India's Participatory Groundwater Management Programme

Learnings from the *Atal Bhujal Yojana* Implementation in Rajasthan

Ekansha Khanduja, Kartikey Chaturvedi, Aditya Vikram Jain, and Nitin Bassi

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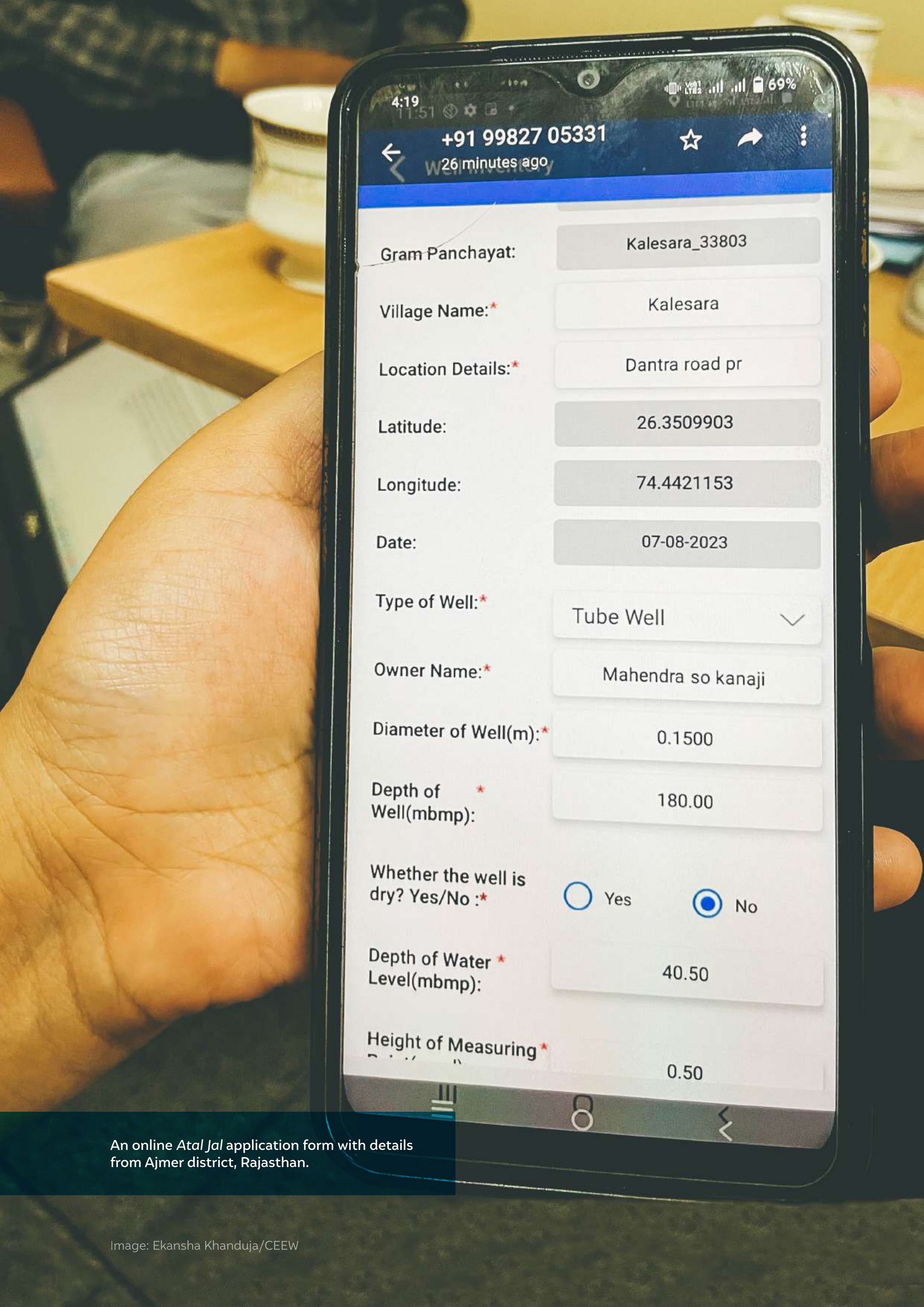

An online *Atal Jal* application form with details from Ajmer district, Rajasthan.

Image: Ekansha Khanduja/CEEW

Foreword

देवश्री मुखर्जी
DEBASHREE MUKHERJEE
सचिव
SECRETARY

भारत सरकार
जल शक्ति मंत्रालय
जल संसाधन, नदी विकास
और गंगा संरक्षण विभाग
GOVERNMENT OF INDIA
MINISTRY OF JAL SHAKTI
DEPARTMENT OF WATER RESOURCES
RIVER DEVELOPMENT & GANGA REJUVENATION

FOREWORD

Groundwater can be considered akin to liquid gold in India due to its critical role in the socio-economic development of the country, which is home to 18 per cent of the world's population but has only 4 per cent of the world's freshwater resources. It meets nearly 85 per cent of the drinking water demand in rural areas and 50 per cent in urban areas. It sustains food and agriculture production by fulfilling a very large proportion of the irrigation demand in the country.

The United Nations Water Conference held in March 2023 at New York stressed the importance of groundwater for tackling growing water scarcity and sustaining biodiversity around the world; it also emphasised an integrated approach to water management that considers the nexus between water, energy, and food. India has long taken cognizance of these facts in its water policies. Atal Bhujal Yojana (ABY) honours the spirit of community participation and acknowledges the need for conjunctive management of surface and groundwater resources and their interaction with the energy and food sectors. Launched as a central sector scheme in 37 per cent of water-stressed blocks in seven states of India, the scheme is mainstreaming the principles of participatory groundwater management in rural areas in the country. The scheme harnesses traditional and indigenous knowledge and the conservationist spirit of the people and integrates them with scientific principles in monitoring, measuring, and managing groundwater resources. The roles of ministries governing various sectors, such as agriculture, power, energy, rural development and forests in the country, have been institutionalised in ABY for its planning and implementation.

The scheme is able to contribute to the attainment of not just SDG 6, which is dedicated to achieving clean water and sanitation, but also to the SDGs that deal with the themes of poverty reduction; achieving global food security; skilling of youth; gender equality; energy access; sustainable economic growth; resilient infrastructure; sustainable consumption and production; actions to combat climate change; conservation and restoration of terrestrial ecosystems; promoting peaceful societies; and strengthening global partnerships for sustainable development.

This report, which is based on an extensive study in one of the implementing states of Atal Bhujal Yojana-Rajasthan-is a repository of insights on achievements and lessons. These findings from the state of Rajasthan are important because of the unique challenges that the state has, in terms of its large size; widespread geographical, topographical, and climatological variations; and the socio-economic dynamics of its heterogeneous population. I congratulate the Council on the Energy, Environment and Water (CEEW) and the National Program Management Unit (NPMU) on coming out with this publication, which has lessons not only for our country, but for other developing nations keen on participatory groundwater management as well.

(Debashree Mukherjee)

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Glossary

Bhujal mitra	This is a Hindi term that means friends of groundwater. *Bhujal* means groundwater and *mitra* means friend. They are local volunteers who are an important link between villagers and gram panchayats and are the local resource persons for the development and implementation of water security plans.
Community working officer (CWO)	Community working officers are field workers who are responsible for the implementation of the *Atal Bhujal Yojana* at gram panchayat levels.
Diggi	A water storage structure constructed near canals.
Frontline workers (FLW)	Frontline Workers are those who take health, nutrition and integrated child development services directly to communities, where access is often limited. India has three types of FLWs that fall within the purview of two ministries, the Ministry of Health and Family Welfare (MoHFW) and the Ministry of Women and Child Development (MoWCD). Anganwadi Workers (AWWs), Accredited Social Health Activists (ASHAs), and Auxiliary Nurse Midwives (ANMs) form the part of FLW.
Ghat	They are stepped mountains with valleys in between them.
Groundwater stress	In the context of *Atal Bhujal Yojana*, groundwater stress is a situation where the stage of groundwater development is more than 100 per cent.
Krishi sakhi	This is a Hindi term for an agricultural supervisor who is designated for three to four gram panchayats. These supervisors are responsible for the daily planning, organisation, supervision, and administration of activities on farm estates, which include raising animals, tending crops, planning strategies for maximising yield, organising farm administration, taking care of work machinery, organising associated businesses, and managing staff.
***Indira Gandhi Nahar Pariyojana* (IGNP)**	Indira Gandhi canal project running through Rajasthan covering a distance of 445 kms. It enters Rajasthan from Tibbi block of Hanumangarh and flows through Barmer, Bikaner, Hanumangarh, Jaisalmer, Jodhpur, and Sriganganagar and irrigates about 15 lac ha of land.
***Jal Jeevan Mission* (JJM)**	A central sponsored scheme, envisioned to provide safe and adequate drinking water through individual household tap connections by 2024 to all households in rural India.
Stage of groundwater development	The stage of groundwater development is a ratio of annual groundwater extraction and net annual groundwater availability in per cent.
Village water and sanitation committee (VWSC)	This is a committee formed at the gram panchayat level, consisting of elected representatives of government at the panchayat level, such as the sarpanch (elected head of panchayat); village development officer; government front-line workers; and *aanganwadi* workers.
Water security plan (WSP)	It is a document that contains details of the water budget, provides updated details of the water balance, and recommends water supply or demand management interventions to address the water deficit (if any) and secure water needs for irrigation, domestic purposes, industries, and livestock for any hydrological or administrative unit.

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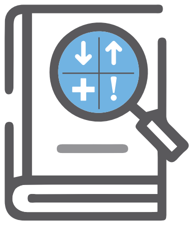
A beneficiary's farm pond and polyhouse constructed as a part of *Atal Bhujal Yojana*, Jaipur district, Rajasthan.

Image: Ekansha Khanduja/CEEW

Executive summary

Groundwater constitutes about 99 per cent of readily accessible freshwater (United Nation 2022). This invaluable resource plays a crucial role in satisfying the water demands of billions of stakeholders worldwide, spanning rural and urban areas and the industrial and irrigation sectors. As the more easily accessible surface water resources are being over-appropriated and their availability adversely impacted by climate change, reliance on groundwater has increased significantly.



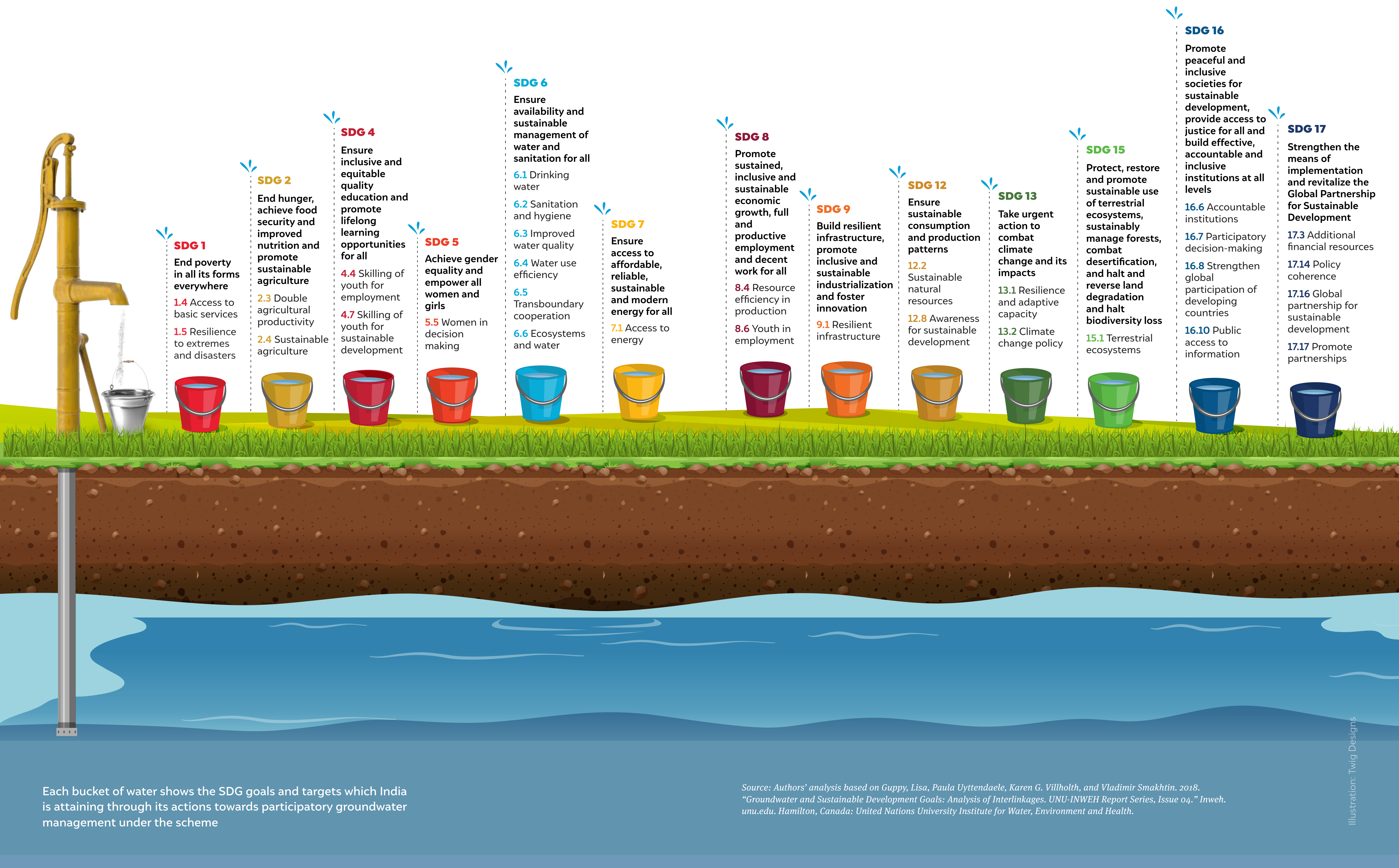
This study presents the implementation status, drivers of success, implementation challenges, opportunities for improvement, and threats to the *Atal Bhujal Yojana*

In India, groundwater has played a major role in sustaining the nation's economy, preserving its environment, and improving standards of living. However, the past few decades have seen an increase in groundwater extraction, with some regions extracting more than the annual replenishment rate. Moreover, this accelerated rise in groundwater extraction has largely been unplanned and unmanaged. Although in the past some efforts were taken to promote the sustainable management of groundwater resources, in the absence of proper statutory backing to regulate groundwater use in agriculture at the national and state level, its governance remains a challenge. In this context, in 2019–20, the Government of India (GoI) launched the *Atal Bhujal Yojana* (ABY), a central sector scheme, to arrest the decline in groundwater levels and improve the governance of groundwater resources through effective community participation, especially in units (usually blocks) that are over-exploited (stage of groundwater development more than 100 per cent). The scheme has an outlay of INR 6,000 crore (USD 840 million[1]) (DoWR,RD&GR 2023a) of which 50 per cent is a loan from the World Bank and the rest is from the GoI, given as grant-in-aid to the implementing states. From 2020–21, the scheme is being implemented in selected water-stressed areas in seven states: Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan, and Uttar Pradesh, for a period till 2024-25. The scheme has potential to achieve the targets under many Sustainable Development Goals (SDGs) including 1, 2, 4, 5, 6, 7, 8, 9, 12, 13, 15, 16 and 17 (refer Figure ES1).

In this report, we present an assessment of the scheme through desk review and field visits. We examine its implementation status, key drivers of success (strengths), implementation challenges (weaknesses), opportunities for improvement, and outside threats affecting the scheme's sustainability. Further, we provide actionable recommendations to improve governance and implementation in the next phase based on the rapid but extensive field research conducted in selected districts of Rajasthan. We also present learnings for other countries to enable community-based participatory groundwater management. This study was undertaken at the behest of the National Program Management Unit (NPMU) of the ABY, under the aegis of the Ministry of Jal Shakti (MoJS), GoI.

1. Conversion rate not adjusted for inflation

Figure ES1 Potential SDG goals and targets that can be achieved through the *Atal Bhujal Yojana*



Each bucket of water shows the SDG goals and targets which India is attaining through its actions towards participatory groundwater management under the scheme

Source: Authors' analysis based on Guppy, Lisa, Paula Uyttendaele, Karen G. Villholth, and Vladimir Smakhtin. 2018. "Groundwater and Sustainable Development Goals: Analysis of Interlinkages. UNU-INWEH Report Series, Issue 04." Inweh.unu.edu. Hamilton, Canada: United Nations University Institute for Water, Environment and Health.

Methodology

We conducted this study using an eclectic methodological approach and deployed qualitative and quantitative tools. It consisted of two phases (Figure 3). Phase I consisted of an exposure visit to Jaipur (where the State Program Management Unit (SPMU) office is located) and the neighbouring district (Dausa) to understand the conditions on ground. The learnings from Phase I were used to develop separate set of questionnaires to gauge stakeholders' responses on implementation of the scheme. These questionnaires were administered in districts selected for phase II, i.e., Ajmer, Hanumangarh, Karauli, Jaisalmer, Kota, and Chittorgarh.

The study has been conducted in eight districts of Rajasthan, using an eclectic methodological approach

The fieldwork for both phases was conducted by a team of three researchers during the months of August and September 2023. In phase II, 17 members from District Program Management Units (DPMUs), 24 members from the District Implementing Partners (DIPs), and 25 GP members were interviewed. Focussed-group discussions (FGDs) were conducted with 17 village water and sanitation committees (VWSCs) in six districts. In addition, 29 respondents from seven line departments in the selected districts were interviewed. The data cleaning and analysis were undertaken using Microsoft Excel. The responses from each stakeholder were analysed and categorised to match the respective disbursement-linked indicators (DLIs). The analysis was synergised with the Quality Council of India (QCI) methodology for DLI verification. The results and findings have been reported only for districts covered in phase II.

Results and findings on *Atal Bhujal Yojana* implementation in Rajasthan

- **Institutional strengthening and capacity building**: We found that 100 per cent of the village water and sanitation committees (VWSCs) were aware of the objectives of the scheme; more than 94 per cent were aware of a rain gauge; more than 88 per cent were aware of a water quality testing kit (WQTK); and more than 64 per cent knew what a piezometer was. However, their capacity to use monitoring instruments was low.

- **DLI 1 – Public disclosure of groundwater data/information and reports**: It was found that 88 per cent of the respondents knew what a rain gauge was and that they were present in the GP. However, data collection in certain GPs is a challenge because of difficulty in accessing the rain gauge. Further, most of the respondents were aware of piezometers, and more than 50 per cent knew where they were installed. Also, around 70 per cent of the respondents were aware of WQTKs and knew how to use them. Some farmers used the existing information on the groundwater level and its quality monitored for wells near their respective fields and shared this knowledge with fellow farmers. More than 50 per cent of line departments think that the additional data can be used for better planning of their respective annual work plans (AWPs).

- **DLI 2 – Preparation of community-led water security plans (WSPs)**: The second round of verification of DLIs by the QCI in 2022 led to the approval of about 82 per cent of the WSPs received from Rajasthan, because they were deemed adequate if the plans were made by GPs in consultation with the community. All the GPs chosen in this study had WSPs for the financial years (FY) 2021–22 and 2022–23 and were in the process of updating the same for 2023–24. While most of the stakeholders were aware of the AWP, VWSC, and WSP, beneficiaries are gradually developing in-depth knowledge about the WSP. The role of DIPs in ensuring this is crucial.

- **DLI 3 – Public financing of approved WSPs through convergence of ongoing/new schemes**: According to the QCI's sixth round of verification, Rajasthan claimed about INR 10,270 lakh or USD 12.3 million for 725 GPs, and they received INR 7,342 lakh or USD 8.8 million (71.5 per cent of the demand) in 2022–23. (1 USD = 83.22 INR as of 26/09/2023).

- **DLI 4 – Adoption of practices for efficient water use**: Around 41 per cent of VWSC members acknowledged that cropping patterns could change as a result of technological advances, such as the availability of better-quality seeds and adoption of micro-irrigation systems in the groundwater irrigated areas through convergence with other departments such as agriculture. Though, between 2021 and 2023, no major gains were made on crop shifting front, the state is making progress on the adoption of demand-side interventions such as micro-irrigation and other water-saving methods. Based on the QCI's sixth round of verification, an area of about 12,256 ha was brought under efficient water use practices, promoted through the ABY; 99 per cent of this was through the adoption of drip, sprinkler, and pipeline-based irrigation. The WSPs submitted in March 2023 for 15 surveyed GPs across five districts (except Jaisalmer) proposes to bring about 24,481 ha of additional area under efficient water use by the fiscal year 2024-25.

- **DLI 5 – Improvement in the rate of decline of groundwater levels**: The scheme is being implemented in over-exploited blocks where the groundwater resource development exceeds 100 per cent. Therefore, it will take some time before outcomes related to DLI 5 are visible. Nevertheless, the trend of declining groundwater levels during pre-monsoon periods was reversed in some districts. This includes GPs in Kota and Chittorgarh (Figure 7 in the main text). The former has also witnessed a reversal in the trend of groundwater extraction at the district level, but in the latter, extraction has increased. This indicates that at least in Chittorgarh the ABY is making a positive impact in terms of improving the groundwater situation.

A farm pond built under *Atal Bhujal Yojana* in Bargawan gram panchayat, Karauli district, Rajasthan.

The SWOT analysis

A strength, weakness, opportunity, and threat (SWOT) analysis was carried out to help address the challenges identified, so that a bigger impact can be made in the future. This is presented in Figure ES2.

Figure ES2 A SWOT analysis of the *Atal Bhujal Yojana* implementation in Rajasthan

STRENGTHS

The design seeks to establish convergence at different levels of governance. It is implemented through the mechanism of incentives.

Harnesses existing state- and grassroots-level institutions.

Places community at the centre of participatory groundwater management.

Hiring of sectoral experts at the district and block levels.

Capacity building at all levels of governance.

Strengthen monitoring networks at the GP level.

WEAKNESSES

Scheme awareness has scope for improvement at the GP level.

Challenges with respect to the functioning of DIPs, especially the absence of targeted work plans.

Absence of a dedicated hydrogeologist deputed for the scheme at the DPMU level.

Non-compliance with standard operating procedures for the installation of rain gauges.

OPPORTUNITIES

Increase focus on exposure visits at all levels.

Leverage existing platforms and knowledge to obtain more sustainable and pronounced impacts.

Improve governance and management of groundwater in the state.

Identify potential for skill development and employment generation at the village level.

Enable crop diversification.

THREATS

Limited mandate of the state groundwater department (GWD).

Absence of an institutional architecture of the GWD at the sub-district level.

A large number of vacancies in the programme implementing agency.

Lack of coherence with schemes outside the ambit of the ABY but having adverse impacts on groundwater sustainability.

Source: Authors' analysis

Recommendations

- **Make DIPs more impactful:** The DIP tendering process should be outsourced to accredited third-party agencies, similar to the hiring of key DPMU experts through the National Bank for Agriculture and Rural Development (NABARD) Consultancy Services (NABCONS) or through empanelment of implementation support agencies as under *Jal Jeevan Mission* (JJM). This change will boost motivation among the DIPs, improve retention rates, streamline human resource (HR) procedures, expedite conflict resolution, foster proactive HR policies, ensure equitable pay for DIP experts across districts, and thereby better implementation of the scheme. Additionally, block-level offices should be established for DIPs to enhance logistics and operational efficiency. Currently, DIPs are stationed at the district level, often far from their organisational offices, resulting in logistical challenges.

- **Include water budgeting in the GP development plan (GPDP)**: Panchayats have been mandated to formulate an annual GPDP in a participatory manner. This includes work under 36 line departments for subjects included in Article 243G of the Eleventh Schedule of the Constitution (Ministry of Panchayati Raj 2023). Seven of the 29 subjects included in this schedule have direct bearings on the state of water resources, including groundwater. An inter-ministerial sub-committee for better coordination on water resources has been formed as an outcome of the first 'All India Annual State Ministers Conference on Water 2023'. Thus, there is a strong enabling environment to make water budget part of the GPDP which will result in better convergence with other line departments right at the planning phase.
- **Explore providing incentives directly to GPs**: Anecdotal evidence from the field suggests that providing incentives to GPs can motivate them to implement projects identified through convergence and, thus, contribute to their success. The ABY guideline has a provision for this if there is a felt need. However, the incentive allotment criteria should consider the stage of groundwater development and the amount of work required for water demand management with community engagement by the GP.
- **Ensure timely release of funds by the line departments and subsidy to beneficiaries**: There is low clarity on the criteria followed by the state line departments in allocating funds to their district offices for various interventions. Thus, one of the reasons for the low uptake of interventions under the ABY was delays in the release of subsidies from the respective line departments. Such delays discourage farmers from availing benefits under the ABY as, often, the upfront costs of interventions are high.
- **Strengthen the verification system for 'proper' installation of rain gauges**: It was observed in some of the GPs that we visited, rain gauges were not placed in the appropriate location. For instance, they were installed in places where they could not be accessed easily. Therefore, the tendering process should strengthen the existing system of verification and reporting of the installation of rain gauges.

Lessons for other countries

Atal Bhujal Yojana (ABY) offers essential lessons for other countries to enable community-based, participatory groundwater management and achieve sustainable development goals (SDGs). They are presented in Table ES1.

Table ES1 **Stage, form, results, and enablers of participation at the gram panchayat (GP) level**

Stakeholder	Stage of participation	Form of participation	Result of participation	Enabler of participation
Beneficiary	Implementation	Form and update water security plans	Propulsion of spirit of bottoms-up planning; water security plans reflect the voice and demand of the community	The Constitution of the country provides for local self-governance The policy landscape for water and allied resource governance acknowledges the importance of community participation Linking community participation to DLIs
		Avail the provisions of the schemes from line departments	Faster and efficient allocation of water demand management interventions	
		Receive guidance on behaviour change, communication, and knowledge-building under information, education, and communication (IEC) activities	Facilitates water conservation behaviours	
		Get awareness of water quantity and quality and learn skills to measure rainfall and water quantity and quality at the GP level	Better planning for agricultural activities	
		Whistle-blowers/ enforcers	Ensures a system of checks and balances and facilitates accountability within the system	
	Monitoring and evaluation	Partake as respondents in the disbursement-linked indicator (DLI) assessments performed by the Quality Council of India (QCI)	Fairer monitoring and evaluation of the scheme	
Village water and sanitation committee (VWSC)	Implementation	Convene community meetings for forming and updating water security plans	The role of VWSCs as a link between the government and the community is consolidated Builds the foundation for a sustainable exit strategy of the scheme; VWSCs are becoming equipped and trained to sustain community participation for groundwater resource governance	The Constitution of the country provides for local self-governance The policy landscape for water and allied resource governance acknowledges the importance of community participation Linking community participation to DLIs Leveraging existing institutional structures: VWSCs have been formed under the Jal Jeevan Mission programme of the same ministry to implement the scheme on the ground
		Guide the panchayat on availing benefits under the scheme		
		Facilitate the installation or storage, usage, and dissemination of the data collected from the monitoring instruments		
		Facilitate institutional strengthening and capacity-building activities in the panchayat as well as receive training for the same		
		Record citizen feedback and resolution of complaints		
	Monitoring and evaluation	Facilitate DLI verification by QCI		

Stakeholder	Stage of participation	Form of participation	Result of participation	Enabler of participation
District Implementing Partners (DIPs)	Implementation	Facilitate handholding of panchayats and VWSCs to prepare water security plans; installation, usage, and information dissemination of the data from monitoring instruments; and institutional strengthening and capacity-building activities	Increases the capacity of the scheme to deliver its objectives	Acknowledgement of the need for external support agencies at the local level within the governance system
		Support District Program Management Units (DPMUs) as and when required on programmatic tasks		
	Monitoring and evaluation	Conduct field visits and community interactions and supervise community working officers (CWO) to monitor the progress of the scheme		
		Facilitate DLI verification by QCI		
Line departments	Implementation	Facilitate programme implementation by providing necessary documents, information, and, expertise from time to time for forming water security plans	Convergence for management of groundwater as a resource	The line departments partaking in this scheme have received community participation and engagement for other existing schemes to various extents Recognition by the parent department and the policy landscape of the country of the need to bring together ministries that govern resources that have a bearing on the water sector The National Interdepartmental Steering Committee (NISC) and State Interdepartmental Steering Committees (SISCs) facilitate the convergence of line departments at the GP level
		Ensure the utilisation of funds obtained by the department under the scheme for demand- or supply-side interventions in the panchayat		
		Synergise annual work plans with water security plans		
		Receive training and capacity- building on various topics under the scheme; co-facilitate the delivery of the same at the GP level		

<table>
<tr><th>Stakeholder</th><th>Stage of participation</th><th>Form of participation</th><th>Result of participation</th><th>Enabler of participation</th></tr>
<tr><td rowspan="3">District Program Management Unit (DPMU);
State Program Management Unit
(SPMU);
State Inter-departmental Steering Committee (SISC);
National Program Management Unit (NPMU); and
National Inter-departmental Steering Committee (NISC)</td><td>Planning</td><td rowspan="2">Coordinate and facilitate programme implementation including coordination with line departments and ministries at the respective levels; provide implementation support to subordinate levels of the scheme. NISC and SISCs are responsible for the overall administration, management, and coordination of the scheme at the national and state levels, respectively</td><td rowspan="3">A conducive environment that guides and facilitates the delivery of the objectives of the scheme, including community participation</td><td rowspan="3">Recognition by the parent department and the policy landscape of the country of the need to bring together ministries that govern resources that have a bearing on the water sector

Inclusion of the apex public policy think tank of the Government of India in the NISC

Institutionalising inter-ministerial and inter-departmental convergence at the national as well as state levels in the structure of the scheme

Inclusion of dedicated subject experts at the national, state, and district levels to ensure smoother implementation of the scheme</td></tr>
<tr><td>Implementation</td></tr>
<tr><td>Monitoring and evaluation</td><td>Coordinate and facilitate third-party verification of DLIs; and filling and updating of management information system (MIS) and scheme's mobile application at subordinate levels</td></tr>
<tr><td>Third-party government verification agency (TPGVA)</td><td>Monitoring and evaluation</td><td>Develop and execute protocols for verification of DLIs including desk review and fieldwork components</td><td>Unbiased assessment of performance leading to nudge for strengthening the scheme's processes and highlighting the areas of improvement</td><td>Buy-in from the government for third-party verification</td></tr>
</table>

Source: Authors' analysis

1. Context

Constructing stepwells, which can be recharged through groundwater, is a traditional water harvesting technique used in India.

Groundwater accounts for approximately 99 per cent of the liquid freshwater resources on the earth (United Nations 2022). Given that in many parts of the world, surface water resources are either over-appropriated or its availability is adversely impacted by climate change, reliance on groundwater has increased significantly. Globally, half of the water demand is for domestic purposes (Garduño et al. 2011) and around 25 per cent of the total demand for irrigation is met through groundwater (United Nations 2022).

In India, groundwater has steadily emerged as a mainstay for ensuring water security. It fulfils 60 per cent of irrigation demand and supplies nearly 85 per cent of the drinking water in rural areas and 50 per cent in urban areas (CGWB 2022). In the recent past, there has been rapid over-extraction of groundwater, and in some regions, the annual extraction has far exceeded the annual extractable groundwater recharge. Thus, though groundwater has played a pivotal role in the socio-economic prosperity of the nation, the sustainability of the groundwater supply is under threat because of over-exploitation. Therefore, there is an urgent need for better management of groundwater.

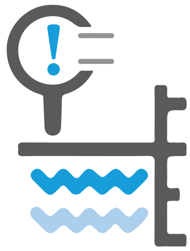
The absence of statutory backing in India to regulate groundwater use in agriculture is a major challenge to sustainable use of groundwater

The complexity in groundwater management and governance emerges from the fact that, de jure, groundwater rights are not clearly defined, and de facto, they belong to all those who have overlying land (Kumar 2005; Bassi 2014; Philippe 2014). In the past, efforts were made to institutionalise the governance and regulatory structure for groundwater management in India. The *National Water Policy of 1998* and the *National Water Policy of 2002* underline the need for regulation of groundwater abstraction, on the one hand, and for mainstreaming groundwater recharge projects through local participation, on the other (Paranjpye and Rathore 2014). However, in the absence of statutory backing to regulate groundwater use in agriculture at the national and state level, these policies have failed to make any substantial impact at scale, despite being front runners in advocating for groundwater protection and sparking extensive political discussion. The *1992 Model Groundwater Bill*, which advocates for the establishment of well permits, water metering, and withdrawal limits, has not been properly adopted by states (Saleth and Dinar 2000; Bassi 2014)

In 2017, the Indian Ministry of Water Resources, River Development and Ganga Rejuvenation (now the MoJS) revised the *Model Groundwater (Sustainable Management) Bill, 2017*. It established a foundation for regulating groundwater as a public resource and for implementing measures at the aquifer level, which is essential for tackling over-exploitation and declining water levels (Philippe 2019). Revisions to the bill were made so that the guidelines to states for framing groundwater legislation could be tailored to their local needs and demands. Although this was a good strategy, as of December 2021, only 19 states and union territories (UTs) in India had enacted legislation for groundwater management, and among them, four states have only partially implemented the legislation.
Given the slow pace of reforms needed to make groundwater use sustainable, in 2019–21, the GoI launched the ABY as a central sector scheme with a budget of INR 6,000 crore (USD 840 million) (DoWR,RD&GR 2023a), for a period of five years till 2024-25. The INR 3,000 crore (USD 420 million) has been a loan from the World Bank to the country for this scheme (DoWR,RD&GR 2023a). The scheme aims to arrest the decline in groundwater levels and improve groundwater resource management by institutionalising convergence at the grassroots level and mainstreaming community participation. From 2020-21, the scheme is being implemented in selected water-stressed areas in seven states, namely, Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan, and Uttar Pradesh. These seven states together account for 229 water-stressed blocks, which constitute about 37 per cent of the total blocks in India (Khanduja et al. 2023).

This report presents a comprehensive analysis of the scheme, including the status of implementation, factors contributing to its success, future challenges, recommendations for achieving the intended outcomes of the ABY, and learning for other countries based on desk review and field research in the state of Rajasthan. The study was undertaken at the behest of the NPMU of the ABY under the MoJS.

1.1 Groundwater situation in the country



In 2022, 30% of the total assessed units in the country were in overexploited, or critical, or semi-critical categories

Groundwater level is one of the fundamental variables used to assess the groundwater regime in a given area, and its periodic monitoring is essential to record the response of the water regime to natural and anthropogenic stresses on recharge and discharge components (CGWB 2022). India, with its diverse physiographic, climatic, and hydrogeological characteristics, and the varied nature of its anthropogenic activities, shows huge spatial and temporal variations in the groundwater regime across regions. The Green Revolution, which was instrumental in providing food security to the nation (Briscoe and Malik 2006), has substantially increased the demand for groundwater, which has led to a steady decline in groundwater levels, especially in the western and northwestern parts of the country. Rapid rural electrification, combined with modern pump technologies and water-intensive cropping patterns, have led to an increase in the number of electric tube wells, from a mere 1 million in the 1970s to more than 20 million in the 2020s (Shiferaw 2021), resulting in increased extraction rates in many parts of India (Bassi 2014).

A recent report on dynamic groundwater resources highlights that about 30 per cent of the total assessed units – that is, more than 2,100 blocks out of 7,089 – are either in the over-exploited (stage of groundwater development above 100 per cent), critical (stage between 90 per cent and 100 per cent), or semi-critical (stage between 70 per cent and 90 per cent) categories (CGWB 2022). Further, it was found that more than 25 per cent of over-exploited and critical units are concentrated in eight states and UTs, predominantly in the northwestern regions, such as Punjab, Haryana, Delhi, and western Uttar Pradesh. The groundwater level in these regions reflects the adverse legacy of the green revolution, which resulted in the indiscriminate withdrawal of groundwater, leading to over-exploitation, which steadily pushed levels down despite the abundance of replenishable resources (Briscoe and Malik 2006).

Further, the groundwater regime, especially in the alluvial aquifers of western, northwestern, and eastern India, has a direct correlation with rainfall with low recharge during the years of below normal rainfall. Moreover, in the western part of India, especially in the arid and semi-arid regions of Rajasthan, Gujarat and Punjab, groundwater extraction is above the annual recharge to meet domestic, irrigation, and industrial water demand. However, in peninsular India, which has hard rock aquifers, the groundwater regime is determined by the hydrogeological characteristics of the region. The hard rock terrain and crystalline aquifers have low transmission and porosity, and therefore, low storage potential. This, combined with the fact that the irrigation, domestic, and industrial sectors depend inordinately on groundwater, means that such aquifers run out of water during summer months (Kumar, Bassi, and Kumar 2022). Such regions include Tamil Nadu, Karnataka, parts of Andhra Pradesh, and Telangana, which account for 42 per cent of the total over-exploited blocks in the country (CGWB 2022).

1.2 Need for community participation in groundwater management

The Intergovernmental Panel on Climate Change (IPCC) highlighted that 'increasing weather and climate extreme events have exposed millions of people to acute food insecurity and reduced water security, with the largest adverse impacts observed in many locations and/or communities in Africa, Asia, Central and South America' (IPCC 2023, 5). The reliance on groundwater for agricultural, industrial, and domestic needs in India has been discussed in previous sections. Thus, the importance of sustainable management of groundwater resources for water security in India cannot be overlooked.

Groundwater is a hidden resource that is renewable but finite since there are aquifer boundaries within the rock layers. While the resource exhibits characteristics of common pool resources (subtractability and excludability), it has been governed mostly like private property globally and nationally (Schlager 2007; Ghose et al. 2017). This means that rights to groundwater have been tied to ownership of the land, which makes it susceptible to the tragedy of the commons.

Governance of groundwater like private property has inflicted the tragedy of commons on the resource

A statist approach to the governance of groundwater may face challenges because of the complex interactions between hydrological boundaries, political boundaries, the socio-economic make-up of the region, state-level complexities in institutional structures, and climate change. Therefore, it is necessary to improve governance through community participation, provided that the gains from it are more than the costs (Ostrom 1990).

There are several formal and informal ways of engaging the community in groundwater governance, 'depending upon the interest of the stakeholder(s) and nature of customary rules and rights around water and land' (Garduño, Van Steenbergen, and Foster 2010). For example, the community could be engaged to various degrees in the following: deciding the local allocation of resources; monitoring the quality and quantity of resources; making and implementing management plans and demand reduction measures; negotiating with other actors in regard to the use and governance of the resource as well as related policymaking; protecting the resource; and negotiating or settling disputes regarding resource allocation or usage. The 73rd and 74th amendments to the Indian Constitution, which laid the foundation for local self-governance in the country, have a provision for resolving water disputes (if any) at the GP level itself (Ghose et al. 2017).

The Indian experience with community participation in managing canal water (Bassi, Rishi, and Choudhury 2010) and aquifers shows that it is possible to promote an ethos of self-regulation and sustainability (Arghyam 2015). Of the latter, there are a few successful examples. In 1972, Vilasrao Salunke formed a '*pani panchayat*', a people's council for the equitable distribution of water in Naigaon village, a drought-prone area of Pune district in the state of Maharashtra. He developed a recharge pond and dug a well and constructed a lift irrigation system on leased land, which were managed and governed by the farmers collectively. This resulted in assured irrigation for eight months, including in summer, and increased crop yield and income (Deshpande and Reddy 1990). *Pani panchayats* have now become a staple in groundwater management in Maharashtra (Arghyam 2015).

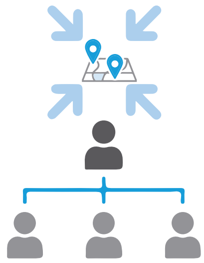
Similarly, the Andhra Pradesh Farmer Managed Groundwater System (APFAMGS) project is worth mentioning. It was led by the Food and Agriculture Organization (FAO) from 2004 to 2009, with collaboration from local NGOs, in seven drought-prone districts of the state (World Bank 2010). The project built capacities and supported farmers in collecting local hydrological data and in making collective decisions on resource use. More than 3,500 male and female farmers from 650 habitations across the project area collected data, which ultimately led to a reduction in groundwater usage in these areas (World Bank 2010).

Nevertheless, there is a need to scale up community engagement in groundwater management. Realising the importance of this, in April 2020, the MoJS, GoI, launched the ABY, which envisages improvement in the groundwater scenario through demand management and community participation in the selected water-stressed areas of seven states.

2. Atal Bhujal Yojana

Groundwater recharge can lead to growth of animal husbandry and improved livelihoods.

The *Atal Bhujal Yojana* (ABY) is a central sector scheme with an outlay of INR 6,000 crore (USD 840 million), of which 50 per cent is a loan from the World Bank and the rest is from the GoI, given as grant-in-aid to the implementing states (DoWR,RD&GR 2023a). The World Bank financing is being made under its Program for Results (PforR) lending instrument, wherein funds for ABY are disbursed to GoI based on achievement of pre-agreed results. ABY is a five-year scheme that started in 2020–21 and will run up to 2024–25, covering the seven states that have the maximum proportion of groundwater over-exploited blocks (DoWR,RD&GR 2023b). These states include Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan, and Uttar Pradesh (refer to Annexure 1 for more details). The scheme aims to establish that community participation in groundwater management is essential for the sustainability of the source and has the potential to be implemented at scale. It envisages sustainable management of groundwater through the convergence of ongoing central and state government schemes and by asking the local community to prioritise the interventions they need, by increasing the community's awareness of groundwater issues, and by building the community's capacity to monitor (and hence generate more data and ultimately protect) its resources. Designed as a pilot (DoWR,RD&GR 2023b), the scheme aims to strengthen the institutional framework around participatory governance with regard to groundwater in the country.



Inter-ministerial convergence has been institutionalised from national to sub-district level, in the institutional structure of the scheme

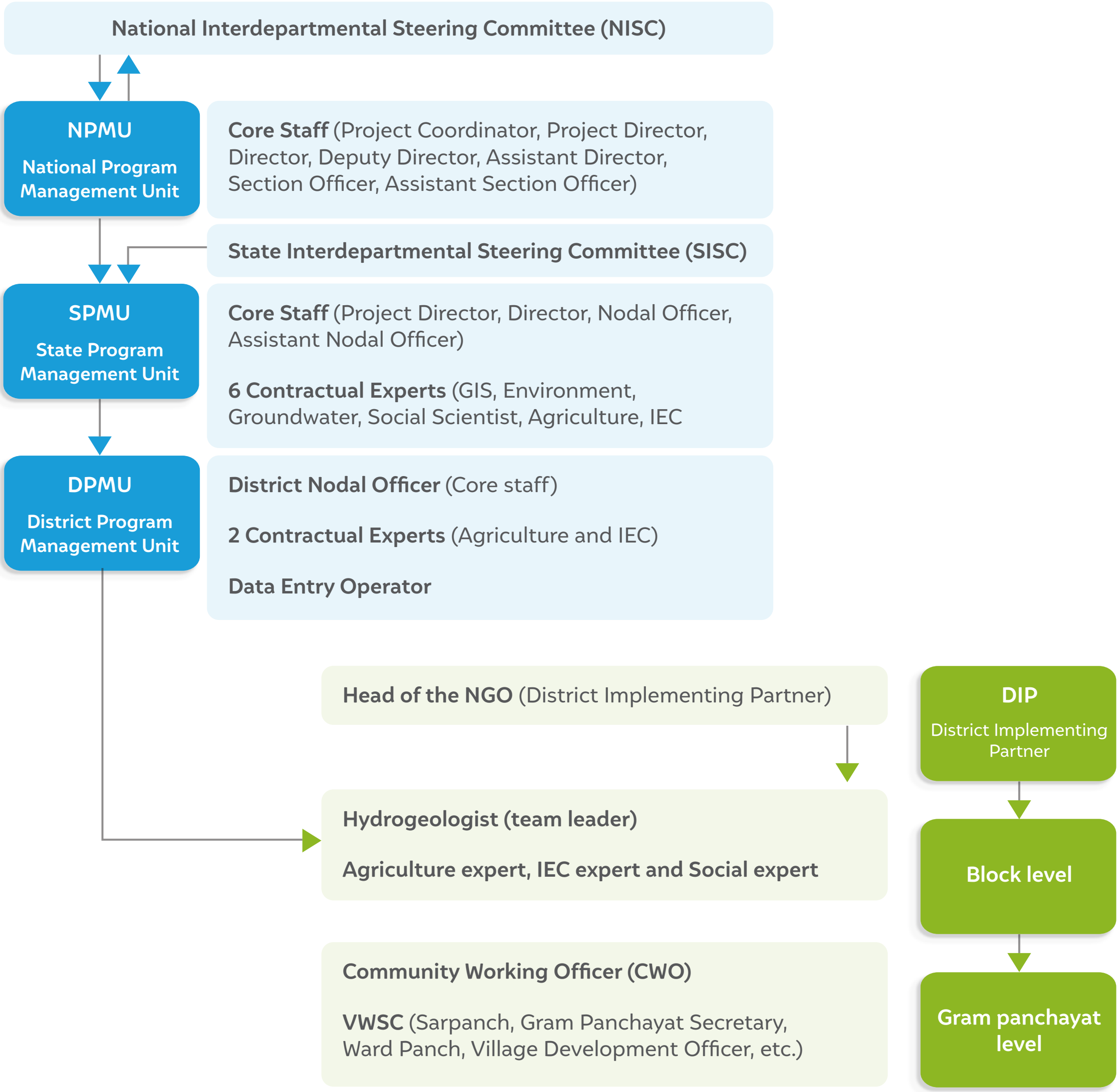
2.1 Institutional structure

ABY is a central sector scheme by the GoI under the MoJS in the Department of Water Resources, River Development and Ganga Rejuvenation (DoWR,RD&GRb). A National Interdepartmental Steering Committee (NISC) has been established to provide oversight and guidance for the programme (DoWR,RD &GR 2023b). The NISC has representation from ministries of agriculture and farmers' welfare; rural development; power; and new and renewable energy. The governance and implementation structures at various levels are presented in Figure 1. The NPMU is responsible for the overall management and implementation of the scheme. The SPMU is responsible for procurement and financial management in the state. It also undertakes capacity-building of the key experts deputed in the field and the hiring of DIPs – usually non-governmental organisations (NGOs) that are responsible for the grassroots implementation of the scheme.

Each of the participating seven states have constituted a State Interdepartmental Steering Committee (SISC) which is chaired by the Chief Secretary of the state. The SISCs are responsible for overall administration, management and coordination of *Atal Bhujal Yojana* in the respective States

A DPMU is also present. For every DPMU, there is a nodal officer who is responsible for the overall administration and implementation of the scheme at the district level. DIPs are also responsible for the overall implementation of the scheme at the district level. In Rajasthan, every block has a team consisting of experts in hydrogeology (team leader); agriculture; information, education, and communication (IEC); and a social scientist which are taken on board by the DIP to assist with the scheme implementation and preparation of the village WSPs. Also, on an average for every two to four GPs, there is a designated community working officer responsible for data collection and dissemination. At the lowest level, VWSC members are responsible for raising awareness within the community. For details on the roles of various experts, refer to Annexure 2.

Figure 1 Governance (blue) and implementation (green) structures of the ABY at various levels



Source: Authors' analysis from the Atal Jal manual (DoWR,RD&GR 2023b)

2.2 Components of the scheme

The scheme has two main components:

I. An institutional strengthening and capacity-building component that is aimed at improving groundwater governance mechanisms in the participating states.

II. An incentive component that is aimed at rewarding or incentivising states for measures that ensure the long-term sustainability of groundwater resources.

The first component, which covers institutional strengthening and capacity-building, has a budget outlay of INR 1,400 crore (USD 224 million), which is fully funded by the GoI. The second component on disbursement (incentive) linked indicators has a total budget outlay of INR 4,600 crore (USD 644 million), out of which INR 3,000 crore (USD 420 million) is the World Bank's share and the rest is borne by the GoI.

2.2.1 The institutional strengthening and capacity-building component

This is aimed at enhancing institutional capacity for effective groundwater management at all levels. This component has two parts. First, expenditure on training and capacity-building to enhance institutional capacity for effective groundwater management at all levels. Second, costs for programme management, independent verification, and, monitoring and evaluation (M&E) that include installation of equipment such as rain gauges and construction of piezometers. For more details on this component, refer to Annexure 3.

2.2.2 Disbursement-linked indicators

DLIs are a part of the incentive component of the scheme (DoWR,RD&GR 2023b). Overall, there are five DLIs, which are selected based on the following: activities that need to be carried out for the sustainable management of groundwater, improve measurability and ease of verification, and enhance the capacity of stakeholders to achieve the desired results.

The disbursement of funds is based on the achievement of DLI-linked results, which are measured and verified by a third-party verification agency (TPVA) (DoWR,RD&GR 2023b). The first four DLIs incentivise activities leading to the sustainable management of groundwater, while the fifth DLI is related to the outcomes of the first four DLIs. Table 1 provides a brief look at the DLIs and the financial allocation for them. For more details, refer to Annexure 4.

2.3 Verification of disbursement-linked indicators

To track the progress of the scheme with regard to the achievement of the objectives, various indicators were devised, some of which evaluate intermediate stages, whereas others also

Table 1 Description of the disbursement - linked indicators and their financial allocation as per the *Atal Bhujal Yojana* manual

DLI No.	DLI description	DLI %	State's share in crore (INR) and USD million equivalent							
			Total DLI allocation	Haryana	Gujarat	Karnataka	Madhya Pradesh	Maha-rashtra	Rajasthan	Uttar Pradesh
1.	Public disclosure of groundwater data/ information and reports	10	460 64.4	45.94 6.4	54.01 7.6	100.83 14.1	21.28 3.0	73.83 10.3	102.94 14.4	61.17 8.6
2.	Preparation of Community-led Water Security Plans	15	690 96.6	68.92 9.6	81.02 11.3	151.23 21.2	31.93 4.5	110.74 15.5	154.4 21.6	91.76 12.8
3.	Public financing of approved Water Security Plans through convergence of ongoing/new schemes	20	920 128.8	91.89 12.9	108.03 15.1	201.65 28.2	42.57 6.0	147.64 20.7	205.88 28.8	122.34 17.1
4.	Adoption of practices for efficient water use	40	1840 257.6	183.77 25.7	216.05 30.2	403.3 56.5	85.14 11.9	295.3 41.3	411.75 57.6	244.69 34.3
5.	Improvement in the rate of decline of groundwater levels	15	690 96.6	80 11.2	80 11.2	150 21.0	30 4.2	110 15.4	150 21.0	90 12.6

Source: DoWR,RD&GR 2023b

act as disbursement triggers. Disbursements under the incentive component are linked to the performance of states against the identified DLIs. Funds are disbursed by the implementing agencies subject to the achievement of the results mandated by the indicators, after due verification by a TPVA (QCI 2021). The MoJS of India has engaged the Quality Council of India in this role to carry out independent verification of the results with respect to the DLIs. Table 2 summarises the details of the six verification rounds conducted by the QCI so far.

Table 2 Six rounds of Quality Council of India's verification of various disbursement - linked indicators have been completed

QCI verification	DLI 1	DLI 2	DLI 3	DLI 4	DLI 5
Round 1 (January 2021)	✓	–	–	–	–
Round 2 (February 2022)	✓ (reassessed in round 3)	✓	–	–	–
Round 3 (June 2022)	✓	✓	–	–	–
Round 4 (September 2022)	✓	✓	–	–	–
Round 5 (February 2023)	✓	–	✓	✓	–
Round 6 (June 2023)	–	–	✓	✓	–

Source: DoWR,RD&GR 2023b

2.4 Contributions to jobs, growth, and sustainability

There are many activities that the scheme envisions to attain its objective of sustainable management of groundwater. These include consistently measuring the groundwater level, water quality, and rainfall at the panchayat level, changing the attitude of the community towards conservation, and aligning the priorities of the various departments that deal with groundwater. These activities have important consequences for jobs, growth, and sustainability in the state.

The deployment of subject experts in NPMUs, SPMUs, DPMUs, and DIPs is creating employment opportunities for experts in the hydrogeology, agriculture, gender, IEC, GIS, and community mobilisation domains. A prime task entrusted to these governance levels is ensuring the training and participation of the village community in the preparation of WSPs and measurement of data. Several GPs have been selected under the scheme; thus, there is immense potential to generate employment for community working officers and *bhujal mitras*.

There are also substantial economic benefits associated with the scheme. For instance, agriculture and allied sectors, which include crop cultivation, animal husbandry, fisheries, and forestry, are the backbone of Rajasthan's (one of the ABY states) economy, employing a large segment of the population (Directorate of Economics and Statistics 2023). It was estimated that the sector contributed about 29 per cent of the gross state value added (GSVA) at current prices in 2022–23. Given that this sector depends substantially on groundwater resources, the scheme has the potential to sustain the economic growth of the state. As per agricultural budget estimates by the Government of Rajasthan in 2023, the amount of power subsidy given to the agricultural sector in Rajasthan is INR 18,751 crore or USD 2.25 billion (Government of Rajasthan 2023). Some of these costs can be saved by augmenting groundwater levels through the sustainable management of aquifers, which will prevent the digging of deeper tube wells and borewells.

The United Nations Institute for Water, Environment and Health has described primary interlinkages of groundwater with SDGs as those in which groundwater and the theme of the SDGs target align directly (Guppy et al. 2018). Similarly, ABY – exclusively formulated for participatory groundwater management holds significant potential to contribute towards attaining specific SDGs. Figure ES1 details the 13 SDG goals and 30 targets that can be achieved through the scheme.

ABY can contribute to attainment of 13 SDG goals and 30 targets

ABY supports the attainment of the following SDG targets in the manner described:

- Targets 1.4 and 1.5 by developing community ownership for groundwater resources through participatory groundwater management, thus enabling equitable access and sustainable management of water resources at the local level;
- Targets 2.3 and 2.4 by promoting efficient water use in agricultural activities through the integration of interventions, such as micro-irrigation and crop diversification, which also contributes to food security and sustainable agricultural practice;
- Targets 4.4 and 4.7 by providing capacity-building to DIPs, *bhujal jankaars*, and other village youth associated with the monitoring instruments and sustainable management of groundwater;
- Target 5.5 by mandating the presence of at least 33 per cent of women in VWSCs and ensuring their participation in water budgeting and water security planning exercises;
- Targets 6.1 to 6.6 by conducting water budgeting and water planning exercises for stocktaking of water resources at the village level to meet the present and future demands of the community sustainably;
- Target 7.1 by converging with national and state schemes on solarisation of irrigation;
- Targets 8.4 and 8.6 through convergence with ongoing schemes under the agriculture; power; new and renewable energy; and land resources departments;
- Target 9.1 by safeguarding water resources for future use through minimised groundwater extraction with demand-side interventions, thus enabling harmony between economic development and environmental protection;
- Targets 12.2 and 12.8 by inculcating behavioural change communication and IEC activities at various programme implementation levels to facilitate the judicious use of groundwater;
- Targets 13.1 and 13.2 via its objective that aims to arrest the declining trend of groundwater level through community participation, which would further strengthen resilient and adaptive capacities of communities;
- Target 15.1 by promoting the creation of water bodies through various supply-side interventions and ensuring the protection of traditional water harvesting structures;
- Targets 16.6, 16.7, 16.8, and 16.10 by deploying TPGVA, mainstreaming the role of the community in planning and measuring water resources, working with the international donors to the scheme, and aiming for information dissemination at various levels of governance; and
- Targets 17.3, 17.14, 17.16, and 17.17 by obtaining 50 per cent of funding as a loan from the World Bank as well as creating NISC and SISCs for promoting convergence and policy coherence at all levels.

3. Objectives and scope of the work

Solar panels and pumps (PM-KUSUM) at a farm, is a successful example of convergence under the *Atal Bhujal Yojana*, Sirsaly panchayat, Jaipur district, Rajasthan.

The assessment of ABY implementation in Rajasthan was undertaken with the following objectives:

- To quantitatively and qualitatively analyse scheme implementation at various levels.
- To identify key drivers of success (strengths), implementation challenges (weaknesses), opportunities for improvement, and external threats affecting the scheme's sustainability.
- To make actionable recommendations for improving scheme governance and implementation in the next phase and provide lessons for other countries.

To achieve these objectives, the study analysed the extent of ABY implementation in Rajasthan by assessing the scheme's delivery on the two components of the schemes, including the five DLIs. The implementation status, success factors, and challenges faced were studied at the state, district, and block levels. The perspectives of multiple stakeholders in Rajasthan – including scheme implementers (groundwater department and line departments), beneficiaries, and non-beneficiaries – have been accounted for.

CEEW's Ekansha Khanduja (right) with State Assistant Nodal Officer, *Atal Bhujal Yojana* and District Programme Management Unit head, Jaipur, at a demonstration on reading the rain gauge that was installed above the panchayat office in Sirsaly panchayat, Jaipur, Rajathan.

CEEW's Kartikey Chaturvedi and Aditya Vikram Jain (last and 2nd last from right) with ASHA and aanganwadi workers interacting about the awareness related to *Atal Bhujal Yojana* at Kesharpura panchayat, Ajmer district, Rajasthan.

Images: CEEW

4. Methodology

Rajasthan, located in the northwestern region of India, is the largest state by land area. It covers an area of 342,239 sq km, accounting for approximately 10.4 per cent of India's total land area. Physiographically, the state can be divided into four distinct regions: the Aravalli hill ranges, eastern plains, western sandy plains with sand dunes, Vindhyan scarp land, and the Deccan lava plateau. The geological composition of the state consists of a diverse range of hard rocks, covering 40 per cent of its land, ranging from Archean metamorphic to recent alluvial sediments.

The climate in the state is semi-arid to arid. On average, the state receives an annual rainfall of 549 mm, with more than 90 per cent of its rainfall occurring during the southwest monsoon. However, there is significant spatial variation with regards to the quantity of rainfall across different regions. It has been observed that the southeastern (S-E) region receives the maximum annual rainfall, ranging from 625–920 mm, whereas the northwestern (N-W) region experiences the lowest annual rainfall, ranging from 200–350 mm.

A study conducted by (Bhati et al. 2017) reveals that in districts such as Bikaner, Barmer, and Jodhpur, crops requiring more than 3–10 irrigation cycles, such as groundnut, pomegranate, olives, wheat, and cotton, are being grown. This practice aggravates drought-like conditions in these areas, further impacting the groundwater regime.

The Government of Rajasthan has previously undertaken some notable measures to improve groundwater governance in the state, such as the formulation of the *Rajasthan State Water Policy, 2010*, and the *Rajasthan Water Resource Regulatory Act, 2012*. The former policy explicitly mentions the need for community participation to prevent overexploitation of groundwater in agriculture, while the latter focuses on facilitating the judicious and equitable distribution and use of water resources. Further, between 2006 and 2012, the state drafted five policy notes for groundwater management in Rajasthan. However, there has been no successful implementation of groundwater regulation in the state so far.

In 2019, the state government launched the *Rajiv Gandhi Jal Sanchay Yojana*, which was focused on the convergence of existing state and central government schemes. The initiative was designed to promote awareness about water conservation, improve groundwater levels, and ensure adequate drinking water supply in rural areas.

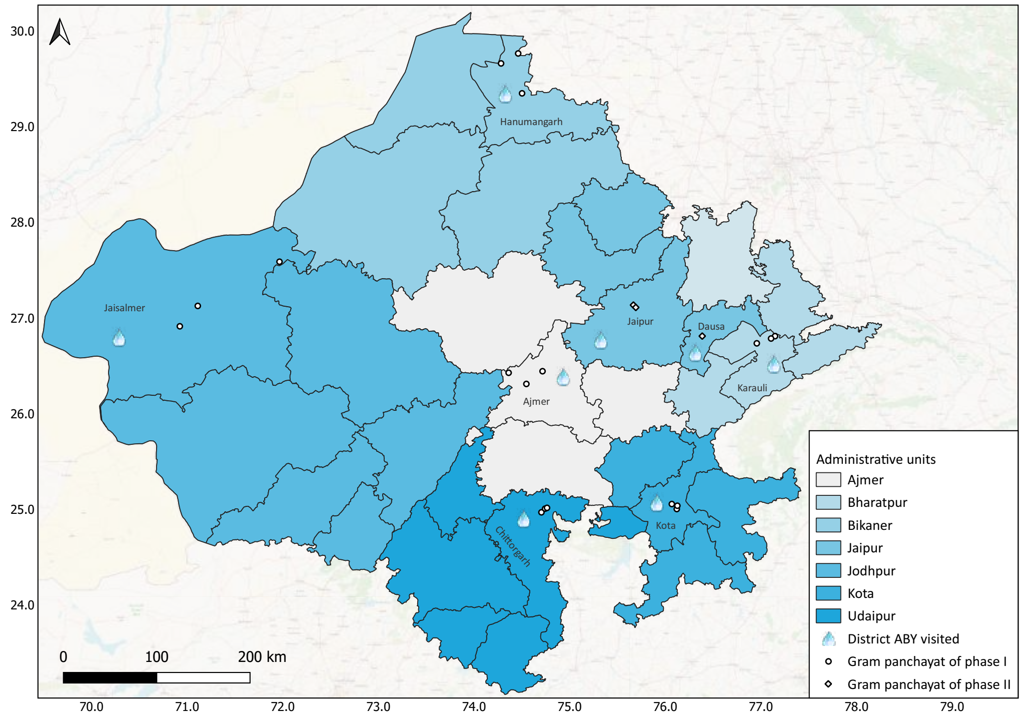
4.1 Selection of study area

CEEW's Ekansha Khanduja (center) with women in Sirsaly panchayat of Jaipur district discussing their awareness of and engagement with the *Atal Bhujal Yojana*, Rajasthan.

Of the seven states where ABY is implemented, Rajasthan was chosen for the study based on the convenience of doing field research, specifically time feasibility, as the study needed to be completed within two months. As the researchers and research organisation (CEEW) are based in Delhi and have had previous experience working in Rajasthan, the state was a natural choice. Throughout the study, CEEW received unwavering support at various institutional levels within the state of Rajasthan and from the NPMU at Delhi, which significantly facilitated smooth execution and the collection of valuable field evidence.

The state is administratively divided into seven divisions: Ajmer, Bikaner, Bharatpur, Jaipur, Jodhpur, Kota, and Udaipur, with 33 districts in total. Each of these divisions has districts wherein the ABY is implemented. For the purpose of the study, at least one ABY district was chosen from each division. The selected districts include Ajmer (Ajmer division), Hanumangarh (Bikaner division), Karauli (Bharatpur division), Jaipur and Dausa (Jaipur division), Jaisalmer (Jodhpur division), Kota (Kota division), and Chittorgarh (Udaipur division) (Figure 2).

Figure 2 Location of divisions, districts, and gram panchayats selected for the study



Source: Authors' compilation

This study was conceptualised in two phases (Figure 3). Phase I consisted of an exposure visit to Jaipur (where the SPMU office is located) and its neighbouring district (Dausa) to understand the ground conditions. Within these two districts, three GPs were covered for the exploratory survey: Sirsaly and Jahota in Jaipur and Alooda in Dausa. During the fieldwork, the following stakeholders were consulted: the project director, nodal officer, and assistant nodal officer of SPMU; SPMU subject experts (GIS, IEC, and environment); DPMU heads of all 17 districts implementing the scheme; IEC and agriculture expert of DPMU of Dausa; four experts from DIP of Dausa (hydrogeology, agriculture, IEC, and gender); the CWO from DIP of Dausa; the head of DIP of Dausa; members of VWSC and villagers of the three GPs; a women's group in one GP; and one beneficiary of the scheme. Line departments could not be included in Phase I due to the competing engagements of the officials elsewhere in the state. Findings from Phase I were shared with the NPMU office and their suggestions were duly incorporated in Phase II.

Based on the learnings from Phase I, separate questionnaires were developed to gauge stakeholders' responses on the scheme implementation in different divisions of Rajasthan under Phase II. The questionnaires were administered to the DPMU nodal officer, DPMU IEC expert, DPMU agriculture expert, DIP nodal, DIP hydrogeology expert, DIP agriculture expert, DIP IEC expert, DIP social expert, members of CWO and VWSC, scheme beneficiaries, and frontline workers such as auxiliary nurses and midwives (ANM) or *aanganwadi* workers (AWW). All the questionnaires are included in Annexure 5.

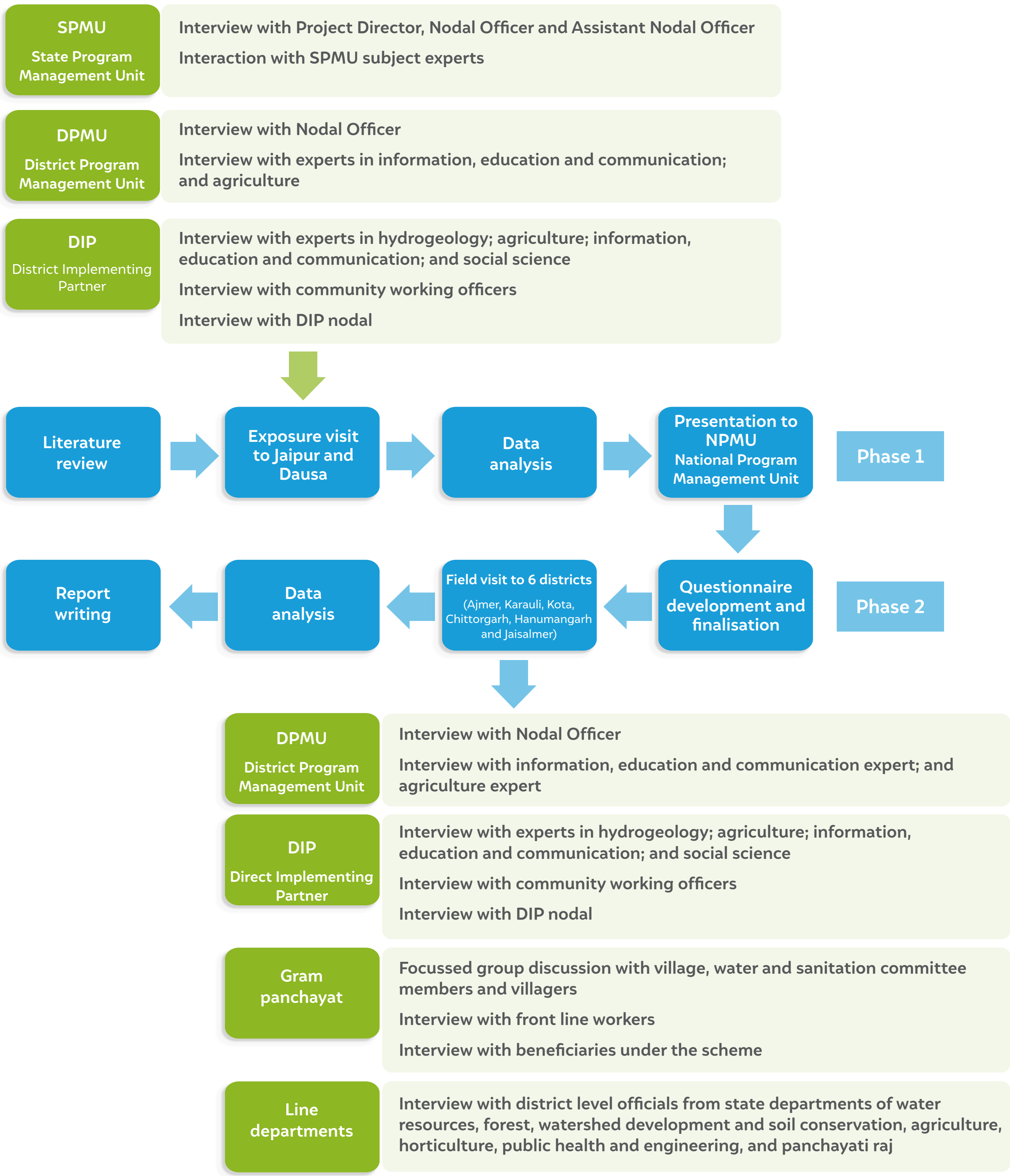
Frontline workers (FLWs) were included in the field investigations in Phase II. These FLWs are female workers from the health or women development sector in the country and part of VWSC. The social dynamics of villages in Rajasthan make the free representation and participation of women in group discussions challenging. Hence, their presence helped us overcome this challenge. Along with engaging with them at VWSC level, they were also interacted with separately to better understand the perspective and engagement of women with the scheme.

The questionnaire at the DPMU and DIP levels was to assess the situation of the scheme's implementation in respective areas of jurisdiction, knowledge and awareness of various components of the scheme, and challenges faced in the delivery of scheme objectives. The questionnaire at the GP level was designed to assess the overall levels of awareness and participation of the community in the scheme; insights on awareness and knowledge of the objectives of the scheme; awareness and knowledge of measuring instruments for rainfall, water quality, and water quantity; awareness and participation in WSPs; and change in agricultural and climatic variables. The questionnaire was to gauge beneficiaries' knowledge of the scheme and its various components and how the scheme has impacted their lives. The questionnaire for line departments was to gauge knowledge and awareness of the scheme's various components, their participation in the delivery of the scheme, and the challenges associated with it. The questionnaires were finalised based on discussions with the in-house expert on the water sector. Additionally, the questionnaires helped validate the information obtained through general consultations with various stakeholders.

Image: Sarapanch, Alooda panchayat

CEEW team (centre) engaging with village water and sanitation committee members in Alooda panchayat, Dausa district, Rajasthan.

Figure 3 Study methodology



Source: Authors' compilation

4.2 Data analysis

Data cleaning and analysis was undertaken using Microsoft Suite tools such as Microsoft Excel. Responses gathered from each stakeholder were analysed and categorised under the respective DLIs. The analysis was synergised with QCIs methodology of DLI verification.

The CEEW team with a beneficiary of the *Atal Bhujal Yojana* in Ajmer district, Rajasthan.

The data was analysed as per the schemes' two components. For the first component, insights collected from the training and capacity-building activities and stakeholders were analysed. For the second component, the data and information obtained using questionnaires were analysed and presented DLI-wise. For DLI1, the extent of knowledge and capacity in the community was assessed. For DLI2, the assessment was undertaken at two levels. At the first level, the awareness of the stakeholders about the annual work plan of GP and VWSC roles and responsibilities was assessed. At the second level, community engagement and their knowledge of water security plans were assessed. Wherever available, WSPs were shown to the community, and if not, their content was explained to stakeholders to help them recall better. For DLI 3, qualitative assessments were carried out based on various parameters to assess the extent of coordination and convergence between different line departments and DPMU officials at the district level, which plays a pivotal role in the successful implementation of the scheme. In DLI 4, certain case studies were highlighted from the field visits, which manifest the adoption of water-efficient practices and the effectiveness of the ABY at the grassroots level in facilitating their adoption.

DLI 5, which focuses on arresting the trend of groundwater decline, is a long-term outcome that can only be validated after the proper implementation of the scheme and the continuation of groundwater demand interventions identified by the community as per the WSPs. Nevertheless, depth-to-groundwater level data during pre-monsoon was obtained from the GPs and analysed along the stage of groundwater development. Such a comparison was necessary to neutralise the impact of inter-annual variability in rainfall on groundwater levels.

4.3 Data collection

The fieldwork was undertaken during August and September 2023 (refer Annexure 6 for photos). For the facilitation of the fieldwork, an official letter with the dates and objectives of the fieldwork was issued by NPMU to SPMU, and a subsequent compliance order was issued by SPMU to all the DPMUs.

All questionnaires were filled using Google Forms; wherever technological issues arose, the same was carried out in hard copy and later filled. At GP level, the researchers were accompanied by members of DPMU or DIP or both. These interactions were also facilitated by them, i.e., they gathered stakeholders at the meeting place, set the context of the interaction, and helped translate certain terms and phrases to vernacular language. Qualitative insights such as dialogues, expressions, body language, internal deliberations, and dialogues within the group or people around were noted. The purpose of the study was clearly explained by the researchers to the stakeholders at all levels. Photographic evidence was recorded diligently, with prior oral consent from the stakeholders.

The questionnaires were administered 'one on one' for all stakeholders other than VWSC and frontline workers (FLWs). The VWSC members were consulted in a focussed group discussion (FGD) format. Discussions with FLW often saw more women from villages gather around and take part. Respecting the social dynamics of the village, villagers were allowed to freely sit and be part of the discussion with FLWs or VWSC. The presence of women and villagers was not seen as detrimental to the robustness of the methodology; rather, it brought about greater nuances to the objectives of the study.

At least three GPs from each district were covered in the study. The number was arrived at based on convenience sampling. The GPs were selected in consultation with DPMU nodal officers and DIP members. However, one non-negotiable criterion for selection was the presence of a scheme beneficiary in the GP.


Image: District Implementing Partners, Chittorgarh

The CEEW team with various line department officials in Chittorgarh district, Rajasthan.

4.4 Sample size

The number and type of respondents consulted and interviewed during Phase II are presented in Table 3. Overall, 17 members from DPMUs, 24 respondents from district implementing partners (DIPs), and 25 GP members were interviewed. FGDs were done with 17 village water and sanitation committees (VWSCs) across six districts. Further, 29 respondents from 7 line departments in the selected districts were interviewed.

The CEEW team with village members and ASHA workers in Chinu panchayat, Jaisalmer district, Rajasthan.

Table 3 Type and number of stakeholders consulted for phase II of the study

District	DPMU office			DIP						Gram Panchayat		
	Nodal officer	Agri-culture	IEC	DIP owner	Hydro-geologist	Agri-culture	IEC	Gender	CWO	VWSC	Front-line workers	Bene-ficiary
Ajmer	1	1	1	1	1	1	1	0	0	3	2	3
Karauli	1	1	1	0	2	NA	1	1	2	2	2	4
Kota	1	1	1	NA	NA	NA	NA	NA	NA	5	1	1
Chittorgarh	1	1	1	NA	NA	NA	NA	NA	NA	1	2	1
Hanumangarh	1	1	1	0	3	2	0	2	2	3	3	2
Jaisalmer	1	1	1	0	1	0	1	1	2	3	3	1
Total	**6**	**6**	**5**	**1**	**7**	**3**	**3**	**4**	**6**	**17**	**13**	**12**

Source: Authors' compilation

5. Results and findings

CEEW's Kartikey Chaturvedi measuring the ground water level using a water sounder in Jahota panchayat, Jaipur district, Rajasthan.

The sections 5.1 and 5.2 given below detail out the findings from this study for both the components of the scheme.

5.1 Institutional strengthening and capacity building

Capacity building and institutional strengthening are crucial components and objectives of the ABY, extending from the NPMU to the GP level. Through our interactions with the six DPMU nodal officers and 11 DPMU experts – 6 for agriculture and 5 for IEC, it became evident that all of them have had orientation programmes for understanding the objectives and structure of the scheme by SPMU, Jaipur. Workshops were also organised for building capacity for the filing and updation of the MIS portal, preparing and updating WSP modules, entering details in the Atal App for preparing well inventory (open well, tubewell, step-wells), geo-tagging of constructed structures, and using and monitoring of measuring instruments.

The Irrigation Management and Training Institute (IMTI) signed a memorandum of understanding (MoU) with the state groundwater department in 2020 for training on various facets of the scheme. Two trainings are conducted annually at the district level, two at the block level, and two at the SPMU level. In all the surveyed districts, two rounds of such trainings had happened since the inception of the scheme. These trainings are targeted at those involved directly or indirectly in the delivery of the scheme or governance at the block or district levels. Further, DPMU offices are diversifying and widening the pool of trainees who can participate. Chittorgarh, for example, has introduced crop diversification as one of the topics for the training. It is targeted at progressive farmers, AWWS, ASHAs, VDOs, and *krishi sakhi* (farmers' friend – female) at the block level.

The task of training villagers and building capacity at the community level is facilitated by the DIPs. The DPMU experts are required to monitor these trainings. Further, IEC activities, aimed at changing the behaviour of the community towards a more conservationist approach, are integrated into the routine work of IEC experts within the framework of DIPs. Brochures, pamphlets, posters, banners, calendars, and promotion of work on social media platforms are the various tools being deployed at the panchayat and district level for behaviour change. To make an impact at scale, the IEC activities are delegated to outside agencies hired by the state through a tendering process by the SPMU. They have been given the responsibility of implementing various IEC activities in each GP of the scheme. These activities include organising competitions and rallies involving school children, conducting *raatri chaupal* (night meetings) and *prabhaat feri* (morning processions), inscribing ten slogans in the local language on walls, and conducting rath yatra (a procession involving a chariot, to be done only at the block level). All districts confirmed having successfully completed this.

The effectiveness of training and workshops for DIPs, beneficiaries, and those included in VWSCs has been summarised in Table 4. The blank cells indicate that the questions pertaining to the given indicator were not relevant and thus not administered to specific stakeholders.

Our results show that when seated as a collective, 100 per cent VWSCs were aware of the objectives of the scheme. More than 94 per cent were aware of the concept of the rain gauge, more than 88 per cent were aware of the concept of WQTK, and more than 64 per cent were aware of the piezometer. However, the capability to use monitoring instruments is lower. Frontline workers and beneficiaries reported lower awareness on all the parameters. This is because the other VWSCs have members with higher levels of awareness and exposure than the FLWs and beneficiaries. Additionally, training at GPs for capacity building is not mandatory for everyone; thus, not all FLW and beneficiaries attend them. Nevertheless, all line departments across the districts confirmed taking part in such trainings at the block or district level at least once.

Table 4 **Synthesis of insights obtained on institutional strengthening and capacity building under the *Atal Bhujal Yojana***

Parameter	Respondents (with total sample size)							
	VWSC (17)	FLW (13)	Beneficiary (12)	CWO (6)	Hydro-geologist (DIP) (7)	Agriculture expert (DIP) (3)	IEC expert (DIP) (3)	Social expert (DIP) (4)
Awareness and knowledge of the scheme (% respondents)								
Objectives and intended outcomes of the scheme	100.0	38.4	50.0	83.3	100.0	100.0	100.0	100.0
Existence and role of DIP experts	52.9	30.7	16.6	100.0	–	–	–	–
Existence and role of CWOs	35.2	15.3	6.25	–	–	–	–	–
IEC activities conducted in panchayat	58.8	46.1	16.6	66.6	100.0	Unaware	100.0	–
Assets created in their block under ABY	58.8	–	41.6	66.6	57.1	33.3	–	–
DLI 1 to 5	–	–	–	–	100.0	66.6	66.6	25.0
Role of QCI	–	–	–	–	71.0	100.0	Aware	50.0
Number of verification rounds by QCI	–	–	–	–	42.8	Unaware	Unaware	50.0
Capacity-building on rain gauges								
Purpose of a rain gauge	94.1	30.7	33.3	83.3	100.0	100.0	100.0	100.0
Capable of using a rain gauge	58.8	5.8	Unaware	83.3	100.0	100.0	100.0	100.0
Training conducted for using a rain gauge	58.8	5.8	Unaware	83.3	100.0	66.6	66.6	50.0
Capacity-building on piezometer/observation wells (OWs)								
Purpose of a piezometer/OWs	64.7	5.8	6.3	66.6	100.0	100.0	100.0	100.0
Capable of reading from a piezometer/OWs	Unaware	Unaware	6.25	33.3	100.0	100.0	100.0	100.0
Training for reading from a piezometer/OWs	Unaware	Unaware	Unaware	33.3	100.0	66.6	66.6	50.0
Capacity building on water quality testing kits (WQTKs)								
Purpose of a WQTK	88.2	71.1	0.25	83.3	100.0	100.0	66.6	100.0
Capable of using a WQTK	58.8	23.0	6.3	66.6	100.0	66.6	33.3	–
Training for using a WQTK	58.8	23.0	6.25	66.6	100.0	Unaware	66.6	50.0
Parameters for testing	58.8	23.0	Unaware	66.6	100.0	Unaware	33.3	50.0

Source: Authors' compilation

5.2 DLI 1: Public disclosure of groundwater data/ information and reports

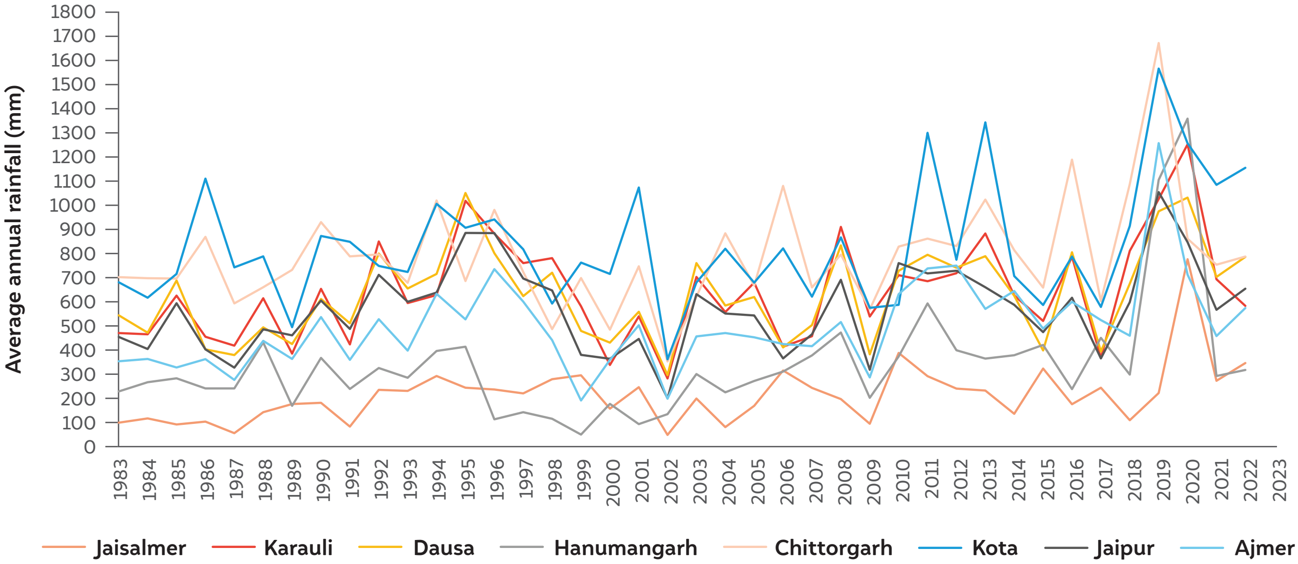
The importance of collecting hydrological data like rainfall at panchayat level, especially for the districts covered under this study can be understood through findings reported in section 5.2.1. The state of disclosure of such data at various levels has been detailed in section 5.2.2.

A water quality test being conducted using field testing kits given under the scheme by experts from DPMU, as a part of DLI 1 of the scheme, in Dhule panchayat, Kota district, Rajasthan.

5.2.1 Rainfall variability in the selected districts

Average annual rainfall for the eight surveyed districts was analysed for the last 40 years (1983–2022) (Figure 4). The districts show high spatial variability in rainfall; the average annual rainfall varies from 204 mm in Jaisalmer to 790 mm in Kota.

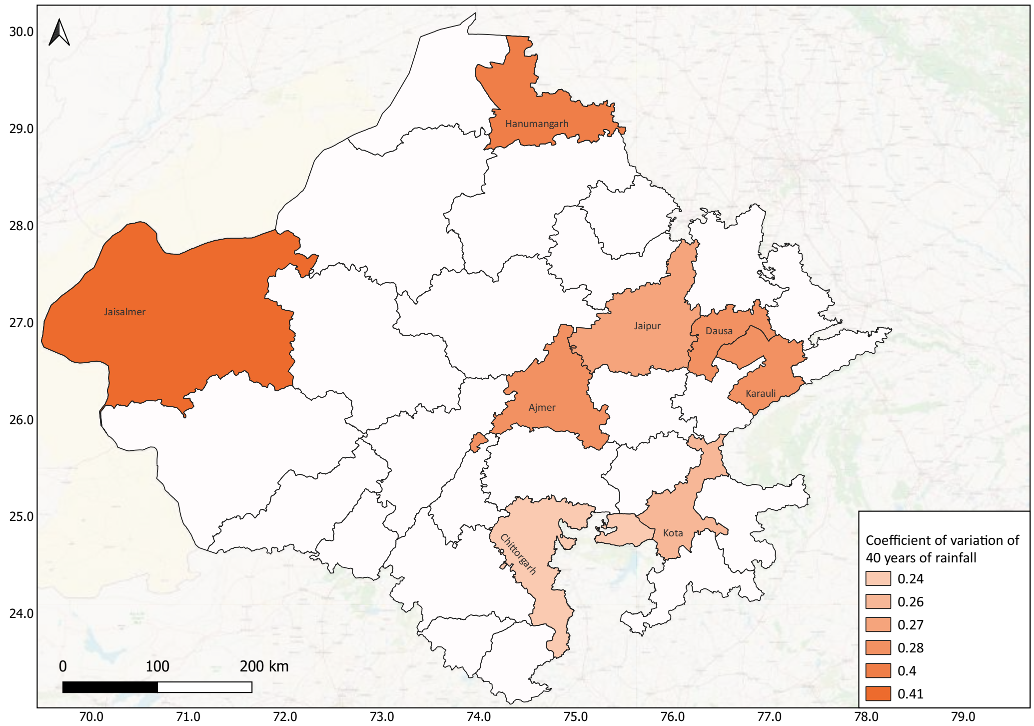
Figure 4 Average annual rainfall shows high inter-annual and spatial variation in the selected districts



Source: Authors' analysis based on daily rainfall data from India Water Resources Information System by the Ministry of Jal Shakti 2023.

Further, the inter-annual variation of rainfall within districts is very high, with the coefficient of variation ranging from 41 per cent in Jaisalmer to 24 per cent in Chittorgarh (Figure 5). Overall, the western and north western districts exhibit higher rainfall variability than those in the eastern and southern parts of the state. Both Jaisalmer and Hanumangarh (coefficient of variation in rainfall is 40 per cent) receive lower and more variable rainfall compared to Ajmer, Chittorgarh, Dausa, Karauli, Kota, and Jaipur. The Jaisalmer and Hanumangarh districts are mostly desert and have saline aquifers with limited fresh groundwater. Such erratic and highly variable rainfall will adversely impact the availability of fresh groundwater in the future, especially in the years of below-normal rainfall.

Figure 5 **Districts in western Rajasthan show high inter-annual variation in rainfall in comparison to those in the eastern parts of the state**



Source: Authors' analysis based on daily rainfall data from India Water Resources Information System by the Ministry of Jal Shakti 2023.

5.2.2 Field insights on DLI 1

One of the core pillars of the ABY is capacity-building at the GP level through the installation of monitoring instruments, including rain gauges and piezometers, and regular monitoring of water quality. This will not only generate community awareness at a wider scale but also generate data for tackling climate change challenges and managing resources judicially.

DLI 1 focuses on the public disclosure of groundwater data/information and reports. According to the six rounds of verification by the QCI, Rajasthan reported about 1,836 successful installations of groundwater observation wells and groundwater quality wells, along with the preparation of the block hydrogeological reports.

Table 5 presents the results obtained from the field consultations with respect to DLI 1. It is interesting to note that about 88 per cent of the respondents were aware of the rain gauge's presence in the GP. However, there were challenges in accessing data from the rain gauge in some gram panchayats. For instance, in a few GP offices the rain gauge was installed on the terrace that lacked permanent stairs

Awareness in VWSCs on rain gauges, peizometers, and water quality testing kits is high

Further, the respondents were aware of the piezometer and more than 50 per cent were aware of its location. This is a direct result of the awareness raised through the IEC activities and capacity-building activities under this scheme. Around 70 per cent of the respondents were aware of the water-quality testing kits and how to use them. Many farmers used the existing data and information on the groundwater level and quality of their respective fields and shared this knowledge with their fellow farmers.

In Kachrauli GP of Karauli district, we found that the groundwater quality and level data were displayed at the GP office. However, across different districts covered under this study, the same were not displayed at any other location in the village. As a result, in certain cases, only a focused set of people living in the proximity of the GP office were aware of such data. Nevertheless, it is necessary to display such data at multiple locations in the villages for better awareness among the community.

Another important insight was that the technical capability and awareness in ANM was higher than in AWW workers, which can be attributed to the higher education and exposure of the former. This can be leveraged for improving awareness within the community, specially among women, on the groundwater level and quality monitoring.

Lastly, from the consultation with line departments, it was found that more than 50 per cent of the line departments think that the additional data can be used for better planning of their respective AWP. Thus, the information and data generated from the monitoring instruments at the GP level can be used by various line departments for the micro and efficient management of resources, especially considering climate variability and changes.

> **"The micro climate of Rajasthan is highly diverse. If we get the basic rainfall and groundwater data at the *gram panchayat* level, we can plan our interventions better for sure."**
>
> Forest range officer, department of forest, Jaisalmer

Table 5 **Synthesis of insights obtained on public disclosure of groundwater data and reports under the *Atal Bhujal Yojana***

Parameter	Response (sample size)							
	VWSC (17)	FLW (13)	Beneficiary (12)	CWO (6)	Hydro-geologist (7)	Agriculture (3)	IEC (3)	Gender (4)
	Awareness on rain gauge(s) installed in panchayat(s)							
Existence of rain gauge (% respondents aware)	88.2	23.1	33.3	83.3	100.0	–	–	–
Number of rain gauge(s) installed	1	1	1	1	1	1	1	1
Rain gauge installed under ABY	1	1	1	1	1	1	1	1
Location of rain gauge (% of respondents aware)	88.2	15.4	8.3	83.3	85.6	–	–	50.0
Responsibility for recording readings from rain gauge	CWO	CWO	Unaware	100.0	CWO	CWO	CWO/DIP experts	Villagers
Period of reading the rain gauge	Monsoon months	Unaware	Unaware	Rainfall events	Rainfall events	Monsoon months	Monsoon months	Monsoon months
Process of sharing rainfall readings with villagers	VWSC meetings/ displayed in or near the office	Unaware	Unaware	VWSC meetings and display in the panchayat office	VWSC meetings	Verbally in VWSC meetings and GP Office	VWSC meetings/ displayed in the GP office	Unaware
	Awareness of piezometer(s)/observation wells (OWs) installed in panchayat							
Existence of piezometer/ OWs (% of respondents aware)	64.7	7.7	16.7	66.6	–	–	–	–
Number of piezometers installed	1	1	1	1	1	1	1	Unaware
Piezometers installed under the Scheme	1	1	1	1	1	1	1	Unaware
Location of piezometers (% respondents aware)	47	7.7	8.3	50.0	–	–	–	–
Responsibility for recording the reading from piezometer/OWs	CWO/ DPMU office	GWD	DPMU	OWs-CWOs and piezometer – DPMU	OWs-CWOs and piezometer –GWD	OWs-CWOs and piezometer – DPM	OWs-CWOs and piezometer – DPMU	OWs-CWOs and piezometer –DPMU
Process of sharing reading from the piezometer/ OWs with villagers	Meetings/ brochures/ displayed	Unaware	Shared on the spot	OWs – on the spot (66.6)/ Piezometer – Unaware	Verbally and brochure	Brochure	Verbally and brochure	Brochure
Time of reading the piezometer	Once a month	Unaware	Every month	Unaware	Pre-monsoon, post-monsoon	Pre-monsoon, post-monsoon	Pre-monsoon, post-monsoon	Unaware

Parameter	Response (sample size)							
	VWSC (17)	FLW (13)	Beneficiary (12)	CWO (6)	Hydro-geologist (7)	Agriculture (3)	IEC (3)	Gender (4)
Awareness of water quality testing kits (WQTKs) in the panchayat								
Existence of WQTKs (% respondents aware)	70.6	46.1	25.0	50.0	–	–	–	–
Number of WQTKs given	1	1-2	1	1	1	1	1	1
WQTKs under the scheme	1	1	1	1	1	1	1	1
Location of storing WQTKs (% respondents aware)	64.7	46.1	16.6	33.3	57.1	33.3	66.6	25.0
Responsibility of using WQTKs	CWO	CWO	Unaware	CWO/ ASHA	DIP experts/ CWO/ ASHA	CWO	CWO/DIP experts	CWO
Process of sharing reading with villagers	In VWSC meetings and displayed in the panchayat office	Verbally in VWSC meetings or GP meetings	Unaware	Verbally	Verbally/ displayed in panchayat office	Displayed in panchayat office	Verbally where sample tested	Verbally where sample tested
Frequency of using WQTKs	Every month	Once in 5–6 months	Unaware	Few samples every month	Largely 2–3 per month	5–10 per month	10 per month	Randomly used (50)

Source: Authors' analysis

A piezometer installed under the *Atal Bhujal Yojana* for regular groundwater monitoring, Kurad gram panchayat, Sarod block, Kota district, Rajasthan.

5.3 DLI 2: Preparation of community-led water security plans

In the second round of verification of DLIs by QCI in 2022, about 82 per cent of WSPs received from Rajasthan were approved. This was based on the criteria of assessing the adequacy of GPs in involving the community in a consultative manner. All the GPs chosen in this study had WSPs for the financial years (FY) 2021–22 and 2022–23 and were in the process of updating the same for the year 2023–24. The format for the preparation of the WSP is provided by the NPMU and PIA support village community in preparation of the same.

Discussing water security plans at the community level.

Table 6 presents the results obtained from the field consultations with respect to DLI 2. The blank cells indicate that the question(s) corresponding to that indicator were not applicable and hence not asked to the respective stakeholders. The aim was to capture stakeholders' awareness of the existence of the annual work plan (AWP) prepared by the GP, the role and functioning of the VWSC, and awareness and knowledge of the WSP. While most of the stakeholders were aware of the AWP, VWSC, and WSP, beneficiaries seemed to be a bit unaware of the WSP. The reason seems to be a lack of technical expertise to appreciate the purpose of the WSP, but at the same time, an interest in availing the benefits of the ABY scheme. Additionally, there seems to be an over-reliance on DIP for the preparation of the WSP.

Table 6 Synthesis of insights obtained on community participation in the formulation of a water security plan

Parameter	Respondents (with total sample size)							
	VWSC (17)	FLW (13)	Beneficiary (12)	CWO (6)	Hydro-geologist (7)	Agriculture (3)	IEC (3)	Social (4)
Awareness of the panchayat's annual work plan and the existence of the VWSC								
Preparation of annual work plan of panchayat (% respondents)	82.4	–	–	33.3	–	–	–	–
Existence of VWSC (% respondents)	–	53.8	8.3	33.3	100.0	100.0	100.0	50.0
Formation year of VWSC (with % who are aware)	2–3 years (70.6)	2–3 years (30.8)	2–3 years (8.3)	2–3 years (33.3)	2–3 years (85.7)	Unaware	2–3 years (66.6)	Re-constituted under 1 year (25.0)
Scheme under which VWSC has been formed (with % who are aware)	JJM (64.7)	JJM (23.1)	JJM (8.3)	JJM (33.3)	JJM (85.7)	JJMb (33.3)	JJMb (33.3)	JJM initially, re-constituted under ABY (25.0)
Responsibilities or tasks done by VWSC (% respondents)	23.5	15.4	Unaware	33.3	–	–	–	–
No. of members in VWSC (with % who are aware)	15–20 (70.6)	15–20 (38.5)	Not aware	15–20 (33.3)	15–20 (85.7)	15–20 (100.0)	15–20 (100.0)	15–20 (25.0)
Frequency of VWSC meetings in a year (with % who are aware)	–	Quarterly (15.4)/Bi-annually (7.6)	Unaware	Quarterly (16.7)	Quarterly (57.1)	Quarterly (66%)/ Every month (33.3)	Every month (66.6)/ Quarterly (33.3)	Quarterly (50.0)
Last meeting of VWSC (% respondents)	64.7	23.1	Unaware	Unaware	–	–	–	–
Documentation process for VWSC meetings (% respondents)	64.7	–	–	16.7	85.7	100.0	100.0	75.0
Awareness and knowledge the of water security plan (% respondents)								
Awareness of water security plan (WSP)	70.6	30.8	Unaware	16.7	100.0	100.0	66.6	100.0
Purpose and content of WSP	70.6	15.4	Unaware	16.7	100.0	Unaware	66.6	50.0
Time frame for the formulation of the latest WSP	47.1	7.7	Unaware	16.7	100.0	33.3	66.6	100.0
Frequency of the updating of a WSP in a year	17.6	7.7	Unaware	16.7	85.7	Unaware	66.6	100.0
Involved in making of the last WSP	70.6	Unaware	Unaware	16.6	42.8	Unaware	66.6	50.0
Role in the formation of the WSP	70.6	Unaware	Unaware	16.6	100.0	33.3	33.3	50.0

Source: Authors' analysis

Nevertheless, VWSCs, which are community-based institutions, confirmed that they maintain written records of citizens' feedback and grievances concerning the status of applications and work granted under various schemes, including those under the ABY. Most stakeholders are aware that VWSCs had been formed under the *Jal Jeevan Mission* (JJM), a central-sector scheme by the GoI to provide drinking water on tap to every rural household in the country. Comprising mostly of 15–20 members, the VWSCs have no fixed frequency of meeting and are convened jointly with gram sabha sessions.

About 25 per cent of VWSCs attributed planning for conservation and better management of water as their primary responsibility. Yet, about 70.5 per cent of the VWSCs were found to be familiar with WSPs and could attribute that the purpose of a water security plan is to manage groundwater in the panchayat through supply- or demand-side interventions.

Further, about 47 per cent of the VWSC members knew the correct time period of the last water security plan made for their GP. In about 53 per cent of the VWSCs, the members were involved in passing the resolution of the water security plan.

Awareness levels among DIP experts and CWOs were found to be correlated to the duration of tenure in their respective roles. 100 per cent of hydrogeologists within the DIPs, who also serve as team leaders, were aware of their purpose, content, and role in the formation of WSPs. Similarly, these figures stand at more than 66 per cent for IEC experts.

"We carry out a range of activities within the scheme – coordination with the line department for data inputs, facilitating the approval of the water security plan in the panchayat, and verification of on-ground work completed."

Hydrogeologist, Tibbi block, Hanumangarh district

All the line departments were aware of the water security plan and their role in it, both in terms of the input data required for compiling the GP information and the preparation of the water budget, and in terms of interventions – whether completed/ongoing/proposed – for water demand and supply-side management. The nature of annual work plans and schemes being implemented by supply-side management departments is such that they generate demand for interventions sought by the community through community interaction. Though, the annual work plan of such converging departments and water security plan synergise, the drafting of the former precedes the latter. The NPMU along with MoJS is working towards streamlining this process so as to let inputs from WSP feed into AWPs.

5.4 DLI 3: Public financing of approved water security plans through convergence with ongoing or new schemes

ABY is a one-of-its-kind scheme, building on the foundation of convergence across different departments and at different levels from top to bottom. It aims to improve the effectiveness of public financing on groundwater by moving to more coordinated investments in sustainable groundwater management.

A *diggi* (water storage structure) constructed under *Atal Bhujal Yojana* in convergence with agriculture department, after its inclusion and approval in the water security plan in Ratanpura gram panchayat, Hanumangarh district, Rajasthan.

DLI 3 facilitates public financing through incentives claimed by respective states against various demand- and supply-side interventions undertaken in a year. According to the 6th QCI round of verification, Rajasthan claimed about INR 10,270 lakh or USD 12.3 million for 725 GPs and received a claim of INR 7,342 lakh or USD 8.8 million (71.5 per cent of the demand) for the year 2022–23 (Quality Council of India 2023b).

During our field visit, DPMU officials – except from Jaisalmer – made the WSP for 2023–24 available to us. Based on the analysis of the WSP in 15 GPs (three in each district), budget estimates for demand-side interventions were about INR 63,762 lakh or USD 76.6 million, and for supply-side interventions, about INR 3,251 lakh or USD 3.9 million. These are proposed costs, and the incentives under ABY will be disbursed based on the extent of completion of the works and after verification carried out by the QCI.

Further, our consultation with the officers of the line departments provided some useful insights, which are discussed in the sub-sections following. We consulted 29 officials across seven line departments and visited some of the interventions undertaken through convergence with their scheme.

5.4.1 Understanding the nuances of ABY

Initially, every line department faced issues in understanding the nuances of the ABY, especially on the type of interventions that can be taken to obtain incentives. For instance, watershed development and soil conservation departments also carry out interventions like pasture development and plantation, which cannot be included under the ABY incentive plan.

However, as the scheme progressed, the line departments became more assured of the interventions that are eligible for convergence under ABY. This shift in confidence can be attributed to the support and regular interaction with DPMU officials, as well as refresher training sessions at the SPMU level, which were instrumental in clarifying their doubts.

5.4.2 Intervention areas and their evolving nature

During the consultation with the SPMU, it emerged that the interventions of the line departments fall into three categories. This includes water harvesting structures, artificial groundwater recharge structures, and water conservation structures. The schemes under which they are implemented vary from department to department (Table 7).

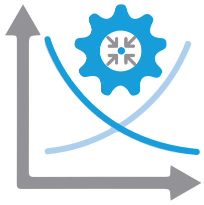
Table 7 Line departments have different programmes for the main types of interventions under the *Atal Bhujal Yojana*

Line departments of Rajasthan	Type of intervention	Scheme
Watershed Development and Soil Conservation	Anni cuts Farm ponds Mini-percolation tanks Sunken ponds Recharge shaft	*Pradhaan Mantri Krishi Sinchayee Yojana- Watershed Development Component* (PMKSY- WDC) *Rajiv Gandhi Jal Sanchay Yojana* (RGJSY)
Department of Horticulture	Micro-irrigation (drip and sprinkler) Mini-sprinkler	*Rashtriya Krishi Vikas Yojana* (RKVY) *Mission for Integrated Development of Horticulture* (MIDH)
Department of Agriculture	Farm pond Sub-surface irrigation pipeline Mini-kits (seeds of less water consuming crops)	*Pradhan Mantri Krishi Sinchayee Yojana – Accelerated Irrigation Benefit Programme* (PMKSY- AIBP) *National Food Security Mission* (NFSM) *Rashtriya Krishi Vikas Yojana* (RKVY) *Mukhyamantri Krishak Sathi Yojana* (MKSY)
Water Resources	Anni cuts Check dams Restoration and renovation of old tanks	*Rajasthan Water Sector Livelihood Improvement Project* (RWSLIP) *Repair, Renovation & Restoration* (RRR)
Department of Rural Development and Panchayati Raj	Farm ponds Small ponds Anni cuts Community farm ponds	*Mahatma Gandhi National Rural Employment Guarantee Act* (MGNREGA) *Members of Parliament Local Area Development Scheme* (MPLAD) *Member of Legislative Assembly Local Area Development Scheme* (MLALAD)
Forest Department	Mini-percolation tank Anni cuts type 1, type 2, type 3 Gabions	*Compensatory Afforestation Fund Management and Planning Authority* (CAMPA) *Rashtriya Krishi Vikas Yojana* (RKVY) *Rajiv Gandhi Jal Sanchay Yojana* (RGJSY) *Pradhaan Mantri Krishi Sinchayee Yojana- Watershed Development Component* (PMKSY- WDC)
Public Health and Engineering Department	Rainwater harvesting structures Recharge shaft	*Jal Jeevan Mission* (JJM)

Source: Authors' compilation from field insights

5.4.3 Financial benefits received under the ABY

The incentive money is transferred only once the verification of the interventions carried out for that year has been approved by the QCI. These funds initially reach the SPMU, which then transfers them to the respective line departments in the state, after which they finally reach the districts. There were mixed responses across different departments in districts regarding the incentive amount received by them. For instance, officials from the panchayati raj department in Chittorgarh mentioned that they haven't received any incentive amount for Chittorgarh district although funds have been received at the state level; these funds, however, had been disbursed to the Ajmer, Dausa and Jaipur districts. Conversely, the forest department of Chittorgarh received an incentive of INR 1.5 crore or 0.18 USD million in 2022–23, whereas the forest department of Jaisalmer reported to have received no funds for 2022–23 despite complete verification of their works. Thus, the approach followed by line departments for fund disbursal at the district level remains unclear.



Both demand-side and supply-side interventions for water management are being implemented by the scheme in convergence with other ministries and departments

5.4.4 Role of line departments in the preparation and updation of WSPs

The need for a more proactive involvement of line departments in formulation and updation of water security plans was highlighted. Already, the line departments undertake their own field surveys to assess the need and feasibility of the structures. They also prepare GP-level annual work plans that are submitted to the DPMU nodal officer. Thus, there is a room for improvement in coordination when it comes to preparation of the comprehensive and collaborative WSP for the GP.

5.4.5 Extent of data usage by line departments

Assessments were conducted to gauge the usage of data collected under ABY, concerning rainfall, groundwater quality, and groundwater quantity by the line departments. Some line departments pointed out that they have limited use of such data, and some mentioned having in-house data collection systems. For instance, the panchayati raj department emphasised their primary focus on employment generation and the creation of surface-water structures, which limits their use of the data collected under ABY. In contrast, the agriculture department mentioned that they have their own accredited labs for water quality, which provide results based on the samples collected from the field. However, all line departments that require depth-to-groundwater level for undertaking specific interventions depend on the data received from the groundwater department.

"Implementation of ABY has strengthened the availability of data on groundwater level and quality. This has improved the decision making of our department on the creation of infrastructures for groundwater level augmentation."

Additional Engineer (AEN), Department of Public Health Engineering (PHED), Chittorgarh district, GoR and XEN, Department of Horticulture, Ajmer district, GoR

5.5 DLI 4: Adoption of practices for efficient water use

A farm pond constructed at a beneficiary's farm under the *Atal Bhujal Yojana* in convergence with Watershed Development Component-*Pradhan Mantri Krishi Sinchayee Yojana* in Suroth panchayat, Karauli district, Rajasthan.

DLI 4 focuses on optimising water-use efficiency through various demand-side interventions, including the adoption of drip, sprinkler, and pipeline irrigation. Further, it emphasises shifting the cropping pattern from high water-consuming to low water-consuming crops. During consultations, around 41 per cent of VWSC members acknowledged that the cropping pattern can shift on account of technological advancements, such as the availability of better quality seeds and better availability of water through tube wells, among others.
On the crop diversification front, our findings align with those of the QCI, which highlights that from 2021–23, no substantial gains were made in terms of cropping pattern shifts. However, the state is making progress on the adoption of demand-side interventions such as micro-irrigation and other water-saving methods. Based on the 6th QCI round of verification, an area of about 12,256 ha was brought under efficient water-use practices promoted through ABY; 99 per cent was through the adoption of drip, sprinkler, and pipeline irrigation (Quality Council of India 2023b). The WSPs submitted on March for 2024 for 15 surveyed GPs across five districts (except Jaisalmer) propose to bring about 24,481 ha of additional area under efficient water use by the fiscal year 2024-25.

Recently, ABY has introduced an innovation component under DLI 4. Under this, each block is designated to establish one model farm that is hi-tech and contains a farm pond, polyhouse, drip or sprinkler, shed nets, and vermiculture. The idea is to showcase the ideal convergence of the intervention areas involving different line departments. Alongside this, a mechanism has been established to obtain feedback and suggestions from the ground officials to widen the guidelines for the selection of demand- and supply-side interventions. It is interesting to note that this idea of showcasing ideal convergence of the intervention was the brainchild of SPMU, Rajasthan which was very well received and accepted by NPMU. It also highlights the adaptability and acceptability of the scheme to novel ideas which could have substantial impact at scale. Along with introduction of certain novel intervention, we also came across certain activities during our field visit which are documented as the case studies that showcases the potential of ABY with respect to managing demand for groundwater and possible impacts at scale in the long run.

"Components of crop diversification demonstration have been included as a demand-side intervention in 2023–24, based on our request made to the SPMU. It incentivises farmers to change their cropping pattern by making them realise the value of low water-consuming crops through behavioural nudges. Here, we provide minikits to farmers which include seeds of jowar, mustard, and soybean along with fertilisers and technical inputs. In 2023–24, we have received the target of 800 ha for crop demonstration in the district."

Agriculture Research Officer, Joint Director, Zila Parishad Office, Chittorgarh, Rajasthan.

Case study 1 Karauli's farmer is a game-changer

Farm owner: Rajkumar Paliwal

Area: Suroth GP (Karauli district)

Interventions deployed: Polyhouse, drip irrigation, and farm pond

Schemes: MIDH (polyhouse), PMKSY-MI (drip irrigation), PMKSY (farm pond)

Crops grown: Cucumber, papaya

Cost incurred: Total cost of the entire unit came out to be INR 1,30,000 or USD 1562.1. The subsidy provided was INR 52,500 or USD 630.9– around 40 per cent of the total cost.

Savings incurred: Groundwater input reduced by 90 per cent and there was a substantial reduction in the incidence of crop diseases, leading to uniformly sized produce with greater market acceptability.

Event that led to transformation: Attending an awareness campaign made the beneficiary realise the importance of smart agriculture in times of changing climate and declining groundwater levels. He started connecting with the local officials and also learned about various smart technologies on social media.

Case study 2 Hanumangarh's farmer is an inspiration for women empowerment in tackling groundwater exploitation

Farm owner: Neelam Sharma

Area: Mirzawali Mer GP (Hanumangarh district)

Interventions deployed: *Diggi* (water harvesting structure) with the dimensions 100 * 20 * 20 ft and capacity to hold 20 lakh litres of water.

Schemes: PMKSY

Crop grown: Mainly used for irrigating cotton fields, plan to irrigate guar gum in coming seasons

Subsidy received: INR 3 lakh or USD 3605.

Benefits: The *diggi* provides an assured water supply at times of canal closure and during dry seasons. Moreover, water storage in these structures also leads to groundwater recharge.

Event that led to transformation: Rainfall is erratic, leading to the irregular supply of water in the canal. For the last few years, there was not enough water to irrigate the cotton fields. The beneficiary attended an awareness campaign organised under ABY last year in Mirzawali Mer GP, Tibbi, where the VDO helped her understand the procedure of availing subsidy for the construction of a *diggi* under the PMKSY.

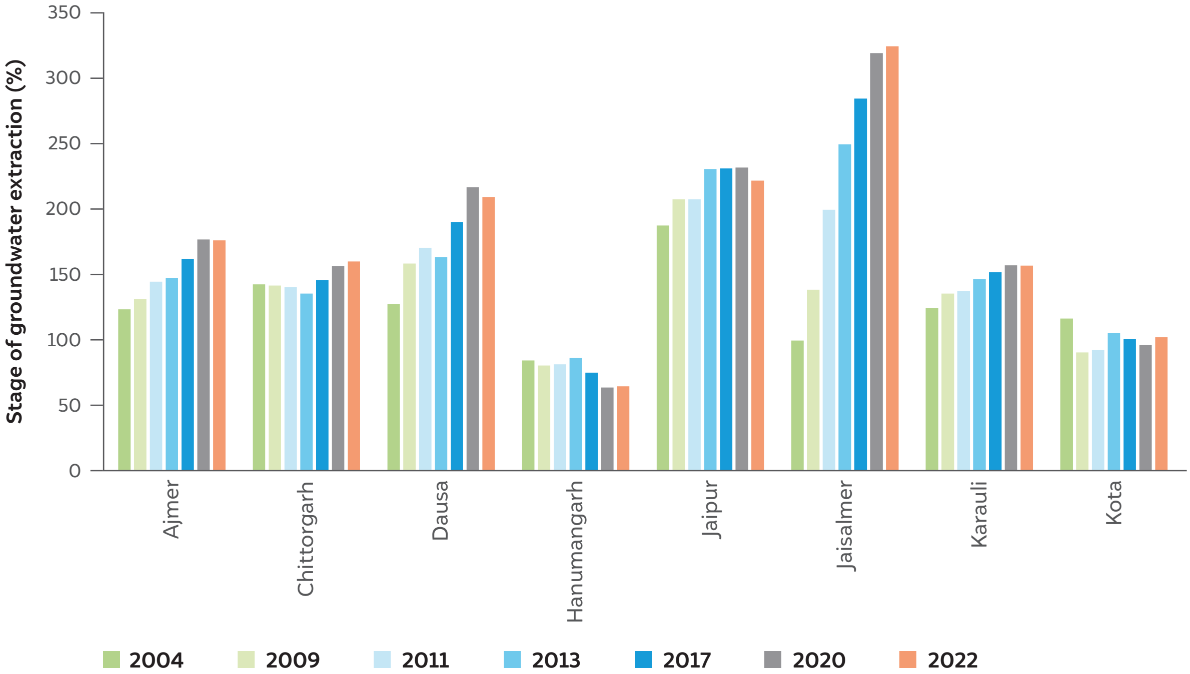
5.6 DLI 5: Improvement in the rate of decline of groundwater levels

The ultimate aim of the scheme is to stabilise or reverse the declining trend of groundwater levels, an objective that is expected to be achieved through interventions supported under the scheme. The scheme is implemented in overexploited blocks where groundwater resource development exceeds 100 per cent. It will take some time before such outcomes are visible. Nevertheless, an analysis was undertaken using the depth-to-groundwater level in the pre-monsoon and the stage of groundwater extraction in the selected districts.

Except for Hanumangarh and Kota, all districts show an increasing trend of groundwater extraction (Figure 6). It is highest in Jaisalmer and lowest in Hanumangarh. In the latter, canal water from *Indira Gandhi Nahar Project* (IGNP) is used for irrigation, and hence, there is less dependence on groundwater as compared to other districts. In Kota too, the stage of groundwater extraction is low in comparison to other districts in the eastern part of the state.

A cucumber plantation inside a polyhouse with drip irrigation at a model farm, Sirsaly panchayat, Jaipur district, Rajasthan.

Figure 6 **Except for Hanumangarh and Kota, other selected districts show an increasing trend of groundwater extraction**

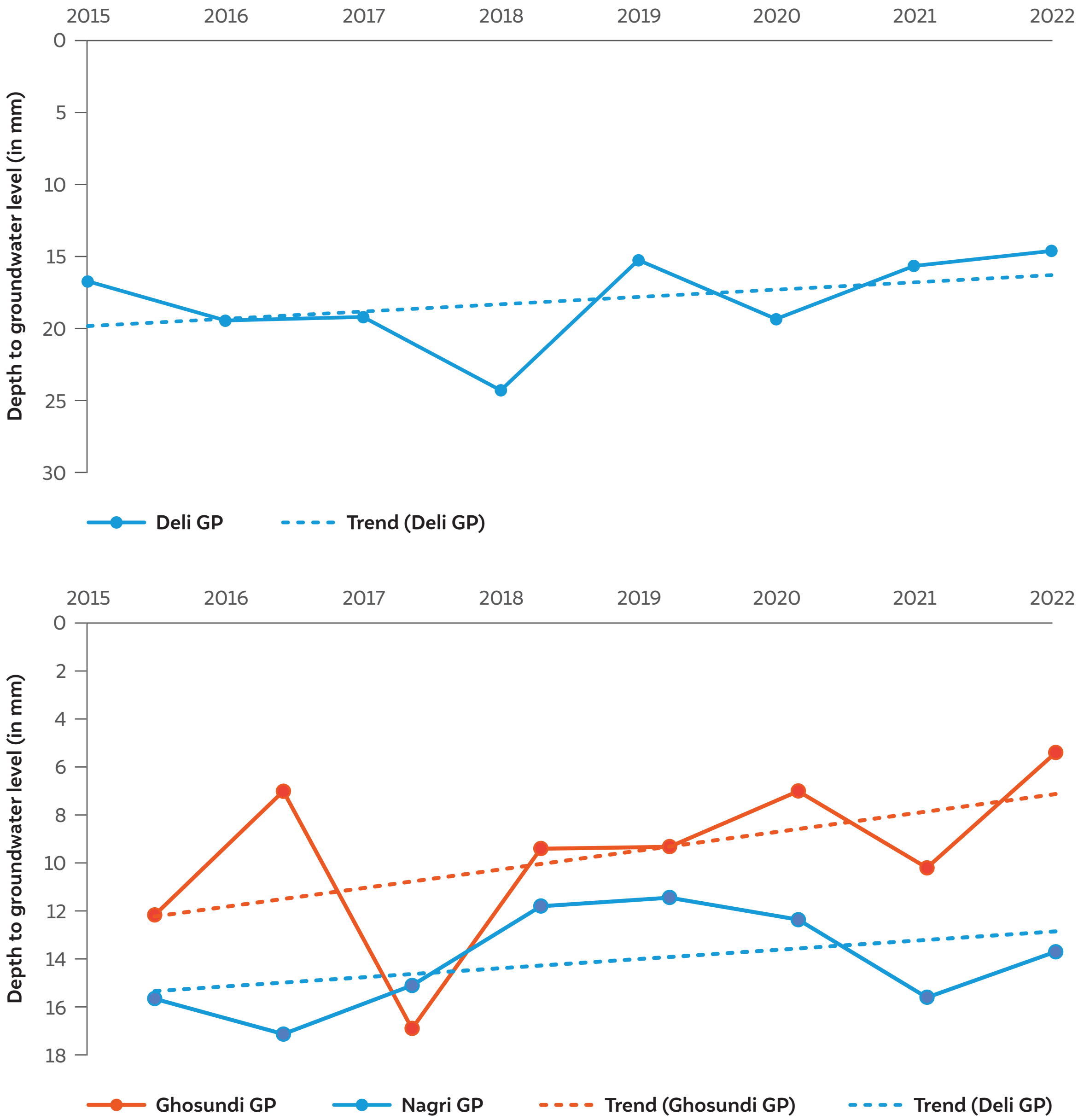


Source: Authors' analysis using reports by Central Ground Water Board (CGWB) on dynamic ground water resources of India for the years 2004, 2009, 2011, 2013, 2017, 2020 and 2022.

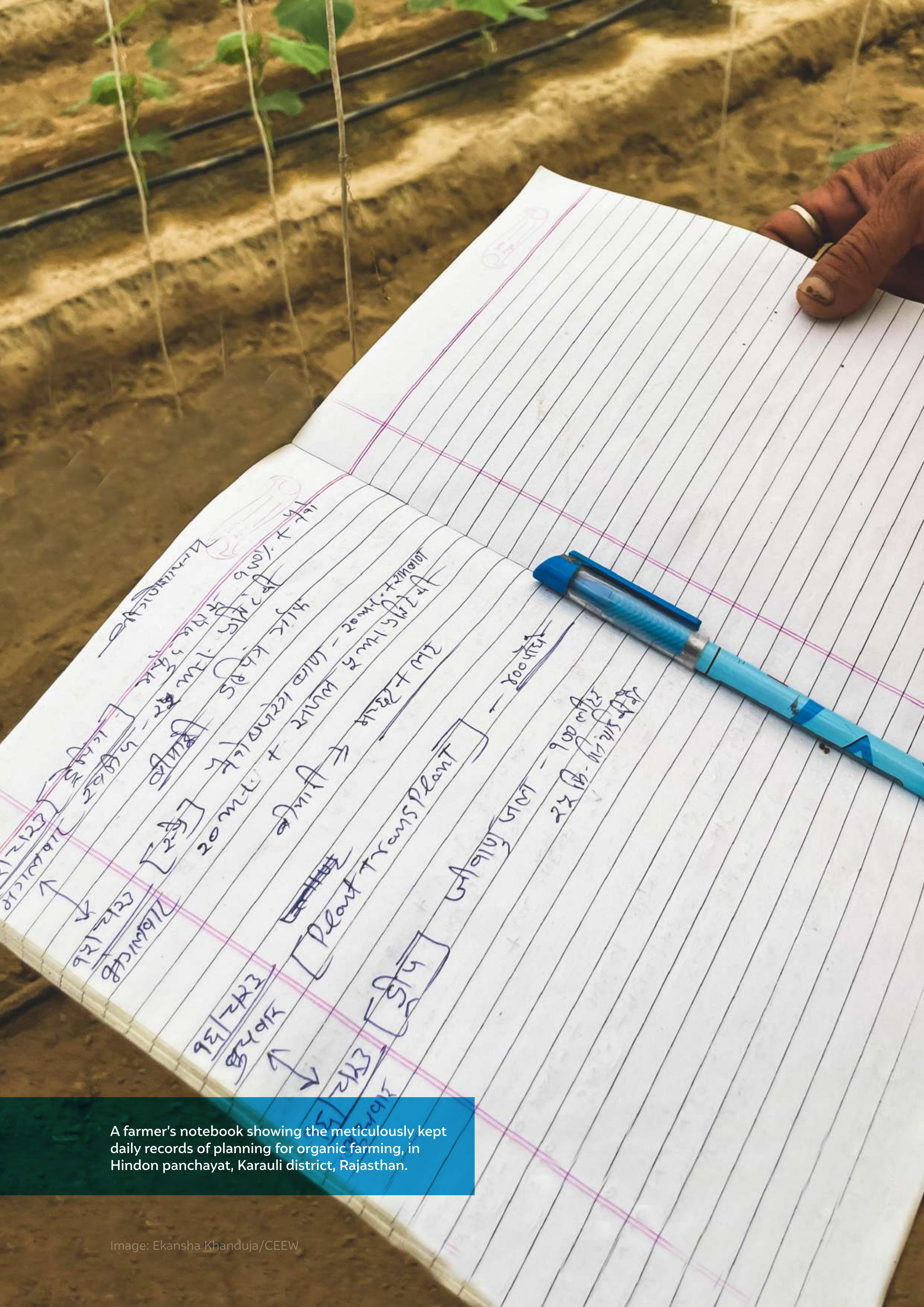
Further, groundwater-level data for the pre-monsoon season was obtained from the GP for the last eight years (2015–22) and analysed to determine whether any success has been achieved in relation to DLI 5. It was interesting to note that the trend of decline in groundwater level during the pre-monsoon was reversed in some districts. This includes GPs in Kota and Chittorgarh (Figure 7). While the former has witnessed a reversal of trend in groundwater extraction at the district level, in the latter, the extraction has increased. This indicates that at least in Chittorgarh, the ABY is making a positive impact in terms of improving the groundwater condition. It is expected that similar results will be observed in the near future.

CEEW team (right) **with head of District Program Management unit of Karauli district** (left)**, and a beneficiary under the scheme; discussing groundwater level trends in Suroth gram panchayat, Karauli district, Rajasthan.**

Figure 7 Gram panchayats in Kota and Chittorgarh districts show a reversal in the declining depth of groundwater level trend



Source: Authors' analysis using block-level hydrogeological reports obtained from respective district groundwater offices.



A farmer's notebook showing the meticulously kept daily records of planning for organic farming, in Hindon panchayat, Karauli district, Rajasthan.

Image: Ekansha Khanduja/CEEW

6. The SWOT analysis

The strength, weakness, opportunity, and threat (SWOT) analysis to help address the challenges identified and enhance outcomes is discussed hereafter.

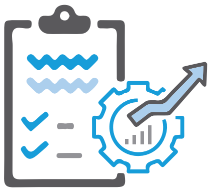
6.1 Strengths

- **The core strength is the ABY design**, which seeks to establish convergence at different levels of governance and implementation through the use of incentives.
- **ABY avoids duplication efforts and harnesses existing human resources in different departments** to ensure wider reach. For instance, the supervisor of the agriculture department works closely with DIP experts to inform farmers of the benefits offered under ABY. Similarly, the role of ASHA and *aanganwadi* workers is mainstreamed to ensure the participation of women.
- **The institutions created under different schemes are harnessed to achieve the objectives of the schemes**. For instance, VWSC – created under JJM – is made responsible for ensuring community participation in groundwater management.
- **The scheme implementation keeps the community at the centre stage** of participatory groundwater management by building capacity and enabling adequate representation of vulnerable sections in decision-making roles such as in VWSCs.
- **Hiring qualified experts from different fields outside of government (agriculture, hydrogeology, social sciences, and IEC) for scheme implementation is a game changer**, especially for the preparation of the GP-level WSP.
- **The scheme is able to build capacity at all governance levels** (GP, block, district, and state). Also, it supports flexibility in onboarding different training experts as per the felt needs of the community.
- With a focus on strengthening the monitoring network by installing rain gauges, piezometers, and water-quality testing kits, **the scheme is able to generate groundwater-specific data with the support of communities**, including VWSCs. The data is entered into the Atal Jal app, which can be accessed by stakeholders and public through the application itself, the IEC display venues, social media, and MIS of the scheme for evidence-based decision-making on improving groundwater management.

6.2 Weaknesses

Some weaknesses were identified at different levels of governance, which need to be addressed to ensure the optimal performance of ABY in the future.

- At the GP level, scheme awareness is restricted to institutions such as VWSC members including ANM, and *aanganwadis*. Though they are essentially community-based institutions, other village members (especially non-beneficiaries) need to be engaged more effectively to achieve the desired outcome.
- At the district level, some challenges were observed in the functioning of DIPs, including the absence of dedicated and targeted work plans (weekly, fortnightly, monthly), which are crucial.
- In DPMUs, there is no dedicated hydrogeologist deputed for the scheme. As a result, existing staff members of the GWD are overburdened with additional responsibilities.
- One operational issue was the non-compliance with standard operating procedures for the installation of rain gauges in some gram panchayats. For instance, rain gauges were installed on the terrace of GP offices, but a few of them do not have a staircase that enables regular access.



The data generated in the scheme should be leveraged for development planning and governance of other resources which have a relationship with groundwater

6.3 Opportunities

The scheme can leverage the following opportunities to create a greater impact.

- An increased focus on exposure visits at all levels can boost morale, promote the adoption of better technologies, and promote innovation in ABY governance and planning.
- Leveraging existing platforms and knowledge is important to make the scheme's impact more sustainable and pronounced. For instance, the state water informatics centre (SWIC) in Rajasthan can be leveraged to incorporate data from water and allied sectors on a common platform to develop comprehensive hydrological models and decision-making tools on water management for the state. Since ABY collects data at the lowest possible scale, there is a huge potential for synergising the efforts made under the SWIC and ABY. It is to be noted that synergy with national water informatics centre is already being sought by the NPMU.
- Specifically, in the context of Rajasthan, the passing of a state groundwater bill has been due for some time. Further, the SPMU is in favour of the expansion of the groundwater department's mandate – allocating dedicated funds for groundwater augmentation, creating new posts, and forming dedicated management committees for groundwater up to the district level. All this offers a great opportunity for improving governance and management of groundwater in the state.
- The scheme has tremendous potential for skill development and employment generation at the village level, especially if it mainstreams the role and reliance on *bhujal mitras*.
- The scheme is an important enabler for cropping pattern changes towards low water consuming crops or adoption of crop varieties needing less water.

6.4 Threats

Within the external but immediate ecosystem of the ABY, there exist a few threats that, if tackled, can enhance the effectiveness of the scheme.

- The groundwater department in Rajasthan and all other ABY states, excluding Uttar Pradesh has a mandate to monitor, explore, and manage groundwater resources, but not to regulate its use.
- The absence of dedicated staff to monitor groundwater at the block and below levels, unlike in other line departments, is a challenge for effective monitoring at the lowest level.
- Specifically, in Rajasthan, about 60 per cent of posts in the state groundwater department are vacant. Hiring has been on hold since 2014 due to a legal bottleneck. Hiring recent pass-outs and young professionals with relevant qualifications on a short-term basis can be one intermediate option. Otherwise, it will be a challenge for the groundwater department to effectively perform all its functions.
- There is a lack of coherence between ABY and activities by other departments that can have an adverse impact on groundwater sustainability. For instance, electricity subsidies to agriculture sector in the country can lead to the unintended impacts on groundwater use which can further adversely impact the gains made by the ABY.

The absence of mandate with the state groundwater department to regulate the use of groundwater, threatens the success of activities aimed at its conservation and augmentation

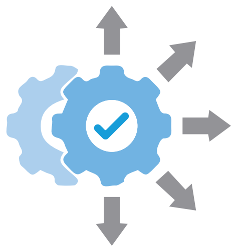
Water conservation slogans on the walls of a government school that the CEEW team visited as part of their field visit at Mirzawali Mer panchayat, Hanumangarh district, Rajasthan.

A mini percolation tank as a convergence intervention with the forest department leading to groundwater recharge as a part of *Atal Bhujal Yojana* in Ghosundi panchayat, Chittorgarh district, Rajasthan.

Image: Ekansha Khanduja/CEEW

7. Recommendations

Based on the findings and SWOT analysis of the scheme, this section discusses the recommendations to facilitate a more effective delivery of the objectives of the scheme. It also summarises the nature and enablers of participation at the panchayat level under the scheme, which may serve as guiding points for other countries on the path of attainment of SDGs and community-based participatory groundwater management.



Restructuring of hiring process of DIPs is crucial for effective delivery of the scheme's objectives

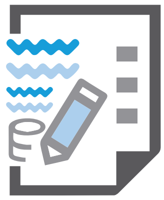
7.1 Make DIPs more impactful

One of the major bottlenecks in propelling the scheme to its full potential is the low morale and retention rate among DIP experts and CWOs. They work closest with the DPMU office, but the office has no control over their HR processes since tendering is done at the SPMU level. One of the options is outsourcing of DIP tendering process to accredited third-party agencies, as done in the case of DPMU key experts hired through NABARD Consultancy Services (NABCONS), an agency of the National Bank of Agriculture and Rural Development (NABARD). Another option is to emulate the model followed under JJM where implementation support agencies are empanelled in the system. This will incentivise DIPs to perform better, both in terms of their retention rate and in ensuring ease of HR processes. It will also ensure faster conflict resolution, more proactive HR policies, and better pay parity among DIP experts deployed in different districts.

Further, at present, DIPs are stationed at districts. Their organisational offices are often in other districts or even in the capital of the state. There is a need to set up block-level offices for stationing DIPs. This is necessary for logistics and operations. Also, four DIP experts are assigned to each block irrespective of the number of GPs under the block. The recruitment of DIPs should be in relation to the number of GPs in a block, which will reduce cost overruns and manage the disproportionate burden of field travel on some DIPs, enabling them to perform optimally.

7.2 Include water budgeting in gram panchayat development plans

Panchayats in the country are mandated to formulate an annual gram panchayat development plan (GPDP) in a participatory manner to ensure effective and proper utilisation of the natural resources available to them. Such plans cover areas of work under 36 line departments (Ministry of Panchayati Raj 2023), and those included in Article 243G of the Eleventh Schedule of the Constitution. Seven of the 29 subjects included have direct bearings on the state of water resources, including groundwater. These include agriculture and extension; land improvement, implementation of land reforms, land consolidation and soil conservation; animal husbandry, dairying and poultry; drinking water; minor irrigation, water management, and watershed development; fisheries; and social forestry and farm forestry (Ministry of Panchayati Raj 1992). The inclusion of water budgeting in the plan will ensure sustainable development and consumption of water. Establishment of an inter-ministerial sub-committee for better coordination on water resources as an outcome of the first 'All India Annual State Ministers Conference on Water 2023' provides a strong enabling environment to make water budget part of the GPDP which will result in better convergence with other line departments right at the planning phase.



Inclusion of water budgeting in GPDPs will facilitate the way for development which can ensure sustainable use of water

7.3 Explore providing incentives directly to gram panchayats

Anecdotal evidence from the field suggests that the availability of funds to the GP can increase their interest in implementation. The ABY guidelines include this provision, provided there is a felt need. However, the incentive allotment criteria should consider the stage of groundwater development and the amount of work required for water demand management, with a focus on community engagement, at the GP level.

7.4 Ensure timely release of funds by the line departments and subsidy to beneficiaries

There is a lack of clarity regarding the criteria to be followed by state line departments when allocating funds to district offices for various interventions. It is imperative to establish uniform criteria that will ensure the proper availability of funds for various interventions, including those that are in convergence with the ABY. The absence of the same results in low motivation to carry out ABY-related activities.

Further, one of the reasons for the low adoption of interventions under ABY is the delays in the release of subsidies from line departments. This discourages farmers from availing benefits under ABY, as the upfront payment costs of the intervention are often high. So, the timely release of subsidies to beneficiaries will enable greater community participation under the ABY.

7.5 Verification of 'proper' installation of rain gauges

Rain gauges have been installed in every GP to measure and report rainfall data. The installation of rain gauges is outsourced to a third-party agency by SPMU through tendering. While rain gauges were installed in most of the GPs that we visited, in some cases they were placed in locations which are difficult to access. Thus, the tendering process needs to be revised to accommodate verification processes, and the existing system to verify and report installation needs has to be strengthened.

Considering the importance of ABY in achieving the SDG goals, other countries can learn important lessons on enablers for achieving participatory groundwater management objectives that are being achieved through this scheme. Table ES1 provides a detailed account of the same.

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Acronyms

AEN	Assistant Engineer
ANM	auxiliary nurse and midwife
ABY	Atal Bhujal Yojana
APFAMGS	Andhra Pradesh Farmer Managed Groundwater System
AWPs	annual work plans
AWW	aanganwadi worker
BCC	behaviour change communication
CAMPA	Compensatory Afforestation Fund Management and Planning Authority
CEEW	Council on Energy, Environment and Water
CGWB	Central Ground Water Board
COV	coefficient of variation
CWO	community working officer
DIP	district implementing partners
DLI	disbursement-linked indicators
DoWR,RD&GR	Department of Water Resources, River Development & Ganga Rejuvenation
DPMU	District Program Management Unit
FAO	Food and Agricultural Organization
FGD	focus group discussion
FLWs	front-line workers
GIS	geographic information system
GoI	Government of India

GoR	Government of Rajasthan
GP	gram panchayat
GPDP	gram panchayat development plan
GSVA	gross state value added
GWD	groundwater department
HR	human resources
IEC	information, education and communication
IGNP	Indira Gandhi Nahar Pariyojana
IMD	India Meteorological Department
IMTI	Irrigation Management and Training Institute
INR	Indian rupees
IPCC	Intergovernmental Panel on Climate Change
JJM	Jal Jeevan Mission
M&E	monitoring and evaluation
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MIDH	Mission for Integrated Development of Horticulture
MIS	management information system
MKSY	Mukhyamantri Krishi Sathi Yojana
MoJS	Ministry of Jal Shakti
MoU	memorandum of understanding
MPLADS	Members of Parliament Local Area Development Scheme
MLALADS	Member of Legislative Assembly Local Area Development Scheme
NABARD	National Bank for Agriculture and Rural Development
NABCONS	NABARD Consultancy Services
NISC	National Interdepartmental Steering Committee
NFE	non-formal education
NFSM	National Food Security Mission
NGOs	non-governmental organisation
NPMU	National Program Management Unit

PHED	public health engineering department
PMKSY-AIBP	Pradhan Mantri Krishi Sinchayee Yojana – Accelerated Irrigation Benefits Programme
PMKSY - MI	Pradhan Mantri Krishi Sinchayee Yojana – Micro-Irrigation Component
PMKSY-WDC	Pradhan Mantri Krishi Sinchayee Yojana – Watershed Development Component
PRIs	panchayati raj institutions
QCI	Quality Council of India
RGJSY	Rajiv Gandhi Jal Sanchay Yojana
RGNGWTRI	Rajiv Gandhi National Groundwater Training and Research Institute
RKVY	Rashtriya Krishi Vikas Yojana
RRR	repair, renovation, and restoration
RWSLIP	Rajasthan Water Sector Livelihood Irrigation Project
SISC	State Interdepartmental Steering Committee
SDGs	Sustainable Development Goals
SPMU	State Program Management Unit
SWIC	state water informatics centre
SWOT	strengths, weaknesses, opportunities, and threats
TPGVA	third-party government verification agency
TPVA	third-party verification agency
USD	US dollar
UTs	union territories
VDO	village development officer
VWSC	village water and sanitation committee
WSP	water security plan
WUA	water user association
XEN	Executive Engineer

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Image: Ekansha Khanduja/CEEW

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