Source sustainability and greywater management in rural areas of Rajasthan

Learnings from the ground on the state of local water sources – identifying the gaps and challenges – case study, Pali

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Aim and objective

- Understanding the source of supply: quality and quantity aspects
- Effectiveness of the Single or Multi village schemes – what is working and what is not working
- Understand the Operation & Maintenance (O&M) of the piped water supply
- Community engagement, their aspirations and involvement in O&M
- State, District and block-level systems and structures supporting the village VWSCs

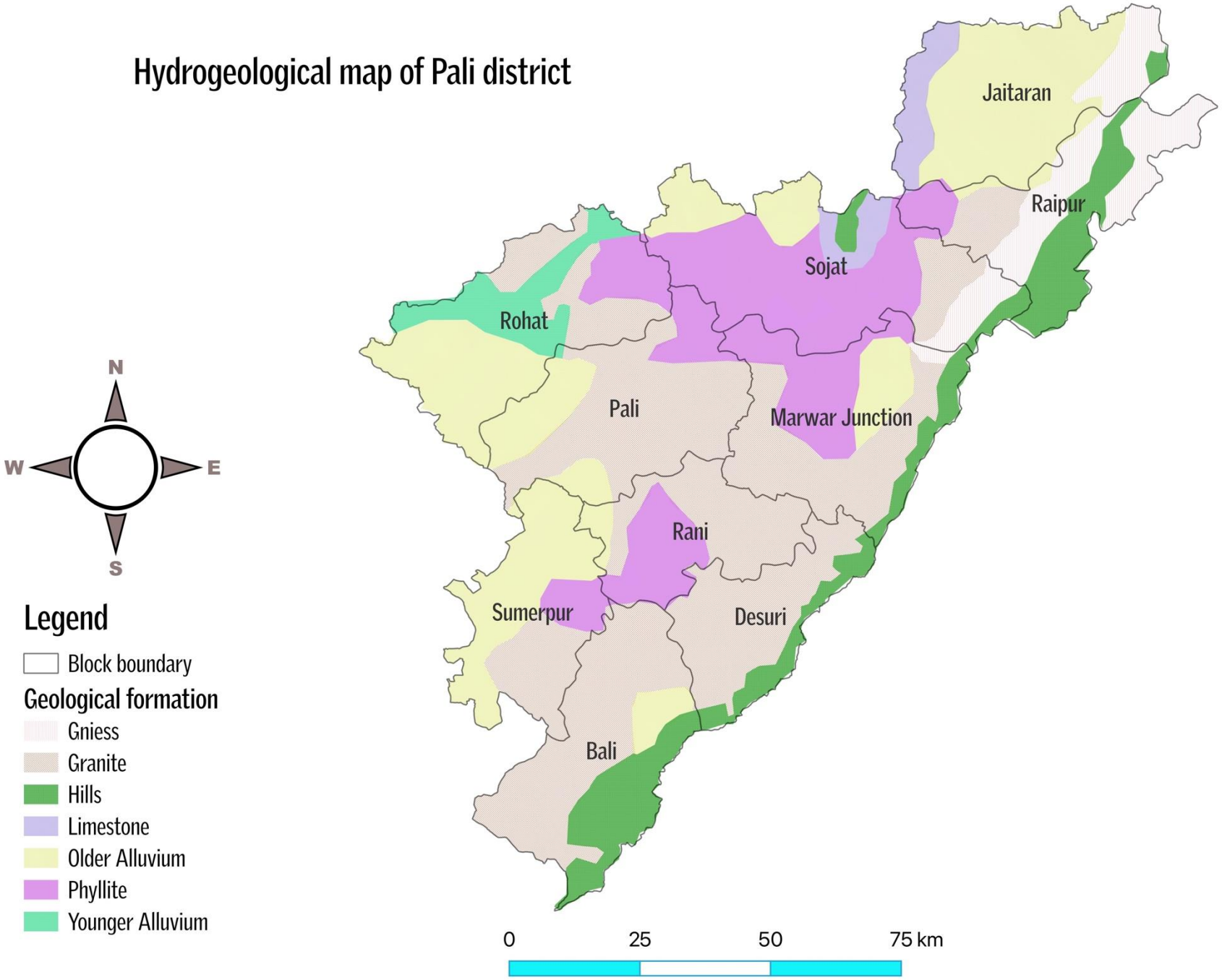
Criteria for selection of study area

District	Block	Village	Total HH	HH Coverage	Rock Type	Har Ghar Jal status (Reported/Certified)	Type of water supply scheme (SVS/MVS)
Pali	Bali	Velar	266	90.23%	Granite		SVS
		Kothar	961	100%	Granite	Reported	SVS
		Bardi	353	60.97%	Granite		SVS
		Khetarli	254	7.87%	Older Alluvium		SVS
		Goriya	641	4.06%	Gneiss		SVS
	Sumerpur	Barli	151	100%	Older Alluvium	Certified	MVS
		Gogra	364	0%	Older Alluvium		SVS
		Rojra	326	54.29%	Granite		SVS
		Basant	598	100%	Granite	Certified	MVS
		Dholasasan	221	100%	Granite	Reported	SVS
	Rani	Keerwa	500	100%	Older Alluvium	Reported	MVS
		Vingarla	227	100%	Phyllite	Certified	SVS
		Pratapgarh	33	100%	Granite	Certified	SVS
		Septawa	167	100%	Granite	Reported	SVS
		Nawagura	497	100%	Older Alluvium	Certified	MVS

Coverage of study

Name of the district	Number of blocks covered	Number of Villages covered	No. of HHs covered	Number of population covered
Pali	3	15	281	1613

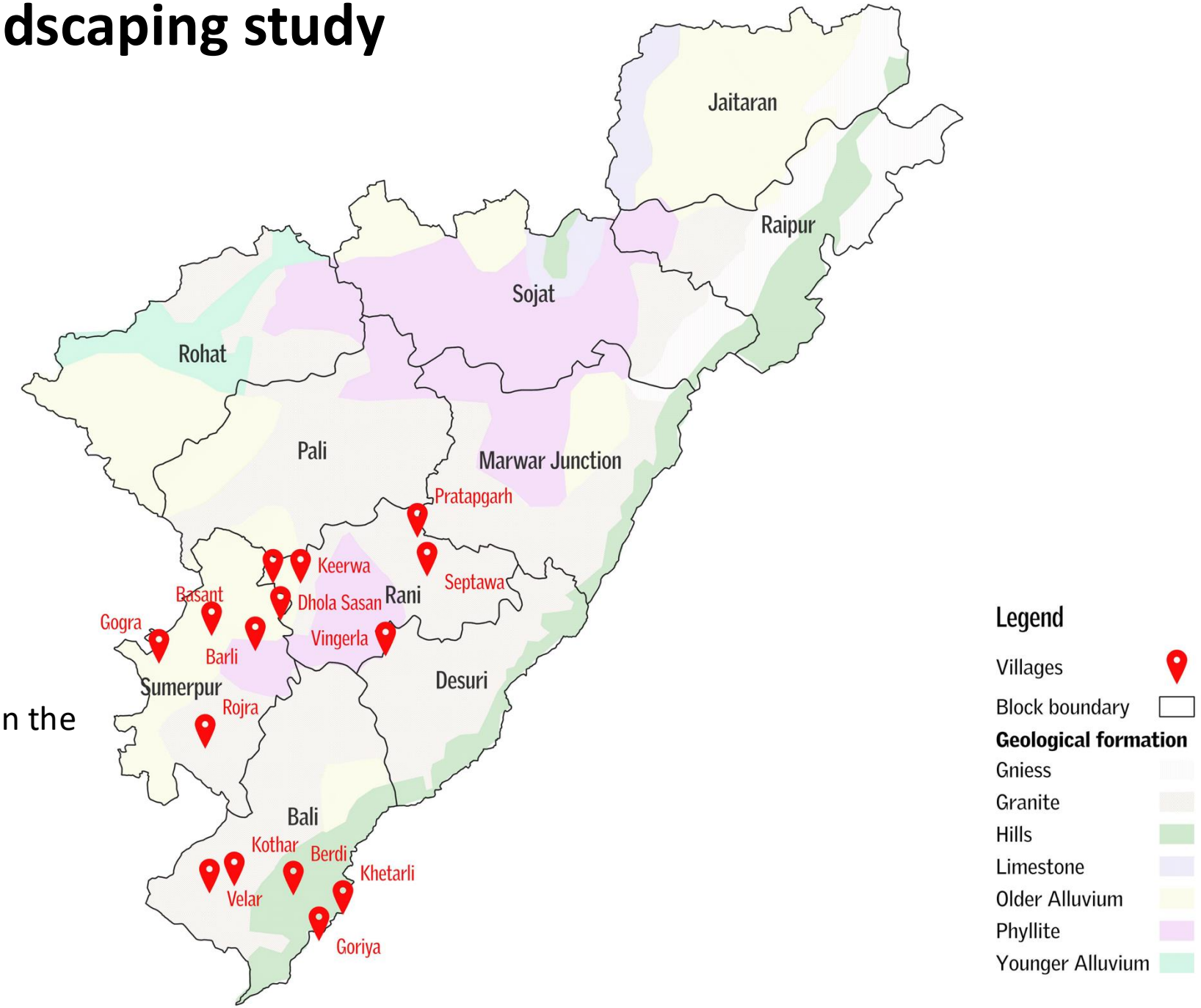
Hydrogeological map of Pali district



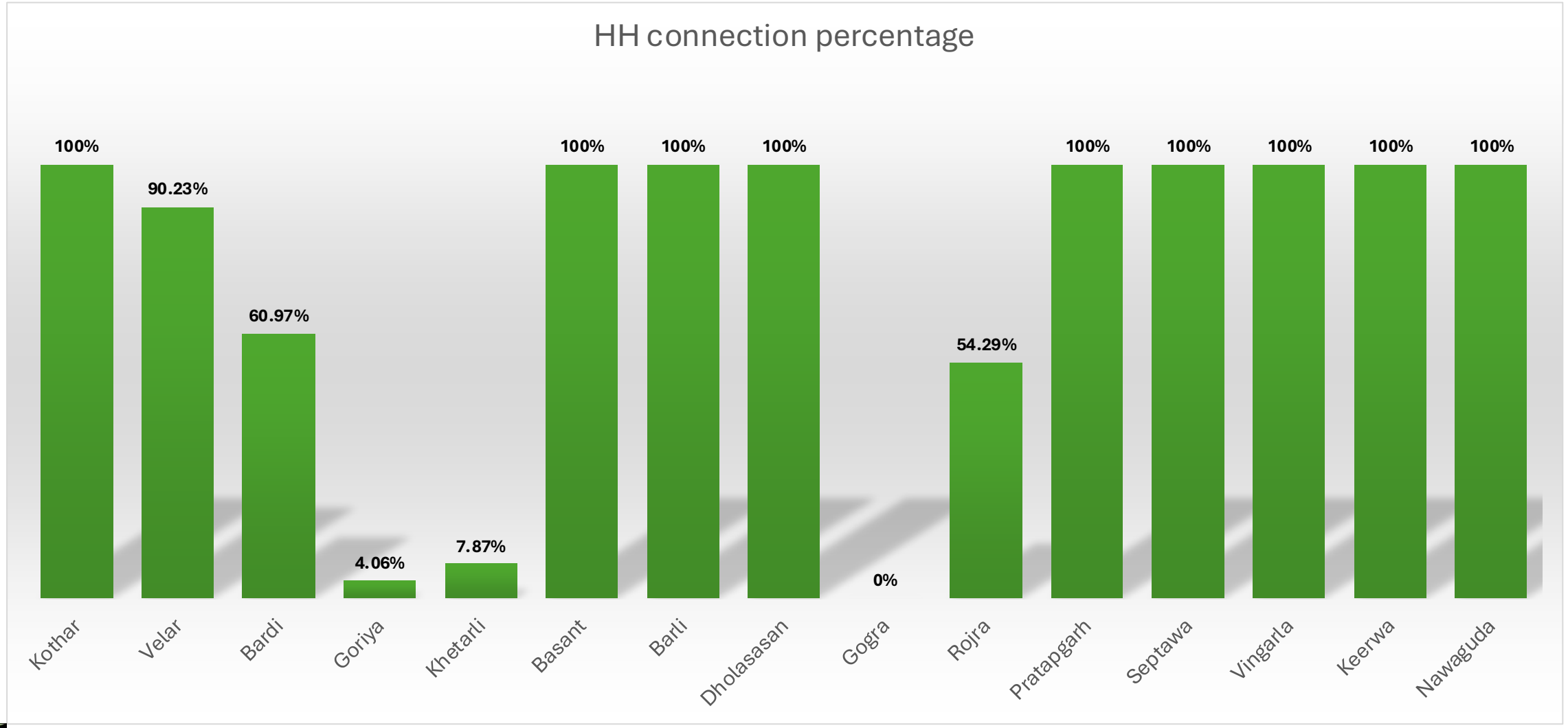
Source: Central Groundwater Board

Selected villages for landscaping study

CSE sampled 15 villages in 3 blocks of Pali district. The villages were selected based on the topography/hydrogeology/population/JJM coverage



Status of Household Water Supply under Jal Jeevan Mission

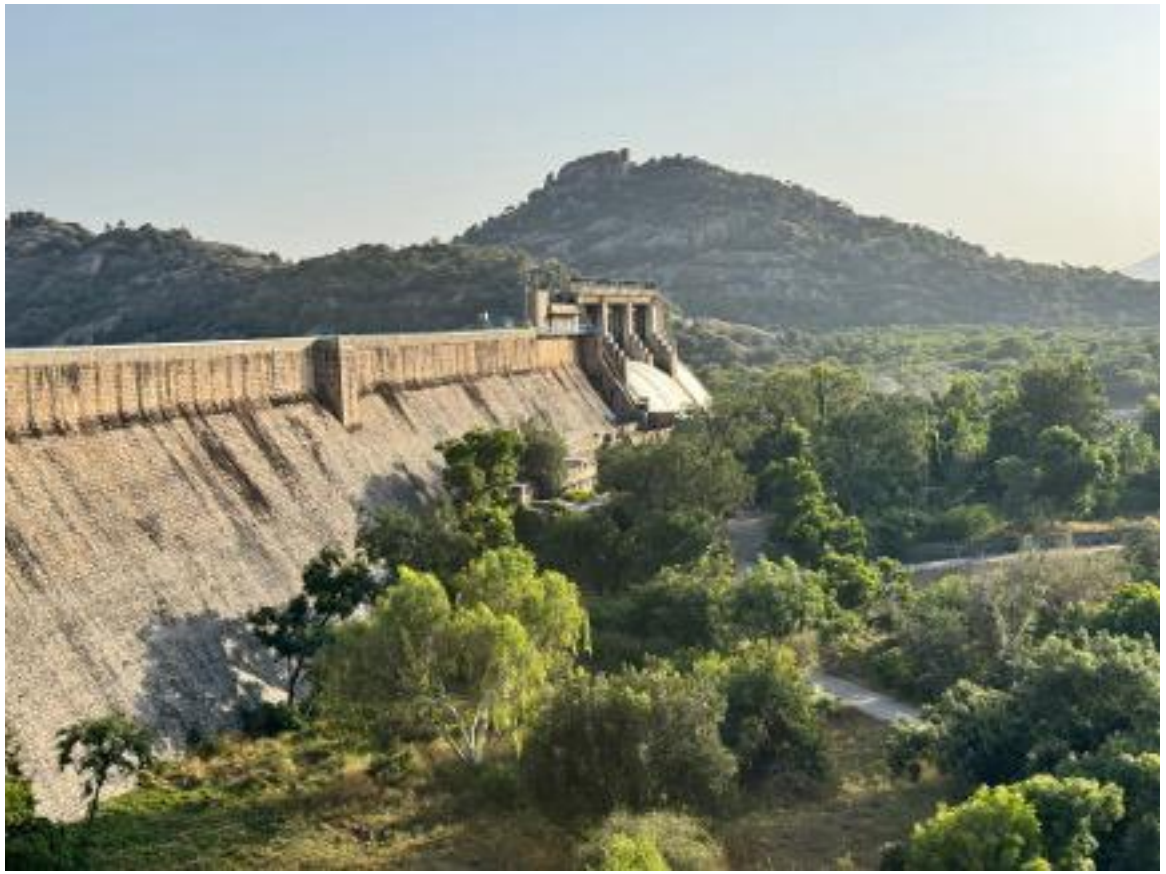


Source: JJM Dashboard, as viewed on September 26, 2025

Sources of drinking water supply

Groundwater (Local Sources)

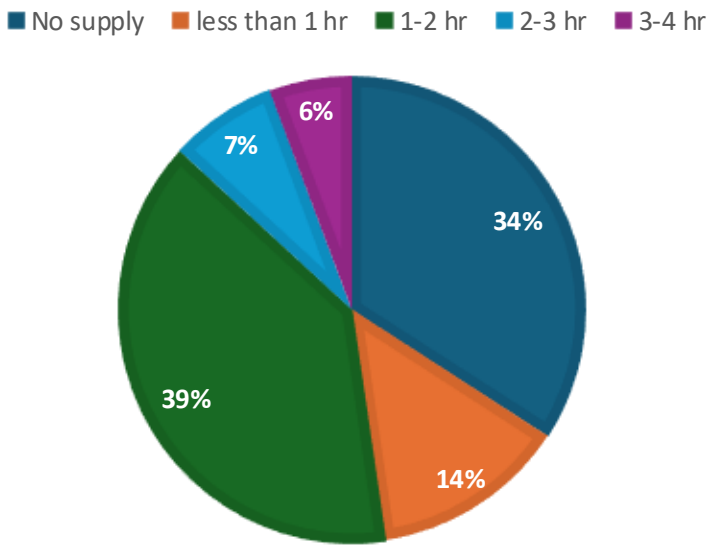
Surface Water (Jawai Dam)



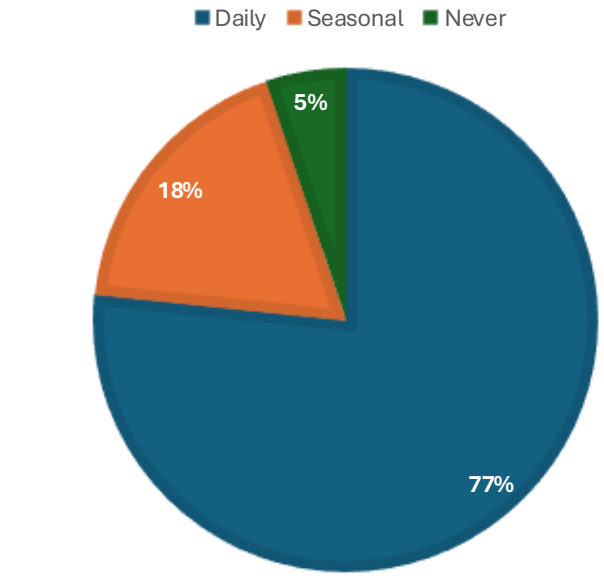
Gaps and Challenges in drinking water supply

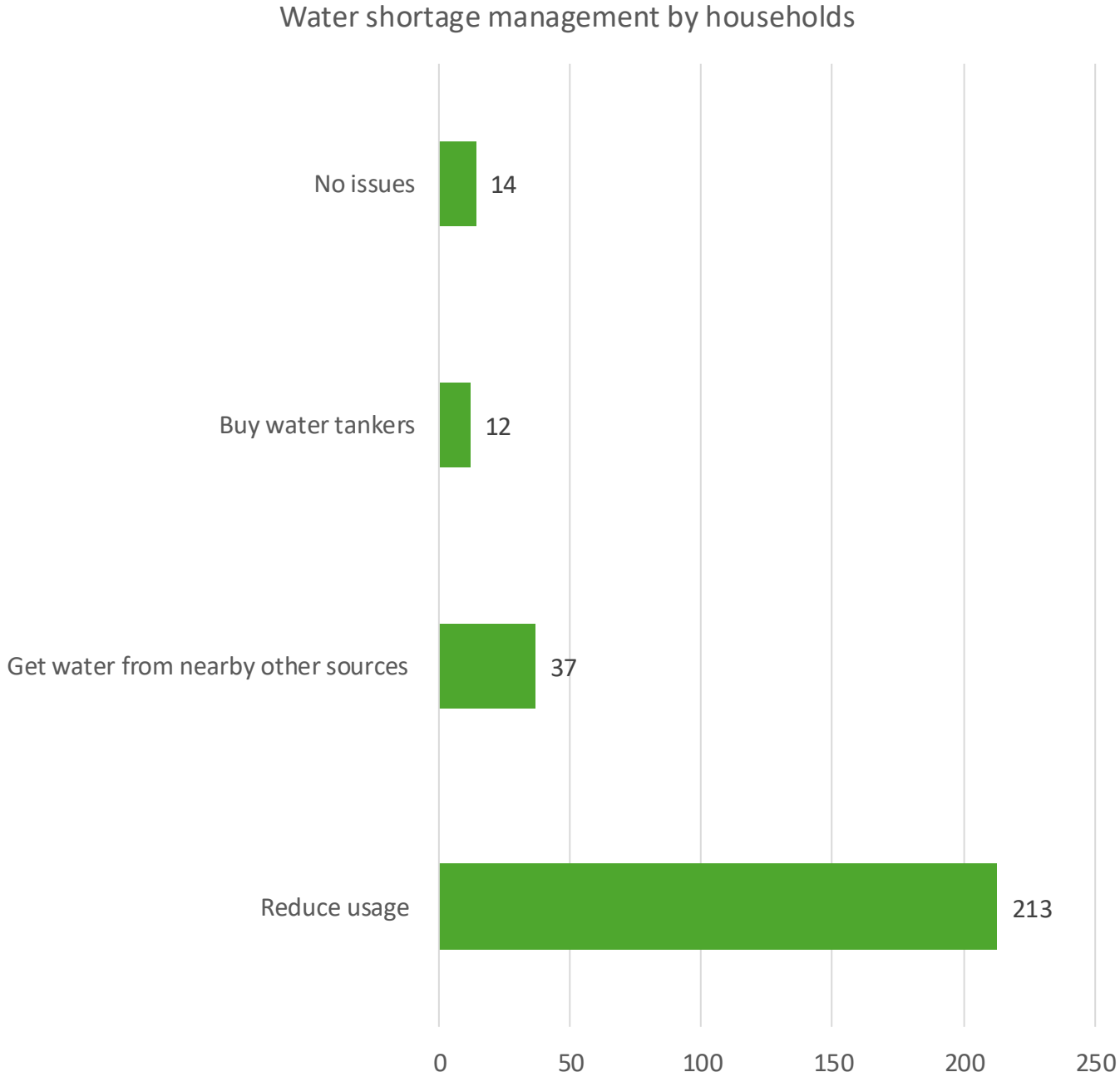
- 70 percent of surveyed households have tap connections provided, but only 66 percent were functional
- 40 percent of surveyed villages are not getting household water supply – either due to infrastructure not yet available, or operational issues
- Households reported that supplied water is not sufficient to meet the household demands
- Absence of mechanism to measure water received at household level
- Household water supply is not regular (once in two days to once in 4 days)
- Local water sources play a vital role in sustaining the drinking water supply

SITUATION OF WATER SUPPLY IN SURVEYED HOUSEHOLDS



WATER SHORTAGE IN SURVEYED HOUSEHOLDS





Sustainability of local water sources

- Local decentralized water sources are still playing crucial role in supplementing drinking water supply in rural areas
- In case of irregular or insufficient water supply through surface water source (Multi Village Schemes), the local sources are used to fetch water for domestic uses
- Lack of mapping of local water sources, potential for household water supply
- The sustainability of these local sources is often ignored, and the sources get defunct. The decentralized water infrastructure has been abandoned; In Pali, 40 % open wells; 55 % handpumps and 32% borewells were found abandoned.
- No groundwater recharge structures have been planned or constructed to recharge these local water sources in any of the surveyed village

Water supply sustainability is a huge challenge.

Local groundwater-based sources used for supplying drinking water to households

Open well used for supplying drinking water in village Velar, Bali block

Open well used for supplying drinking water in village Basant, Sumerpur block

Borewell used for supplying drinking water in village Keerwa, Rani block

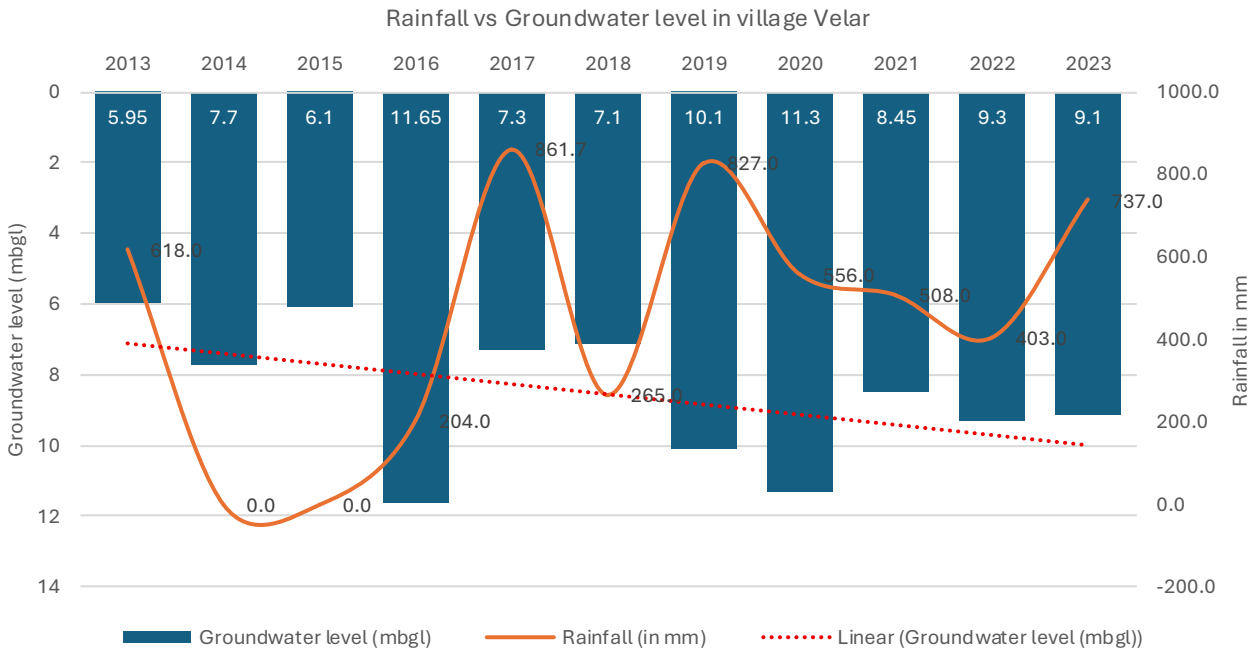
Borewell used for supplying drinking water in village Rojra, Sumerpur block

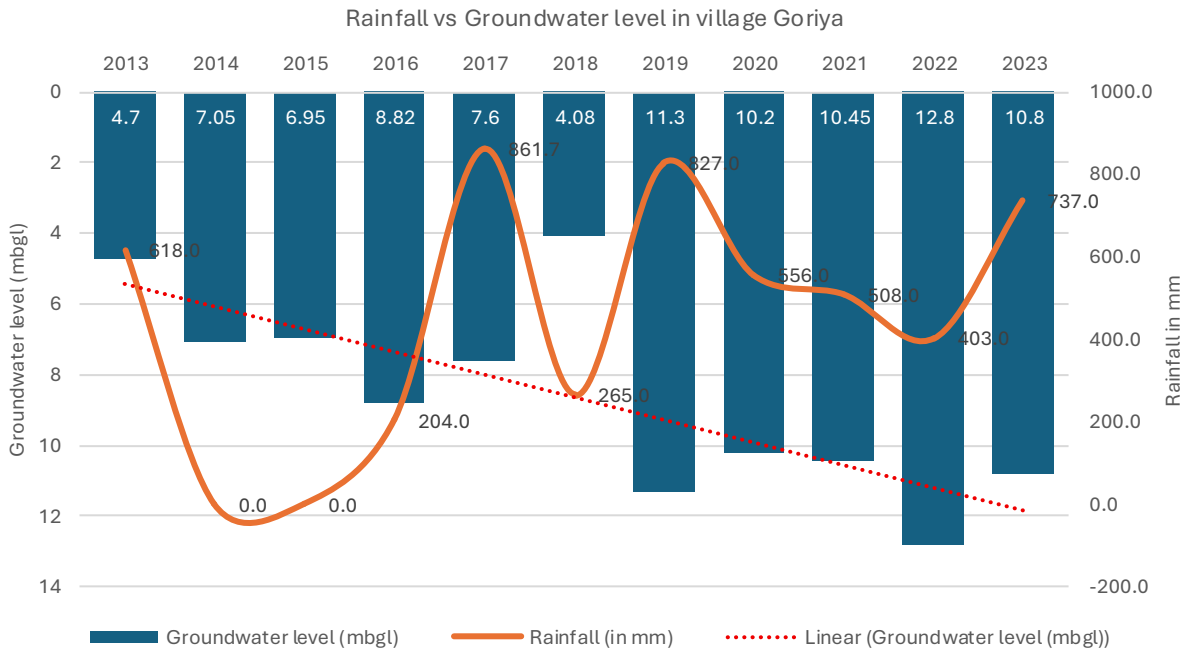
Community participation and ownership

- Village water and sanitation committees have been formed in villages, but the committee does not conduct its regular meetings
- According to JJM Guidelines, all operation and maintenance work must be done by VWSCs – in reality, their roles must be more defined
- Periodic capacity building of VWSCs is required to strengthen their roles and ensure active participation and ownership of village infrastructure
- They must be actively involved in identification of local water sources potential for water supply, and planning for their source sustainability

Rainfall vs Groundwater levels

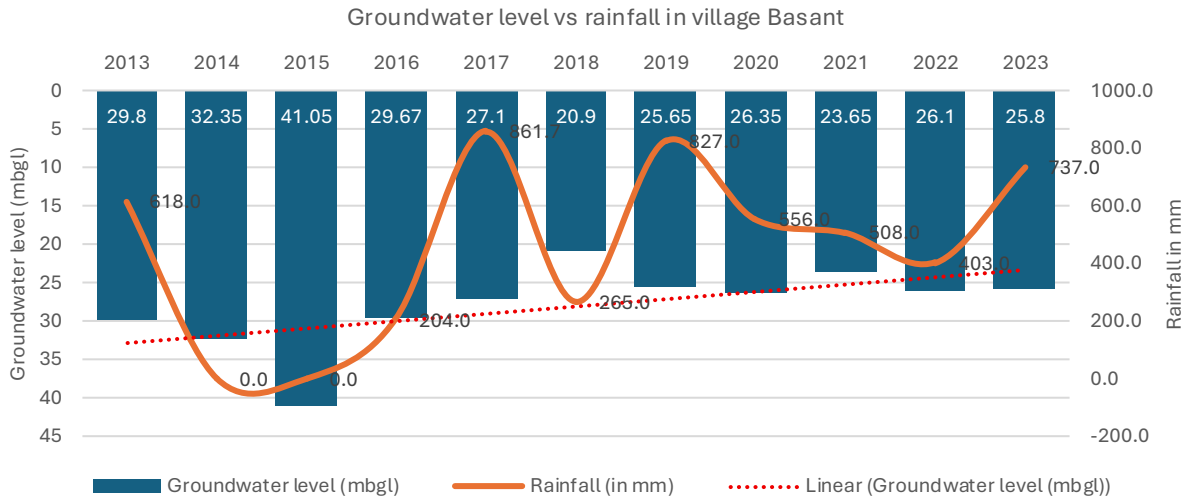
Bali block

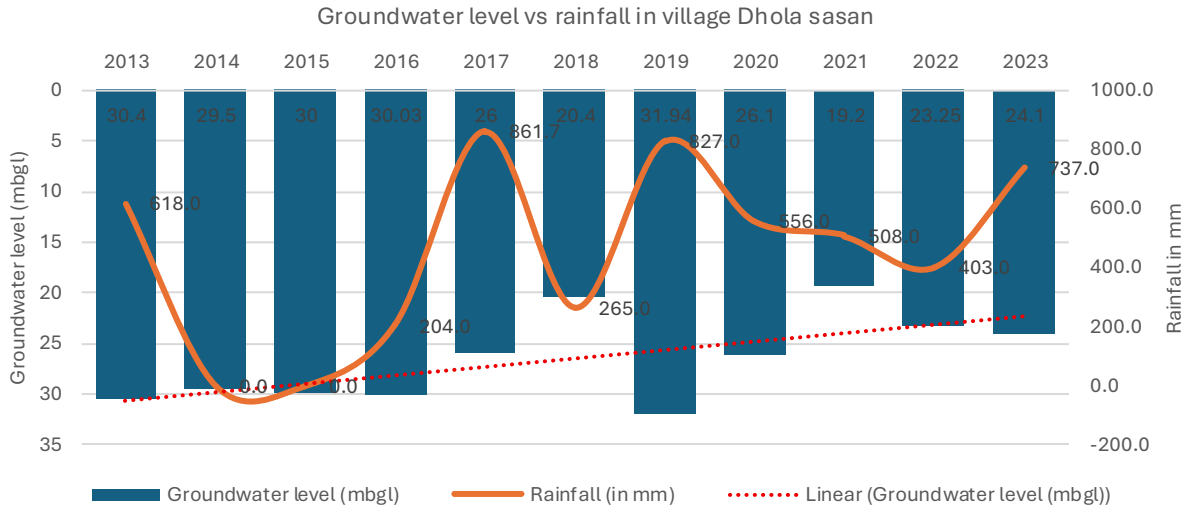


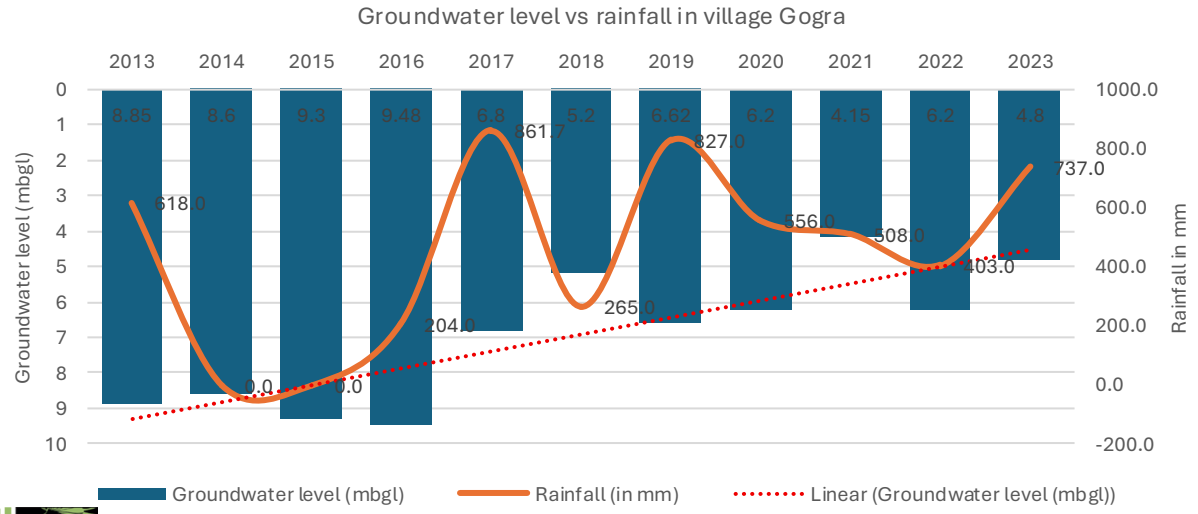


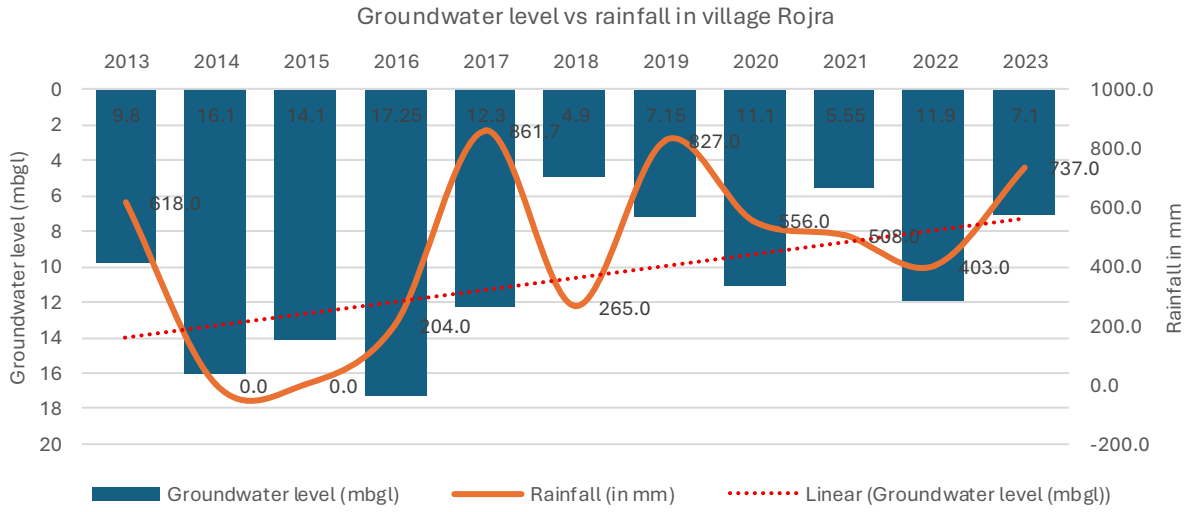
Rainfall vs Groundwater levels

Sumerpur block



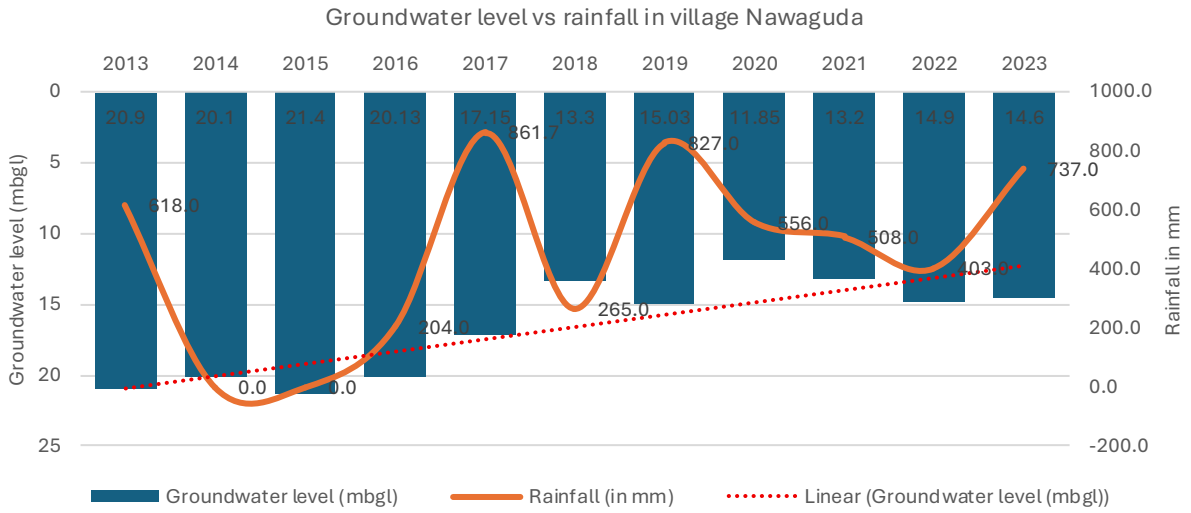


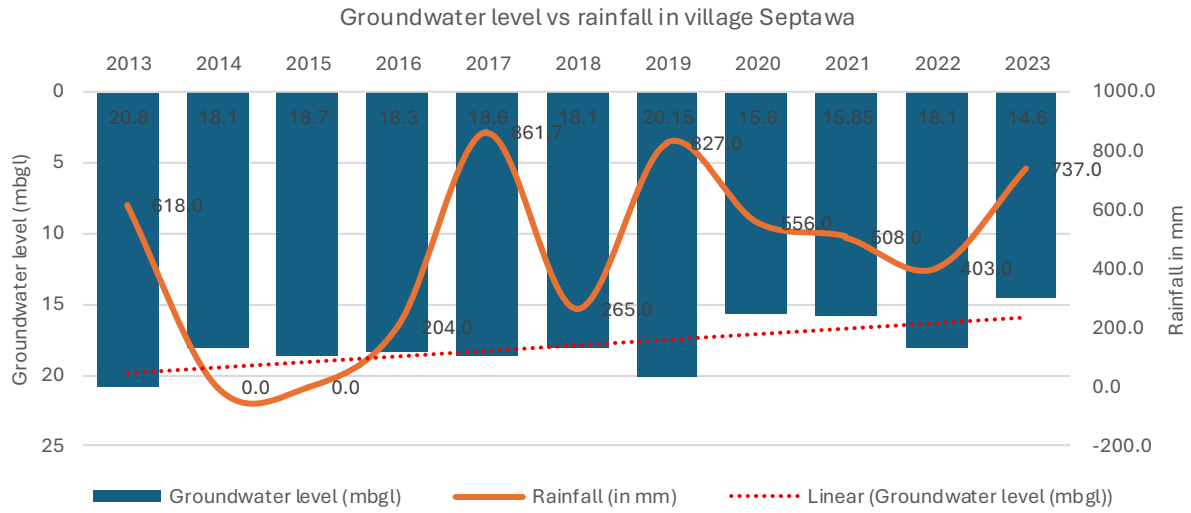


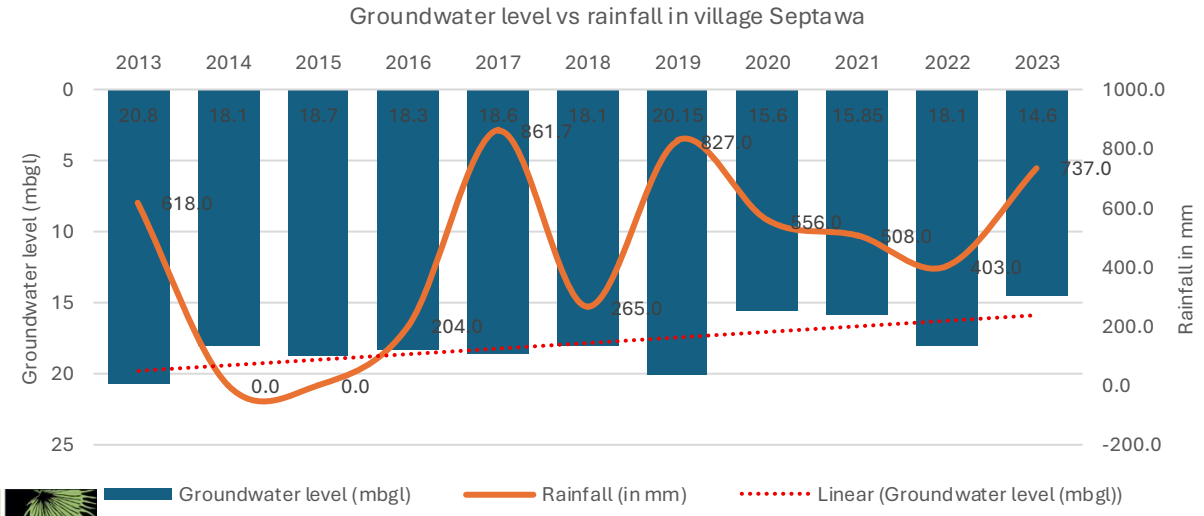


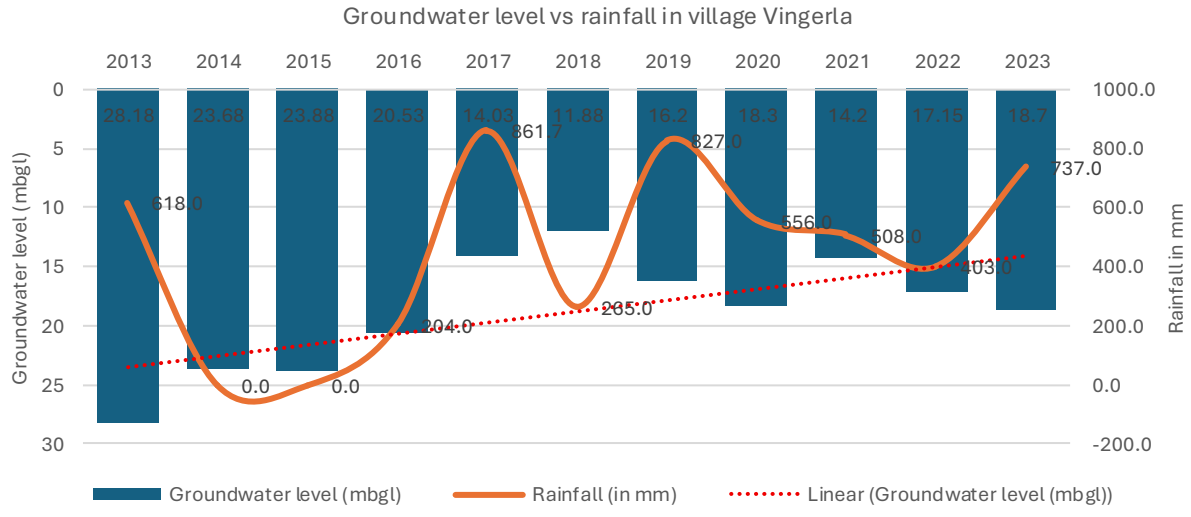
Rainfall vs Groundwater levels

Rani block

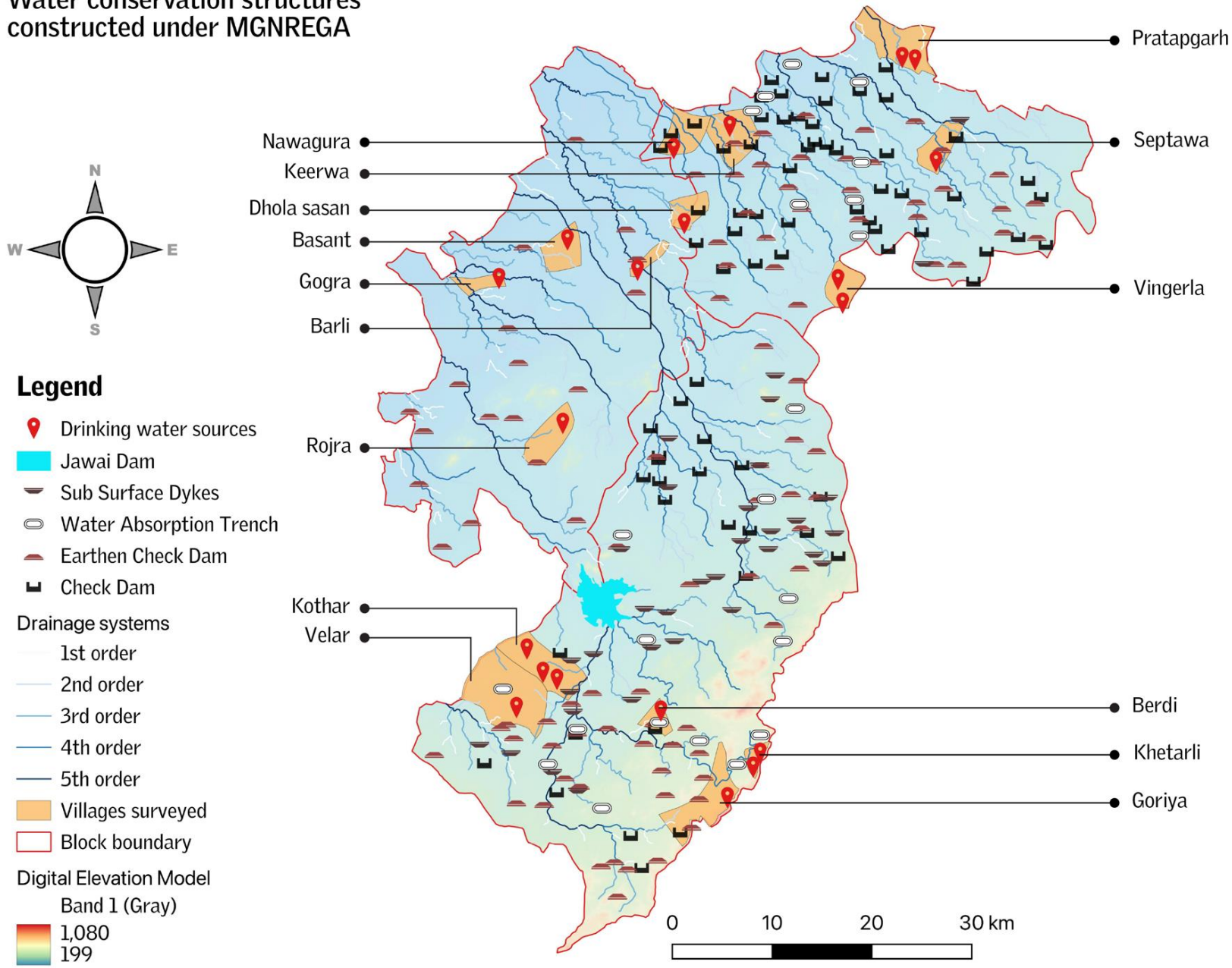








Water conservation structures constructed under MGNREGA



Legend

- Drinking water sources
- Jawai Dam
- Sub Surface Dykes
- Water Absorption Trench
- Earthen Check Dam
- Check Dam

Drainage systems

- 1st order
- 2nd order
- 3rd order
- 4th order
- 5th order
- Villages surveyed
- Block boundary

Digital Elevation Model

Band 1 (Gray)

1,080
199

CSE

These conditions must be addressed

Thank You