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Community Participation-Based Rural Drinking Water Management under the Aapni Yojana in Rajasthan: A Geographical Evaluation of Implementation, Impact and Sustainability

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ABSTRACT

The Aapni Yojana ("our scheme") is a canal-based rural water supply, sanitation and health-education programme jointly funded by the German development bank KfW and the Government of Rajasthan, in which village Water and Health Committees (WHCs) manage internal distribution, pay for metered bulk water and maintain village systems. This paper evaluates its implementation, impact and sustainability in northern Rajasthan—Churu, Hanumangarh and Jhunjhunu districts, on the northern fringe of the Thar—using the implementing agency's 2001 achievement report, the independent KfW ex-post evaluation (2010), a 2022 groundwater impact study, press reports and the 2026 audit of the Jal Jeevan Mission (JJM) by the Comptroller and Auditor General (CAG) as a comparator. The Initial Agreement was signed on 18 August 1994; Phase I targeted about 9 lakh people in 370 villages and two towns over about 20,000 km². In 2000–01 every commissioned village paid its water bills on time, with consumption of about 33–43 litres per capita per day, and by 2010 villages still paid 100 per cent of billed amounts. KfW nevertheless rated overall success "unsatisfactory" (level 4): only 8 per cent of users had 24-hour supply, technical losses were 30–40 per cent, tariffs were never raised, and about 25 per cent of operation-and-maintenance (O&M) costs were recovered. A 2016–2020 study in Taranagar block found no recovery of groundwater. The case shows that community management can secure payment and village-level upkeep but not system-level financing, and lessons for JJM are drawn.

Keywords: Aapni Yojana; community participation; rural water supply; Thar Desert; Churu; Water and Health Committee; sustainability; Jal Jeevan Mission

INTRODUCTION

Rural drinking-water programmes in India have repeatedly delivered infrastructure faster than they have sustained services. The implementers of the Aapni Yojana attributed earlier failures in Rajasthan to heavy wastage of unmetered or free water, lack of community ownership, siting of village installations without consultation, neglect of hygiene, unresponsive local bodies, a purely technical outlook in the engineering department and the absence of cost recovery (Sharma et al., 2002). Successive national programmes—from the National Drinking Water Mission (1986) and Swajaldhara (2002) to the National Rural Drinking Water Programme—preceded the Jal Jeevan Mission (JJM), launched in 2019 (CAG, 2026).

The Aapni Yojana ("our scheme" in Rajasthani and Hindi idiom) was designed to address these problems in the northern Thar, where groundwater is saline and fluoride-contaminated. It rests on an Initial Agreement signed between the Government of Rajasthan and KfW on 18 August 1994 and combines canal-based bulk supply with village-level management by WHCs. Its implementers described it as the first use of community participation in the State's drinking-water sector (Sharma et al., 2002).

The programme's long life—from the 1994 agreement to an independent evaluation in 2010 and groundwater studies after 2016—offers rare evidence on what happens after the project phase. This paper asks, from a geographical perspective: (i) how did the physical setting shape the design; (ii) how was participation organised in space; (iii) what were the impacts; (iv) was the system sustainable; and (v) what follows for JJM?

Study Area and Geographical Context

The project area covers about 20,000 km² in Churu, Hanumangarh and Jhunjhunu districts of northern Rajasthan (Sharma et al., 2002). In Moharana's (2017) agro-climatic classification, Churu lies in the arid western plain, Hanumangarh in the irrigated north-western plain and Jhunjhunu in the transitional plain of inland drainage. Mean annual rainfall falls from 402 mm in Jhunjhunu to 366 mm in Churu and 251 mm in Hanumangarh, with coefficients of variation (CV) of 36, 37 and 56 per cent respectively (Table 1). The implementers describe the three districts as blended into the Thar, with harsh living conditions and scarcity of water (Sharma et al., 2002).

Table 1. Physical and service context of the three Aapni Yojana districts

District	Agro-climatic zone	Mean annual rainfall (mm)	CV (%)	Rural households with tap water, 21 May 2026 (%)
Churu	Arid western plain	365.7	37	67.53
Hanumangarh	Irrigated north-western plain	250.5	56	90.89
Jhunjhunu	Transitional plain of inland drainage	402.0	36	54.34

Sources: *rainfall and zones, Moharana (2017); tap-water coverage, JJM 'Har Ghar Jal' dashboard (printed 21 May 2026). Tap-water coverage includes all piped schemes, not only the Aapni Yojana.*

Groundwater is the central constraint. The implementers describe the area's groundwater as saline and contaminated with high levels of fluoride, leaving irregular rainwater and wells as the main sources (Sharma et al., 2002). KfW (2010) concluded that a decentralised groundwater-based supply was not possible because of the high salt content, and Sheikh (2022) records that supply is drawn from the Indira Gandhi Canal because local groundwater is insufficient and saline. CGWB (2024) lists Churu, Hanumangarh and Jhunjhunu among the districts with localised anomalies in groundwater quality.

Before the project, households relied on rainwater *kunds* (cylindrical wells 10–15 m deep with lime-and-stone walls, a dome and a sloping lime-plastered catchment), *joharas* (large open community ponds, used mainly for cattle), ground-level reservoirs and wells. In a baseline survey of 10 of 37 villages (30 households each), 32 per cent of households were already paying for water directly or indirectly, more than 70 per cent were dissatisfied with supply and 87 per cent were willing to pay for better service, at an average of Rs 24.70 per household per month; average family income was Rs 27,671 a year (Sharma et al., 2002).

Data and Evaluation Framework

This is a desk-based evaluation of secondary sources; no primary survey was conducted. The principal sources are the achievement report of the Community Participation Unit (CPU) for 2000–01 (Sharma et al., 2002), the ex-post evaluation by KfW (2010), a 2022 groundwater impact study (Sheikh, 2022), press reports of 2006 and 2014, and the CAG (2026) performance audit of JJM in Rajasthan, used as a comparator. The analysis is organised around implementation (inputs, time, cost, coverage), impact (water availability, payment, health, gender, groundwater) and sustainability (financial, technical, institutional, environmental). KfW's own criteria—relevance, effectiveness, efficiency, overarching developmental impact and sustainability, rated on a six-point scale in which levels 1–3 are successful and 4–6 are not—provide an external benchmark. Two cautions apply: the CPU report is a self-assessment by an implementing agency and relates to the first villages commissioned (2000–01), and project figures differ between sources (for example, 355 to 385 villages).

Project Design and Implementation

4.1 Chronology, scale and cost

The Initial Agreement between Rajasthan and KfW was signed on 18 August 1994; the CPU entered its first village in June 1997, the first 50 villages were connected by mid-2000 and 117 villages were commissioned between March 2000 and March 2001 (Sharma et al., 2002). Phase I targeted about 9 lakh people in 370 villages and two towns (Taranagar and Sardarshahar) at a cost of Rs 402.57 crore (Sharma et al., 2002). KfW (2010) records a planned implementation period of 65 months from the third quarter of 1993 against an actual 144 months from the fourth quarter of 1994, and investment costs of EUR 91.24 million against EUR 72.10 million planned. Two central water-supply systems were built. Phase II was not funded by KfW because of difficult sector conditions and weak performance of the executing agency, but the Indian side extended connection and distribution lines from its own funds, so that by 2010 the systems served about 1.37 million people (1.02 million rural) in 512 villages and six small towns (KfW, 2010). Reported village counts vary with source and date (Table 2).

Table 2. Aapni Yojana: programme profile

Parameter	Details	Source
Agencies	KfW (Germany) and Public Health Engineering Department (PHED), Government of Rajasthan; Project Management Cell (PMC) of PHED for technical works; Community Participation Unit (CPU), a consortium of five NGOs, for community measures	Sharma et al. (2002); KfW (2010)
Key dates	Initial Agreement 18 August 1994; CPU in first village June 1997; first 50 villages connected by June 2000; 117 villages commissioned by March 2001	Sharma et al. (2002)
Project area	About 20,000 km² in Churu, Hanumangarh and Jhunjhunu districts	Sharma et al. (2002)
Phase I target	About 9 lakh people; 370 villages and two towns (Taranagar, Sardarshahar); Rs 402.57 crore	Sharma et al. (2002)
Raw water	Indira Gandhi Feeder Canal (Harike barrage); stored, treated and pumped to village clusters	Sharma et al. (2002); Times of India (2014)
Cost and time (KfW)	Planned EUR 72.10 million and 65 months; actual EUR 91.24 million and 144 months (excluding the complementary measure)	KfW (2010)
Scale by 2010	About 1.37 million people (1.02 million rural) in 512 villages and six small towns; 360 WHCs	KfW (2010)
Reported villages	355 (IIHMR); 370 (CPU); 378 (UNI); 385 (KfW)	IIHMR (n.d.); Sharma et al. (2002); UNI (2006); KfW (2010)

Source: *as listed in the table.*

4.2 Hydraulic and spatial design

Raw water is drawn from the Indira Gandhi Feeder Canal, stored and treated; it then passes through clear-water reservoirs and booster pumping stations to elevated service reservoirs (ESRs), each serving a cluster of villages through a transfer network to public stand posts (PSPs) and cattle water troughs (Sharma et al., 2002). The CPU described the water as coming from Himalayan rivers about 600 km away. The design allotted one PSP with two taps per 150 persons, based on the 1991 population, and extra PSPs could be added against a 50 per cent community cost contribution (Sharma et al., 2002). The reliance on a distant surface source follows from geology: groundwater is too saline for decentralised supply, which also explains the very high specific investment of about EUR 120 per user for roughly 780,000 users, since the Phase I production facilities were sized for 2.6 million people (KfW, 2010).

4.3 Institutions

The PMC executes technical works and collects rural water charges, while the CPU—led by the Indian Institute of Health Management Research (IIHMR), Jaipur, with the Indian Institute of Rural Management, Jaipur, Gandhi Vidya Mandir (Sardarshahar), Bhoruka Charitable Trust (Churu) and Urmul Setu Society (Bikaner)—handles community measures (Sharma et al., 2002). In each village a five-member WHC—communicator (president), caretaker, payment collector, sanitation representative and women's representative—signs an agreement with the PMC, deposits security

equal to one month's charges and manages internal distribution. WHCs of villages fed by the same ESR form a Pani Panchayat, later federated, which represents users to the State and the operator (Sharma et al., 2002; KfW, 2010).

Community Participation in Practice

Mapping, siting and labour. Residents prepared a social village map through participatory rural appraisal, showing water sources, streets, houses, schools, health facilities and caste distribution. These maps guided mohalla-wise siting of PSPs and cattle troughs, with women's views given weight and technical feasibility cross-checked by PMC engineers (Sharma et al., 2002). Villagers supplied unskilled labour for trenching and pipe-laying—about 140 km of trench in the first 117 villages (Sharma et al., 2002)—which the implementers saw as a source of ownership.

Metering, payment and village funds. Bulk water is metered at the village, and a monthly bill is issued to the WHC. The WHC apportions it among households through a village-specific payment model that often resembles the traditional *aangan* system (Sharma et al., 2002; KfW, 2010). Prompt payment earned a rebate (20 per cent in the CPU account) and a 10 per cent maintenance allowance credited to a Village Water Fund; by March 2001 the first villages held about Rs 1 million in these funds and had replaced more than 500 taps (Sharma et al., 2002).

Women and social inclusion. Each WHC includes a women's representative, stand-post attendants (user-group leaders) are generally women, and the CPU aimed at 50 per cent female representation in WHCs in new villages. By March 2001 women's groups existed in 138 villages (1,907 members) and 67 self-help groups (722 members) had saved Rs 1,65,830 (Sharma et al., 2002). Constraints remained: in the baseline survey, 56 per cent of households stressed son preference and 46 per cent of female members were not allowed to go out of their homes (Sharma et al., 2002).

Sanitation and traditional sources. The programme packaged water with sanitation and health education: 5,782 sanitation units had been built by March 2001 and school sanitation work had begun in 200 villages. It also rehabilitated community kunds and joharas as back-up sources, since communities kept using them when piped supply failed, while many public kunds and joharas had been neglected (Sharma et al., 2002).

Impacts

Availability and payment. In the villages commissioned by March 2001, the population served rose from 28,772 (April 2000) to 132,343 (March 2001); per capita consumption ranged from 43.4 litres per day in May 2000 to 32.9 in January 2001 and stayed below 40 litres after the first months, when users filled household tanks and kunds; and every village paid its charges on time in each of the 12 months (Sharma et al., 2002). KfW (2010) reports rural consumption of up to 60 litres per capita per day and 100 per cent collection of billed amounts in villages (80–90 per cent in towns). A 2014 press report described over 350 villages and 9 lakh people supplied for 7–8 hours a day, with more than Rs 5 crore deposited annually by villages and almost no defaulters (Times of India, 2014).

Health, time and welfare. KfW's sample interviews indicated a clear reduction in water-borne gastrointestinal illness among people and in diseases of livestock attributed to saline groundwater, and less time and money spent obtaining water, although systematic health data were not available (KfW, 2010). The CPU observed that women's time was largely absorbed by fetching water for the family (Sharma et al., 2002); the effect on women's time was not measured in the sources reviewed.

Service quality. Supply did not match the design as the system expanded: only 8 per cent of users had 24-hour supply and over 92 per cent had intermittent supply owing to the enlarged supply zone and operating deficiencies, forcing household storage that reduces quality; water-quality checks were irregular and WHO standards appeared to be met only at times; and technical losses of 30–40 per cent kept consumption below target (KfW, 2010). The contrast with the 24-hour supply reported for the first 117 villages in 2001 (Sharma et al., 2002) is consistent with the later extension of the network.

Groundwater. Imported canal water substitutes for drinking-water sources but does not by itself restore aquifers. A 2016–2020 study in Taranagar block found that groundwater levels did not rise after the project, as had been expected, that the water table continued to fall and quality to deteriorate, and recommended household rainwater storage to reduce groundwater use (Sheikh, 2022).

Table 3. Aapni Yojana: planned versus observed performance

Indicator	Plan / benchmark	Observed	Source
Payment of bills	All billed water paid	All villages paid on time in each month, April 2000–March 2001; 100% collection in villages in 2010	Sharma et al. (2002); KfW (2010)
Consumption (villages)	35 litres per capita per day	32.9–43.4 litres (2000–01); up to 60 litres (2010)	Sharma et al. (2002); KfW (2010)
Continuity	Year-round supply; interruptions ≤14 days a year	24-hour supply in 117 villages (2001); 24-hour for 8% of users and intermittent for over 92% (2010); 7–8 hours a day (2014 report)	Sharma et al. (2002); KfW (2010); Times of India (2014)
Water quality	WHO guidelines at point of supply	Testing irregular; WHO standards met only at times	KfW (2010)
Technical losses	—	30–40 per cent	KfW (2010)
O&M cost recovery	Full recovery five years after start of operation, with tariff increases	About 25 per cent; tariffs never raised	KfW (2010)
Time and cost	65 months; EUR 72.10 million	144 months; EUR 91.24 million	KfW (2010)
KfW ratings (1 = very good; 6 = no impact)	—	Overall 4; relevance 2; effectiveness 3; efficiency 4; overarching impact 3; sustainability 4	KfW (2010)

Source: as listed in the table. lpcd = litres per capita per day.

7. Sustainability Assessment

KfW (2010) rated relevance "good" (2), effectiveness and overarching impact "satisfactory" (3), but efficiency and sustainability "unsatisfactory" (4), giving an overall rating of 4. Four strands of its reasoning are relevant here.

Financial. Water tariffs were never raised although the Government of Rajasthan had consented; with inflation averaging about 8 per cent a year and operating subsidies not provided in adequate amounts, O&M cost recovery reached only about 25 per cent five years after supply began, against the plan of full recovery. Funds sufficed only for essential repairs, and facilities were gradually neglected (KfW, 2010). Full collection of village bills could not compensate.

Technical. Water meters and control equipment proved less durable than other components, and losses of 30–40 per cent undermined volumes (KfW, 2010). The CPU's own 2001 stocktaking had flagged irregular supply, tardy O&M and the need for dependable spare parts, tool kits and trained mechanics (Sharma et al., 2002).

Institutional. The village layer proved resilient: about 360 WHCs still operated village systems in 2010, and the Pani Panchayat structure continued to represent users (KfW, 2010). The system layer did not: the autonomous operating organisation planned under a 2007–2009 complementary measure had not been established, and the Indian side was reportedly exploring the involvement of a private operator (KfW, 2010). Implementers had earlier warned of frequent PMC staff transfers, of WHCs' dependence on the CPU and of the need for timely transfer of the 10 per cent maintenance allowance to village funds (Sharma et al., 2002).

Environmental and spatial. KfW (2010) found no negative ecological impact, since the raw water comes from a water-rich region. The same geography, however, entails long conveyance, high per-user investment and no local recharge benefit, and groundwater in Taranagar block did not recover (Sheikh, 2022).

Assessment. The evidence points to a mismatch of scales. Community institutions handled village-scale tasks—siting, labour, local repair, collection—effectively, but cluster- and system-scale tasks—treatment, trunk mains, tariff-setting and operator accountability—stayed with the State and were under-financed.

8. Lessons for the Jal Jeevan Mission Era

JJM adopts a similar logic—a village committee as local water utility, demand-driven delivery and community contribution—but the 2026 audit of Rajasthan shows gaps that the Aapni Yojana had addressed in part (Table 4).

Table 4. Aapni Yojana and JJM in Rajasthan compared

Feature	Aapni Yojana (Churu, Hanumangarh, Jhunjhunu)	JJM in Rajasthan (CAG, 2026)
Metering and billing	Bulk meter per village; monthly bill to the WHC; all billed amounts paid by villages (Sharma et al., 2002; KfW, 2010)	No tariff structure or billing system; metered connections not in scheme design; 407 of 560 surveyed beneficiaries (72.68%) willing to pay user charges
Community institution	WHC per village; Pani Panchayat per ESR cluster; five-NGO CPU for training and mobilisation	Village Water and Sanitation Committee (VWSC) at village / Gram Panchayat level; Nal Jal Mitras selected in 8,842 of 11,208 Gram Panchayats (78.89%) up to June 2024
Handover and O&M	WHCs sign agreements with the PMC, pay a security deposit and keep a village water fund	Only 858 of 2,785 in-village schemes (30.81%) handed over to VWSCs; 39 of 682 (5.72%) in seven test-checked districts
Source sustainability	Distant canal source; traditional kunds and joharas rehabilitated as back-up; local groundwater not recovering (Sheikh, 2022)	No scheme planned under Annual Action Plans 2019–24 for direct source recharge; of nine groundwater-based sampled villages, seven had no provision and two did not execute it
System financing	Tariffs never raised; about 25% of O&M costs recovered (KfW, 2010)	O&M policy awaited; State said (November 2025) that tariffs and handover would follow its approval

Sources: *Sharma et al. (2002), KfW (2010), Sheikh (2022) and CAG (2026).*

Five lessons follow. First, **metering and tariffs**: bulk metering with monthly billing underpinned the Aapni Yojana's full collection record, whereas JJM in Rajasthan has neither. Second, **match institutions to hydraulic units**: ESR-cluster Pani Panchayats mirrored the hydraulic geography of the network. Third, **finance the system layer**: community payment cannot substitute for an operating subsidy or an accountable operator. Fourth, **pair imported water with local storage and recharge**: the CPU's rehabilitation of kunds and joharas, and the recommendation of household rainwater storage by Sheikh (2022), point to a hybrid model. Fifth, **evaluate independently and early**: the KfW evaluation exposed financial weaknesses that village-level success had masked.

CONCLUSION

The Aapni Yojana demonstrates that rural communities in a water-scarce desert margin will pay for metered, reliable water, maintain village networks and manage distribution fairly: villages met 100 per cent of billed charges in 2000–01 and again in 2010, and users and water committees were still functioning in 2010. It also shows the limits of community management when it is attached to a large, expensive, State-operated bulk system: tariffs were not revised, only a quarter of O&M costs were recovered, supply became intermittent as the network expanded, and KfW rated overall success unsatisfactory. Geographically, the project's strengths lay at the village and cluster scales, and its weaknesses at the scale of the whole system and of the aquifer. For JJM in Rajasthan, the implication is that community participation is necessary but not sufficient: metering, tariffs, O&M financing, an accountable operator and local source sustainability must be designed together. Future research should combine household surveys with GIS-based mapping of supply reliability and groundwater change across the three districts, because the sources reviewed here are largely from 2001–2010 and later primary evidence is thin.

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