https://cwc.gov.in/sites/default/files/nwauser/nwp-lectnote6.pdf>
- ¹³ The Jal Doots convened under Atal Bhujaal Yojana are distinct from the Jal Doots trained and employed under ACWADAM's Drops of Hope program.
- ¹⁴ Sachin Tiwale et al., *Reviving Participatory Irrigation Management in Maharashtra*, 2021.
- ¹⁵ Central Ground Water Board, *Aquifer Mapping And Management Of Ground Water Resources*, Department of Water Resources, 2018, http://cgwb.gov.in/AQM/NAQUIM_REPORT/Maharashtra/Nashik.pdf
- ¹⁶ Government of Maharashtra, *Nashik District*, n.d. <https://nashik.gov.in/about-district/>

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