

Impact of climate change, a way forward to supply water to urban poor and vulnerable communities : A case study of Jaipur city

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Rajasthan Water Scenario

- Largest state with 342230 Sq.km area.
- Has 50 districts & more than 390 tehsils.
- The driest state of India.
- Uncertain rainfall confined only to two/three months of the year.
- Actual rainfall during southwest monsoon over Rajasthan – 595.9mm (2022), against national average of 1180 mm

- 219 blocks out of a total of 302 blocks in Rajasthan are over-exploited.
- Government sanctioning new tube well connections for irrigation.
- No law on underground water management (2023)
- The cattle owners also facing acute shortage of water.
- Drought like situation in 19 out of 33 districts of Rajasthan in 2016
- During 2012-2017, state received just 15%-20 % of rainfall as per Indian Meteorological Department
- Water supply once in 24 hours for 161 towns, once in 48 hours for 49 towns, and once in 72 hours in 12 towns.
- The annual water table loss is 1 to 3 meters at many places. Around 90% of drinking water is met by groundwater

Jaipur Urban Water demand/gap scenario

Population: 4,207,000 in (4.2 million) in 2023

Demand: 750 MLD (In Summer)

Supply : 465 MLD from Bisalpur Dam

: 170 MLD from 3252 tubewells

Gap: 115 MLD

Leakages: 10-15%

NRW issues: 45 %

Bisalpur

- In 2004, government started the construction a pipeline to bring Bisalpur water to Jaipur.
- Project co-financed by [Asian Development Bank](#) (ADB) and [Japan International Cooperation Agency](#) (JICA).
- The project was opposed by farmers relying on the Bisalpur water for irrigation.
- In 2019 Bisalpur Jaipur Stage 2 initiated



Urban Jaipur- Ground Water Scenario

- Average Groundwater depleted by 25 metres (last one decade)
- 40% of the ground water table in Jaipur has gone below 40 metres and continues to go down with every passing year. (2023)
- All 13 blocks declared dark zones by the Central Ground Water Board (CGWB).
- Rampant construction and concrete flooring have virtually blocked all natural inlets.
- Withdrawal very high as 100-110 million litres of water every day,
- 200% more than the rate at which this source getting recharged.
- Some areas it is more than 600 %

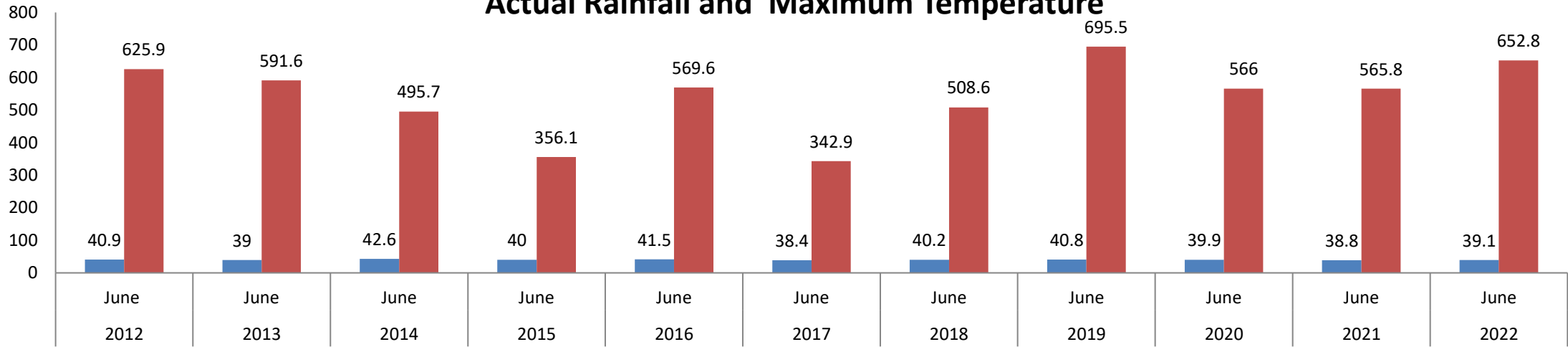
Ground Water Scenario

- Real estate developers are drawing groundwater for construction and drinking purposes.
- Areas such as Jhotwara, Murlipura, jagatpura, Malviya nagar and parts of mansarover, Bapu nagar are almost dry
- Rampant regularisation of colonies and delivery of pattas by JDA putting pressure to supply Bisalpur water to each one.
- Solution lies in implementation of ERCP (Eastern Rajasthan Canal Project) which shall enable Bisalpur water to Jaipur

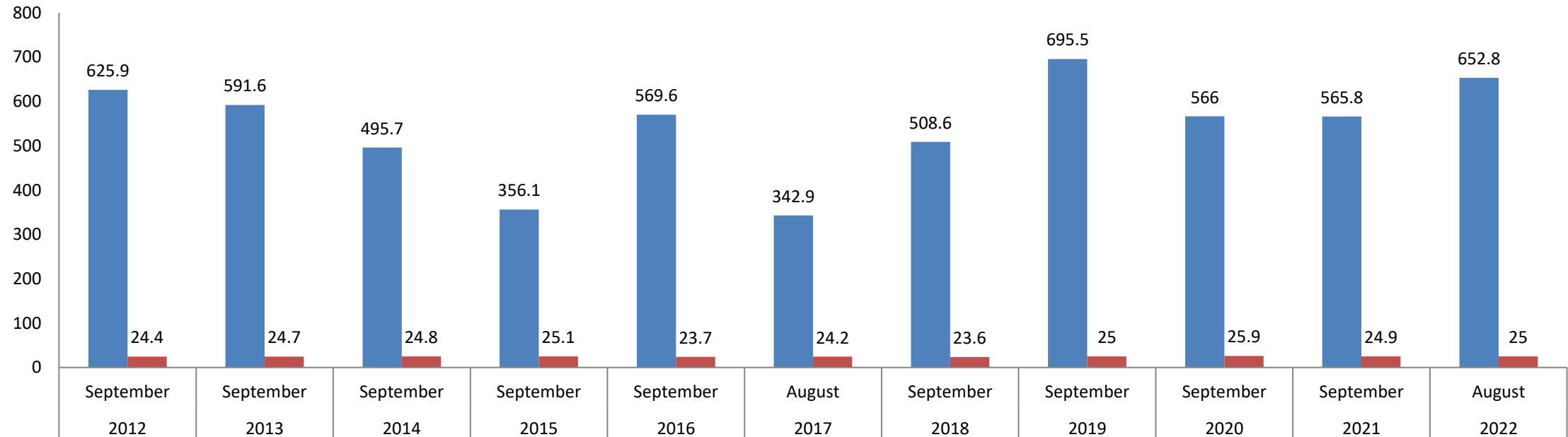
Rainfall and temperature variation in last decade

YEAR	ACTUAL RAINFALL (MM)	Maximum Temperature		Minimum Temperature	
2012	625.9	June	40.9	September	24.4
2013	591.6	June	39.0	September	24.7
2014	495.7	June	42.6	September	24.8
2015	356.1	June	40.0	September	25.1
2016	569.6	June	41.5	September	23.7
2017	342.9	June	38.4	August	24.2
2018	508.6	June	40.2	September	23.6
2019	695.5	June	40.8	September	25.0
2020	566	June	39.9	September	25.9
2021	565.8	June	38.8	September	24.9
2022	652.8	June	39.1	August	25.0

Actual Rainfall and Maximum Temperature



Actual Rainfall and Minimum Temperature



Tube wells

- The requirement of Jaipur is around 750 MLD in summers,
- An estimated 20,000 unauthorized private tube wells within the city,
- Approximately 3252 Public Health Engineering Department controlled tube wells,
- Regulation and monitoring of groundwater extraction are nearly unachievable.
- As the temperature soars, the water consumption increased in the city and people have been forced to rely on water tankers.
- Most severe sufferers are urban poor, forced to pay 2000 INR/tanker

Tanker Transportation

- Tanker transportation done in connected as well as unconnected areas of city throughout the year.
- 60% Bissalpur pipeline connected areas through tankers, 40% in unconnected area, Rest need is fulfilled through tubewells.
- Till Year 2021, Nos of tanker trips was about 2200.
- In year 2022, Nos of tanker trips decline 1,100 because PHED plans to make Jaipur free of water tankers by 2023.
- The present no of trips about 1000.
- March 2012; Tanker tracking system introduced,
- All tankers fitted with GPS and payment as per trips recorded in GPS.
- Distribution system improvement works in progress.

Tanker mafia in Jaipur city

- Official estimate states that this city has 2,000 private water tankers
- These tankers source water from 2,500-odd illegal private tube wells from the city (2019).
- For 4,000 litre tanker charges are 500 to 700 INR
- With temperature increase during the summer it is 1100 to Rs 1,300 INR/tanker
- In extreme conditions they charge 2000 INR/tanker.
- Vulnerable communities, the urban poor suffers the most.

Water Metering

- As per the PHED records, the city has total 4 lakh 96 thousand water connections. Out of which, 4 lakh 25 thousand are domestic and 45 thousand connections are non-domestic. The department has also provided 4 thousand industrial connections and 22 thousand flat rates connection.(2019)
- All houses in urban areas will get water connections by 2030, says PHED
- Shortage of staff and low meter repair rate.
- Tariff system not defined it is based on average consumption value and not on actual consumption.
- Revenue collection not systematized
- Monthly Charges are very nominal.
- Some places there are regular bills but at others they have never seen a water bill.

Jaipur Slum

- A recent household survey performed by government appointed agency estimates the slum population to be around 6.88 lakh consisting 22.5 percent of the total population of city.
- Of the 65 slums areas falling under the Jaipur Development Authority (JDA), plans have been drafted to relocate 42 slums. The Jaipur Municipal Corporation is also set to launch its affordable housing scheme under which 12,000 houses will be constructed and the city's biggest slum Sanjay Nagar Basti will be relocated.

Challenges

- The texture of soil does not allow the wells to get recharged naturally.
- Water, which flows through field, not collected and remains unused.
- *Over three-quarters of the sampled wells that provide drinking water contain contaminants such as fluoride, nitrate, and uranium at levels that exceed both Indian and World Health Organisation (WHO) drinking water norms.*
- Illegal connections and Long distance connections.
- Equitable distribution of water in distribution zones
- Low pressure, short supply and tail end problems
- Inadequate staff for regular O& M
- Low Water tariff leading to higher consumptions:
- More than 50% of O&M expenditure goes on power charges alone.

Remedial measures : Enforcing the regulations

- Drilling of private tubewells prohibited
- Rain water harvesting structures mandatory for houses more than 300 sqm.
- 100 roof top artificial recharge structure developed by JDA.
- 100 artificial recharge structure on abandoned tubewells.
- NON functional consumer meters to be replaced.
- Illegal connections: Consumers to be counseled for regularization of illegal connections.
- Distribution system Improvements: by providing additional pipelines
- Pollution control Measures
- MOU signed among Ranhill Co Malaysia and govt. of Rajasthan.
- More Pilot projects for 24 hours water supply
- Bulk meters for DMA metering
- Reduction of water losses: Water Audit

Eastern Rajasthan Canal Project (ERCP)



- It is planned to meet drinking and industrial water needs of the southern and south eastern Rajasthan, for humans and Livestock till the year 2051
- The estimated cost of the ERCP is around Rs. 40,000 crore
- It proposes to provide drinking water to 13 districts of Rajasthan and provide irrigation water for 2.8 lakh hectares of land through 26 different large and medium projects.
- 13 districts: Jhalawar, Baran, Kota, Bundi, Sawai Madhopur, Ajmer, Tonk, Jaipur, Karauli, Alwar, Bharatpur, Dausa and Dholpur.

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Thank You

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