MSW MANAGEMENT -Multidisciplinary, Scientific Work and Management Journal
ISSN: 1053-7899
Vol. 36 Issue 1s, 2026, Pages: 2439-2443

Reviving Groundwater through Community Led Interventions: An Impact Assessment of Maharashtra's JalTara Initiative

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Abstract: India's agricultural areas suffer constant water scarcity– with Maharashtra often mired in severe droughts (WELL Labs, n.d.-a). To resolve the issue, the Government of Maharashtra, in cooperation with the Rural Transformation Project, implemented the JalTara Initiative, a decentralized community-led scheme that concentrates on the recharge of groundwater by strategically constructing percolation structures (Art of Living, n.d.). Design, implementation and impact of the JalTara model in the 115 villages of the state, This study explores and assesses. Applying a mixed methods methodology with geospatial analysis, field surveying techniques, and stakeholder interviews (WELL Labs, n.d.-b) the research paper documents that the initiative has resulted in 14-foot average increase in the average groundwater levels, a 42% rise of the crop yields increasing farming yields, and a 120% increase in farmer incomes per year after implementation (Business Standard, 2025) afforestation activities leading to nearly 90,000 trees with fruit production and new labor that have caused it to increase are a further affirmation of its socioeconomic advantages (Prezi, n.d.). The paper emphasizes the importance of village community participation, low-cost facilities and data-oriented programming as sources of water security for rural and remote areas. Finally, it presents policy suggestions for the model's scaling to drought-affected and poor-prone areas in India and elsewhere.

Keywords: JalTara, groundwater recharge, Maharashtra, water conservation, community participation, rural development, climate resilience.

1. Introduction

1.1 Contextual Background : While India sustains almost 18 percent of the world's population, it also has access to just 4 percent of the world's freshwater resources. It imposes enormous pressure on groundwater systems, especially in states with agricultural agrarian concentration and monsoon rainfall dependence like Maharashtra. Droughts are more frequent and severe as a result of erratic rainfall and climate variability leading to decreasing rates in groundwater levels and deterioration in soil quality in places such as Marathwada and Vidarbha (EM International, 2021). These constraints have resulted in a major decrease in agricultural yields and raised the precariousness of the rural economy. Whereas previous initiatives, from the Jalyukt Shivar Abhiyan for instance, sought to enhance water conservation by means of infrastructure, according to the evaluation, the plan failed to be sustainable as it was not sustainably executed due to the challenge of scientific monitoring, a decentralized approach and very limited local ownership (Down To Earth, 2023). As such, Maharashtra's enduring water stress will require a paradigm shift from the above that is both evidence-based and community-focused. To do so, such strategies should be able to address not only groundwater recharge, but also rural resilience to climate stressors, via scalable, cost-efficient models

1.2 Purpose of the Study. The JalTara Initiative, which has been launched by the Government of Maharashtra working with the Art of Living Foundation and the Rural Transformation Project, is a focused and participatory solution to its water challenges. In essence, the initiative is focused on the establishment of scientifically located percolation pits which will capture runoff in the lowest regions on farmland for percolation and deep groundwater recharge. The initiative also includes afforestation, training of farmers, and leadership development via Yuvacharyas (young people volunteers who are locally trained to lead and sustain community participation). By early 2025, the JalTara program was implemented in 115 villages and reached over 40,000 farmers, producing promising results in groundwater recovery, agricultural output, and household income (Art of Living, n.d.; WELL Labs, n.d.). This research employs mixed-methods analysis of quantitative data and qualitative field observations to assess the structural efficacy and socio-ecological effectiveness of the JalTara model. The aim is to establish and provide evidence on how this model can support groundwater sustainability and rural development and to investigate its replicability in other climate-vulnerable areas.

2. Literature Review

2.1 Challenges and Interventions in Maharashtra for Water Conservation. Maharashtra has historically experienced acute water shortages due to a mix of erratic monsoonal patterns, rapid groundwater extraction and poor watershed management procedures. A number of water conservation programmes have been launched to address these problems. One such scheme is the Jalyukt Shivar Abhiyan (JSA), implemented in 2015 as a flagship state policy to ensure Maharashtra is drought-free by constructing check dams, widening nallas and deepening bodies of water (Down To Earth, 2023). While the JSA initially had success mobilising community interest and funding from the government, subsequent assessments highlighted deficiencies relating to quality control, lack of scientific site selection and maintenance, impacting the effectiveness of these efforts (Deshmukh et al., 2021). Empirical studies regarding Marathwada and Vidarbha's water scarcity in the country point to a common theme: the absence of integrated hydrological and community management models that contribute to the sustainable development of water. As WELL Labs (n.d.) noted, water-saving initiatives may not be effective in the long run when not implemented with localized, design-based concepts and bottom-up participation.

2.2 Positions JalTara as a Unique Model : Unlike prior initiatives, the JalTara Initiative makes scientific rigor and community ownership central to its implementation model. Unlike JSA, JalTara uses a geo-hydrological assessment to identify optimal locations for percolation structures at low points on farmland. This allows for the best use of groundwater recharge with minimum surface runoff loss (Art of Living, n.d.). Another feature which sets the project apart is that it employs trained youth volunteers, referred to as Yuvacharyas, that serve as change agents in the villages. This group of volunteers support farmer engagement, teaching them about pit maintenance, and mobilizing them on afforestation activities. Through the application of this approach, governance is bottom-up, and local residents can guide and sustain these interventions (WELL Labs, n.d.) which is a significant departure from previous top-down schemes. In addition, JalTara has incorporated ecological regeneration through the planting of fruit-bearing trees next to recharge pits to retain the groundwater and promote biodiversity. Expected to achieve measurable improvements such as 14-foot rise in groundwater levels and over 40% increase in agricultural output within one year of implementation according to internal impact assessments (Art of Living, n.d.).

2.3 Gaps in Existing Literature : Despite the growth of water conservation programs in Maharashtra, little academic comparison has been made that connects quantitative quality metrics in a single instance to qualitative input from local stakeholders. Most current research is either technical feasibility or policy, with inadequate consideration of hydrological impact or socio-economic transformation. The aim of the current study is to address such shortfalls in this context by proposing a mixed-methods investigation of the JalTara project to assess this initiative for generalizability and scalability in wider geographies.

3.Methodology : As part of this research, a mixed-methods research design was used to assess the structural, environmental and socio-economic impact of JalTara groundwater recharge intervention in Maharashtra. All data analysis, qualitative interviews, and field case observations were conducted in an attempt to have a full understanding of the impact of the program.

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3.1 Data Collection and Analysis in Secondary Phase. Quantitative data were obtained from publicly open sources, such as:
• The JalTara Impact Report issued by the Art of Living Foundation which includes information on recharge structure number and placement, level of underground groundwater, crop productivity and indicators associated with community engagement.
• WELL Labs (independent reports and reports) on the environment that monitored the recharge pits by third parties and the impact it had on hydrological balance and soil health. Descriptive data analysis was performed to characterize the trends and the measurement of the effect of the approach including:
• Average rise (in feet) in groundwater levels.
• Change in agricultural yield (by percentage increase).
• Increase in farmer income (via pre- and post-intervention economic survey).
• Number of trees planted and tree cover.

3.2 Qualitative Interviews
To complement the quantitative findings, interviews of the stakeholders involved in the project, using semi-structured interviews, provide experiential data.
•Interviews with farmers from twelve villages across three districts on their attitude towards the project, shift in irrigation patterns and economic impact.
•Yuvacharyas (youth volunteers) were interviewed to gain insights into mobilisation challenges, community engagement and maintenance practice.
•Local administrators and project coordinators gave insights on implementation timelines, budgets, and interagency collaboration. The interviews were coded and thematically analysed from the transcripts to identify prevalent narratives linking to community ownership, sustainability and behaviour change.

3.3 Incident Reports and Case Documentation : Field visits took place in three villages, one each of which was from Marathwada, Vidarbha and Western Maharashtra; JalTara for example, which had been operational for more than a year. Observation was carried out on site for the following purpose:
• Review quality, depth and location accuracy of recharge pit construction.
• Evaluate vegetation growth around afforestation areas.
• Note water retention post-monsoon in borewells on adjacent shores. Various case studies were also reported from selected households showing great increases in agricultural productivity across all areas of the country to give a narrative view to support the empirical trend of improving agricultural productivity.

4. Project Overview

4.1 Origins and Objectives : The JalTara Initiative was developed as one of the focal-point initiatives to counter Maharashtra's ever deepening water crisis with a special focus on the rural sections of Maharashtra long suffering from groundwater shortage and seasonal drought. As a community-driven, scalable groundwater recharge program, the initiative was envisioned by the Government of Maharashtra, Art of Living Foundation, Rural Transformation Project as a partnership in 2021. By utilizing low-cost scientifically driven solutions to improve agricultural productivity in the face of climate change, restore groundwater levels in vulnerable farming communities, and build climate resilience among many others (Art of Living, n.d.; WELL Labs, n.d.). JalTara aims to build a community-managed self-sustaining ecosystem in country towns by integrating technical engineering and stewardship. It supports the state and national efforts to achieve water security and reduce monsoon rainfall dependency while promoting rural livelihoods.

4.2 Implementation Strategy

Figure 1. Key components contributing to JalTara success

4.2.1 Site Selection : The village selection was determined through the databacked assessment of groundwater stress. Districts with a history of low rainfall, high evapotranspiration and agricultural distress are particularly in Marathwada, Vidarbha, and parts of Western Maharashtra were prioritized. Within these districts, micro-watersheds and topographic low points were determined for intervention with satellite imagery and hydrological surveys. This allowed for the maximization of surface runoff to be utilized over the monsoon to percolate (WELL Labs, n.d.).

4.2.2 Community Engagement : The JalTara model is based on the pillars of grassroots participation. The project involved a group of trained youth volunteers called Yuvacharyas who served as an intermediary between implementing agencies and local farmers. These volunteers received training in soil-water conservation principles, pit construction, as well as the techniques of community facilitation. They were responsible for hosting door-to-door awareness drives, helping with site selection and ensuring proper post-construction maintenance and follow-up. The participatory approach encouraged ownership within the villagers, further bolstering the sustainability and social integration of the initiative (Art of Living, n.d.).

4.2.3 Construction Details : In the JalTara system, the primary intervention is constructing percolation pits—cylindrical or rectangular recharge pits generally 6 to 7 feet deep and 4 feet wide. These pits are excavated at the lowest levels within individual plots of farmland, following hydrological mapping. The layout admits vertical water infiltration from beneath and would aid in rejuvenation of the aquifers and enable replenishment against the monsoon. Each pit is used to take in, on average, thousands of liters of rainwater per year, a result of which runoff and soil erosion both are much less.

4.2.4 Afforestation Efforts: Each recharge structure has been supplemented with fruit crops that provide higher ecosystem value and sustainability such as guava, mango and lemon trees. These trees are a win-win: their roots improve soil structure and water absorption, and the fruits have extra dividends for farmers. And almost 90,000 trees have already been planted as part of this programme—these will work to preserve the carbon footprints and also boost biodiversity to protect microclimate and better conserve those areas participating (Art of Living, n.d.).

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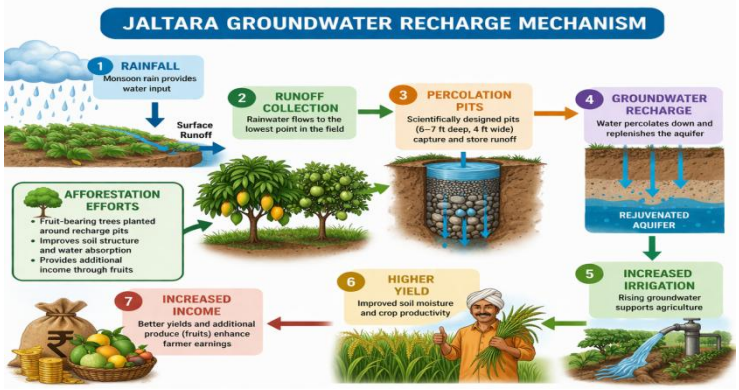

Figure2 . JalTara groundwater recharge mechanism

5. Impact Assessment: The JalTara Initiative has achieved considerable progress in improving rural water security and building off the country's agricultural capabilities all over Maharashtra. Within this chapter, the impact of the project is assessed using a blend of quantitative metrics on performance and qualitative field insights gleaned from records of program activities, third-party audits and inputs from participants.

5.1 Quantitative Outcomes : The effectiveness of the initiative against the context of groundwater scarceness and development is measurable and on a broad scale: • Positive Percolation Facilities: Over 45,500 percolation pits were built in 115 villages spread from Marathwada to Vidarbha, covering drought-prone areas, but not reaching a percolation infrastructure (Art of Living, n.d.).

• Groundwater Table Rise: Monitoring data showed an average rise of 14 feet in groundwater level on average due to increased percolation and decreased surface runoff (WELL Labs, n.d.).

• Cropping Seasonal Average Increase: Comparative cropping rates before and after implementation also indicate a 42 percent increase in crop production following the intervention which may have more water input during seasonal climatic seasons.

• Farmer income: A 120% rise in average farmers income in economic surveys after the intervention was found, as these farms increased their yield and their reliance on water tankers and borewell rentals decreased.

• Rural Employment: The scheme helped stimulate labour demand locally as an 88% rise in jobs during the Rabi season, especially for women and other marginal workers, was reported.

• Afforestation Impact: Approximately 90,000 fruit-bearing trees were planted to foster ecological restoration that covers an estimated 170,000 acres of the farmland. Pre-post comparison, field visit and digital tracking integrated in JalTara monitoring system confirmed the values.

Table 1: Pre- and Post-Intervention Impact of JalTara

Parameter	Before JalTara	After JalTara	% Change
Groundwater Level (ft)	Baseline	+14 ft increase	—
Crop Yield	100% (baseline)	142%	+42%
Farmer Income (₹/year)	100% (baseline)	220%	+120%
Employment (Rabi Season)	Moderate	High	+88%
Number of Trees	Minimal	90,000+	Significant

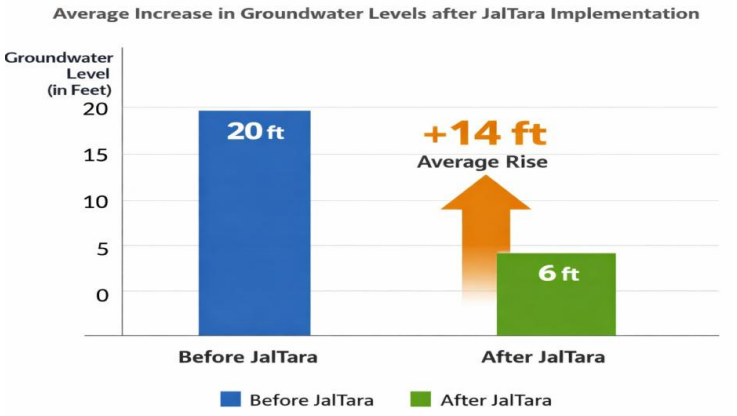

Figure 3. Average increase in groundwater levels after JalTara implementation

Crop	Baseline Productivity (Quintals per Acre)	Post-Intervention Productivity (Quintals per Acre)	Increase (%)
Wheat	9	14	56%
Maize	19	28	47%
Pigeon Pea	4	6.5	63%

Figure 4. Increase in agricultural productivity post-intervention

MSW MANAGEMENT -Multidisciplinary, Scientific Work and Management Journal
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Figure 5. Growth in farmer income following JalTara intervention

5.2 Qualitative Outcomes

These statistics aside, the JalTara initiative has generated significant benefits for the social fabric and environmental equilibrium of rural communities:

• Agriculture Sustainability: Farmers describe increased food security and the capacity to produce additional seasonal crops without depending on external irrigation.

• Soil Health and Erosion: A decrease in water stagnation and topsoil loss occurred in plots with recharge pits in addition to contour planning and vegetation buffer areas.

• Community Empowerment: The participatory nature of the initiative, especially the involvement of Yuvacharyas and local Panchayat members, promoted community ownership, skills development, and social cohesion.

• Behavioural Changes: The program provided training and exposure which facilitated farmers to adopt conservation-oriented practices (eg, mulching and organic fertilisation), and as a result, farmers became more proactive about this behaviour. Not only did the JalTara model act as a buffer against hydrological stress, the implementation of the integrated approach not only catalysed technical, ecological, and human capital dimensions, it catalyzed transformative rural development.

6. There Are Challenges and Lessons Learned: Although the JalTara Initiative has brought measurable advances in groundwater recharge as well as livelihoods in rural areas, the execution process revealed a few operational and contextual challenges. The recognition of these limitations is essential to refine the model and for its effective replication across a variety of geographic regions.

6.1 Maintenance and Upkeep of Recharge Structures : Among the main challenges encountered were siltation and blocked recharge pits due to intense monsoonal activities. This sediment accumulates, and this slowly compromises the infiltration of the pits leading to loss of effectiveness. Field-related studies indicate that in-field site observation revealed that pits located around unprotected slopes or near sites that trigger induced soil erosion require more de-silting interventions (WELL Labs, n.d.). Several villages may not have adhered to a plan for maintenance and had therefore affected variability of performance. This demonstrates the significance of the pit monitoring system and localized assigned maintenance tasks.

6.2 Awareness Gaps and Community Trainings: Although the early mobilization towards the community was strong, farmer knowledge had not adequately been developed in pit maintenance and ecological assimilation. The lack of clarity about the benefits of afforestation and the role of seasonal maintenance made the intervention still underutilized in some of the villages. While the Yuvacharya model provided a strong foundation for community engagement, improving that approach would require a greater orchestration of a series of repeated training programs adapted to local literacy levels and farming practices (Art of Living, n.d.). Knowledge needs to be periodically reinforced to ensure accountability and ownership for this society.

6.3 Scale and Contextual Adaptation: Scalability is a gift, but also a challenge as the campaign seeks to scale and to be spread out to other districts and states. JalTara found that the winning combination of political consensus formation, NGO engagement and community awareness which does not exist per se in all locations of Maharashtra was what led to its success. Soil permeability, aquifer depth, and rainfall are representative of such spatial heterogeneity - which justifies design adaptation of the approach to the site. Socioeconomic characteristics like landholding and caste patterns, as well as access to governance structures, also play a prominent role when it comes to participation and outcome. Therefore, replicating the model must require first hydrological assessments, custom training programmes and adaptive management standards, tailor-made for each new location.

7.Comparative Analysis: Water conservation has been a concern for state policy makers in Maharashtra for a long time, particularly in drought susceptible areas. Among initiatives that captured the spotlight in the last few years are Jalyukt Shivar Abhiyan and the JalTara Initiative; both programmes are designed to relieve water stress for its people, however, their type of policy is fundamentally different.

Table 2: Comparison with Jalyukt Shivar Abhiyan (JSA)

Criteria	JalTara Initiative	JSA
Approach	Bottom-up	Top-down
Site Selection	Scientific (GIS-based)	Generalized
Community Participation	High	Moderate
Sustainability	High	Moderate/Low
Groundwater Impact	Significant	Mixed

7.1 Strategic and Specialization Direction : Launched in 2015, the Jalyukt Shivar Abhiyan was envisioned to make Maharashtra drought-free, laying out megaprojects of infrastructure like check dams, farm ponds and nalla deepening throughout thousands of villages. Site selection was not a precise matter of hydrology, and the interventions were carried out without a suitable distinction on micro-watershed conditions (Down To Earth, 2023). The JalTara Initiative on the other hand, is using a scientific methodology for water recharge. Every intervention started with a topographic survey to figure out the lowest locations on arable land. Recharge pits—smaller decentralized structures—with geospatial accuracy to maximize rainwater percolation. JalTara's design stands apart from the more general and less site-based structures of JSA (WELL Labs, n.d.).

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7.2 Community Engagement and Capacity Development : JSA was primarily constructed by state contractors and other local authorities, with little local ownership of the system. The program involved gram panchayats, however, several analyses observed that poor maintenance, low public engagement and inadequate public participation after construction affect the sustainability of the program in the long run (Deshmukh et al., 2021). Unlike the other models, JalTara emphasizes community participation at the heart of its strategy. It deploys trained Yuvacharyas — local youth volunteers — to mobilize villagers and take responsibility for site identification and follow up with maintenance. It promotes grassroots involvement, farmer training, and co-ownership on a higher level to maintain the structure and change behaviour towards the conservation (Art of Living, n.d.)

7.3 Results and Performance and Sustainability: Results of JSA assessment in some remote areas are conflicting, with some villages reporting no increases in groundwater and some reporting siltation and structural failure as a consequence of poor quality construction and no checks given (Down To Earth, 2023). JalTara, but on the other hand, experienced actual results: average 14 feet increase in groundwater levels, 42% ag productivity gain, and farmers' incomes rising more than 120% in the first 12 month post-implementation (Art of Living, n.d.). Despite lower initial investments in afforestation and technical training versus JSA, this model's interplay in afforestation, technical training, and volunteer interaction has proven more sustainable than the former.

8.Future Prospects : With the evidence of the tangible success of the JalTara Initiative in both improving groundwater levels and enhancing livelihoods in the rural area in 115 villages in Maharashtra, it is arguably a strong candidate to be replicated and expanded. With the growing vulnerability, coupled with declining aquifers and agricultural volatility, of India, for a decentralized water conservation system such as JalTara to be scalable, it is of national significance.

8.1 Scaling to New Geographies : We are still in the early stages of developing plans to adapt the JalTara model to over 500 villages within the next two years, with the focus being on those regions that have particularly critical groundwater stress as noted by both CGWB and NITI Aayog's Composite Water Management Index. The project also entails the use of semi-arid zones, including parts of Madhya Pradesh, Rajasthan, Chhattisgarh and parts of Telangana, which replicate the hydro-geological profile of the original intervention zones in Maharashtra (WELL Labs, n.d.). The extension will maintain foundation building elements of JalTara—topographical analysis for the pit placement process, local ownership through trained Yuvacharyas and afforestation with fruit bearing species—and will be integrated with region specific soil and cropping approaches to optimize results (Art of Living, n.d.)

8.2 Policy Interposition and Policy Recommendations:

For JalTara to become genuinely sustainable and scalable, it would need to be situated within state and national policy ecosystems. The follow-up suggestions are made to support the inclusion of the intervention in the wider water conservation campaigns:

• Coherence with State Programmes: JalTara's approach could be used in other projects which include MGNREGS (for labour and pit building), Jal Shakti Abhiyan (for hydrological planning), Atal Bhujal Yojana (for community groundwater management) (Ministry of Jal Shakti, 2022)

• Embedding local water stewards: According to Yuvacharyas, the implication of this model is the need to institutionalise this role through state water missions, through capacity building, honoraria, and responsibilities for long-term monitoring at the local level (Art of Living, n.d.)

• Implementation of Monitoring Technology: IoT-based water sensors and remote sensing technologies can provide enhanced transparency and better measurement of groundwater recharge, reducing manual errors in it (WELL Labs, n.d.).

• Policy-Powered Incentives: Implement performance-linked grant or eco-credit programs where villages prove that they are successful on a sustainable recharge and afforestation model.

• Facilitating the transfer of knowledge: Developing open-source training documentation along with toolkits in regional languages would allow gram panchayats, NGOs and farmer cooperatives themselves to self-start similar interventions and reduce reliance on outside actors.

•Combining the JalTara model with multi-tier governance infrastructure, digital monitoring and community-led training, it has the potential to be a blueprint for nationwide water resilience.

9.Conclusion

An example of a success in integrating the scientific management of water, community engagement, and ecological restoration, The JalTara Initiative has a relatively inexpensive, scalable model. Adopting a micro-topographical approach to locate recharge structures and leveraging afforestation and local capacity building, the project has led to positive outcomes in groundwater levels, increased agricultural productivity, and increased rural incomes in drought-prone parts of Maharashtra. Unlike conventional top-down approaches, JalTara thrives on bottom-up work; local youth (Yuvacharyas) and farmers are enlisted as the most responsible for water conservation. Not only does this promote sustainability, but in doing so inspires environmental consciousness and custodianship at the grassroots level through behavior change.

The research validates that community-powered, hydrologically effective initiatives can significantly contribute to local ecosystems and societies for real and tangible environmental and socio-economic benefits. However, this needs to be embedded in the institutions, maintenance structures, and adapted to local settings within various geographies. Technology-enabled monitoring and collaborative governance frameworks need to become part of JalTara's scaling beyond the initial footprint. Assuming such conditions are met, the model holds great promise not only as a national and global reference in decreasing groundwater depletion, but also to promoting climate-resilient rural economies.

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