

Urban groundwater, recharge and source sustainability

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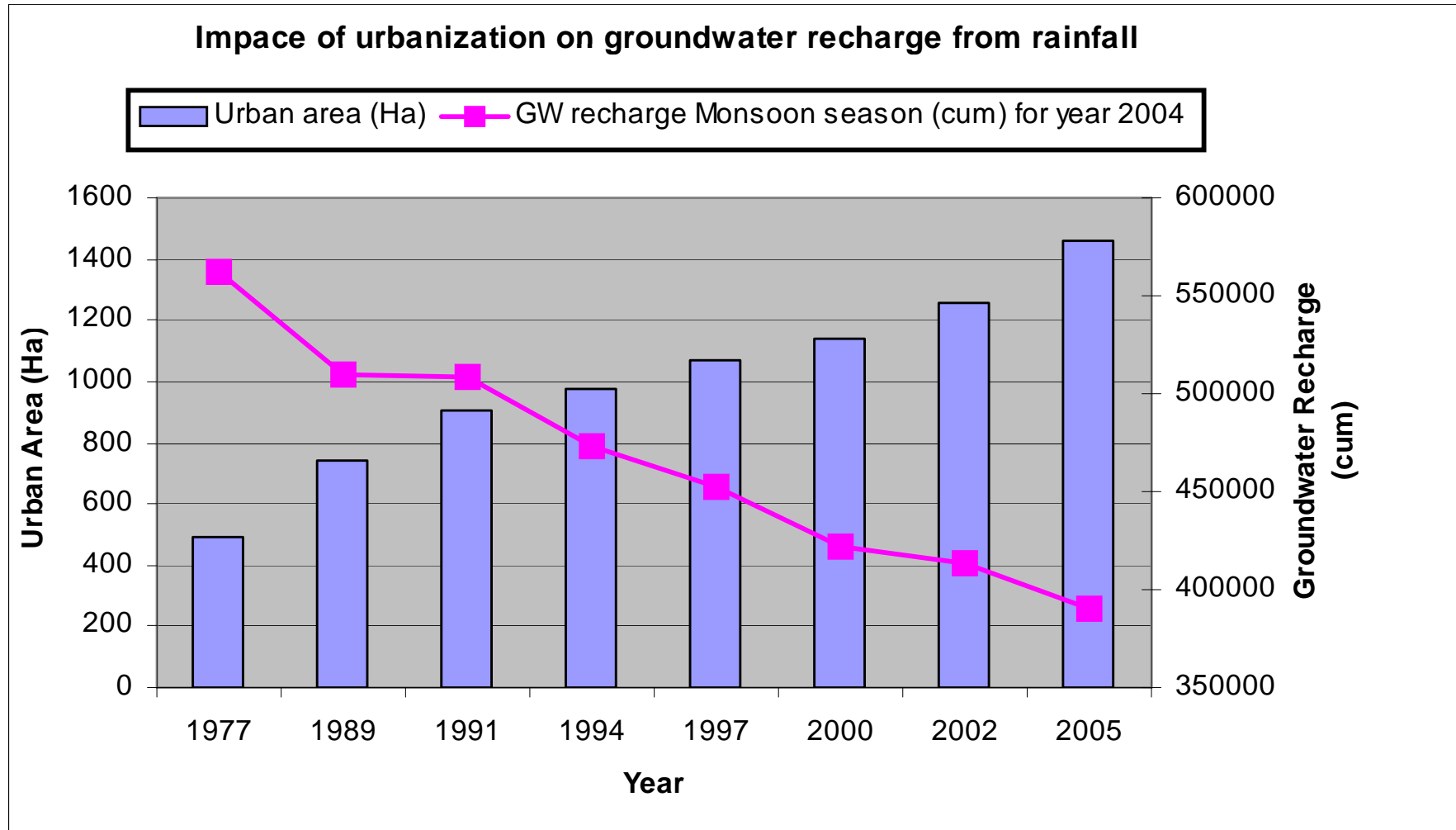
Water Programme



Urbanisation in Rajasthan

- Number of class I cities in Rajasthan increased from 20 to 32 between 2001 and 2011
- According to Rajasthan Housing and Habitat Policy (2006), Rajasthan population of every district is likely to be urbanised 2025

Urbanisation and reduction of recharge in Ajmer

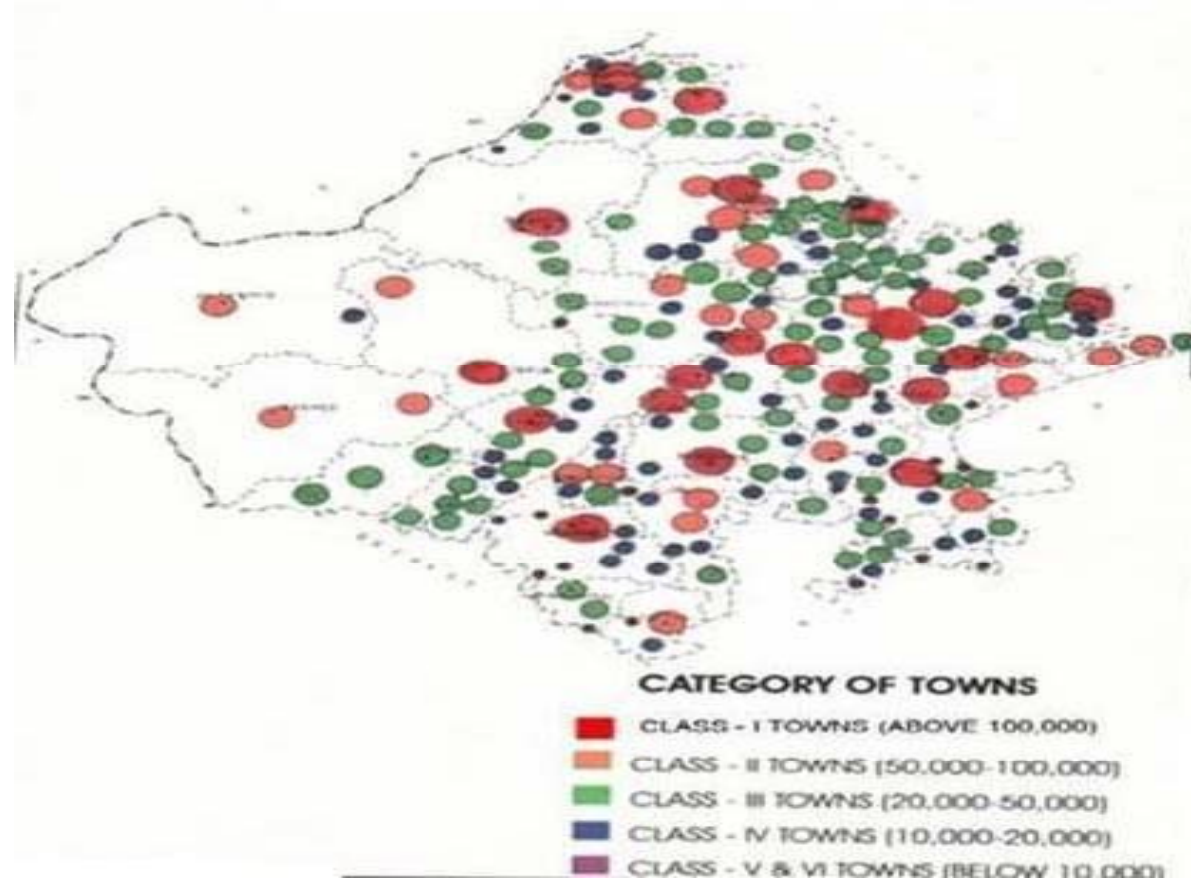


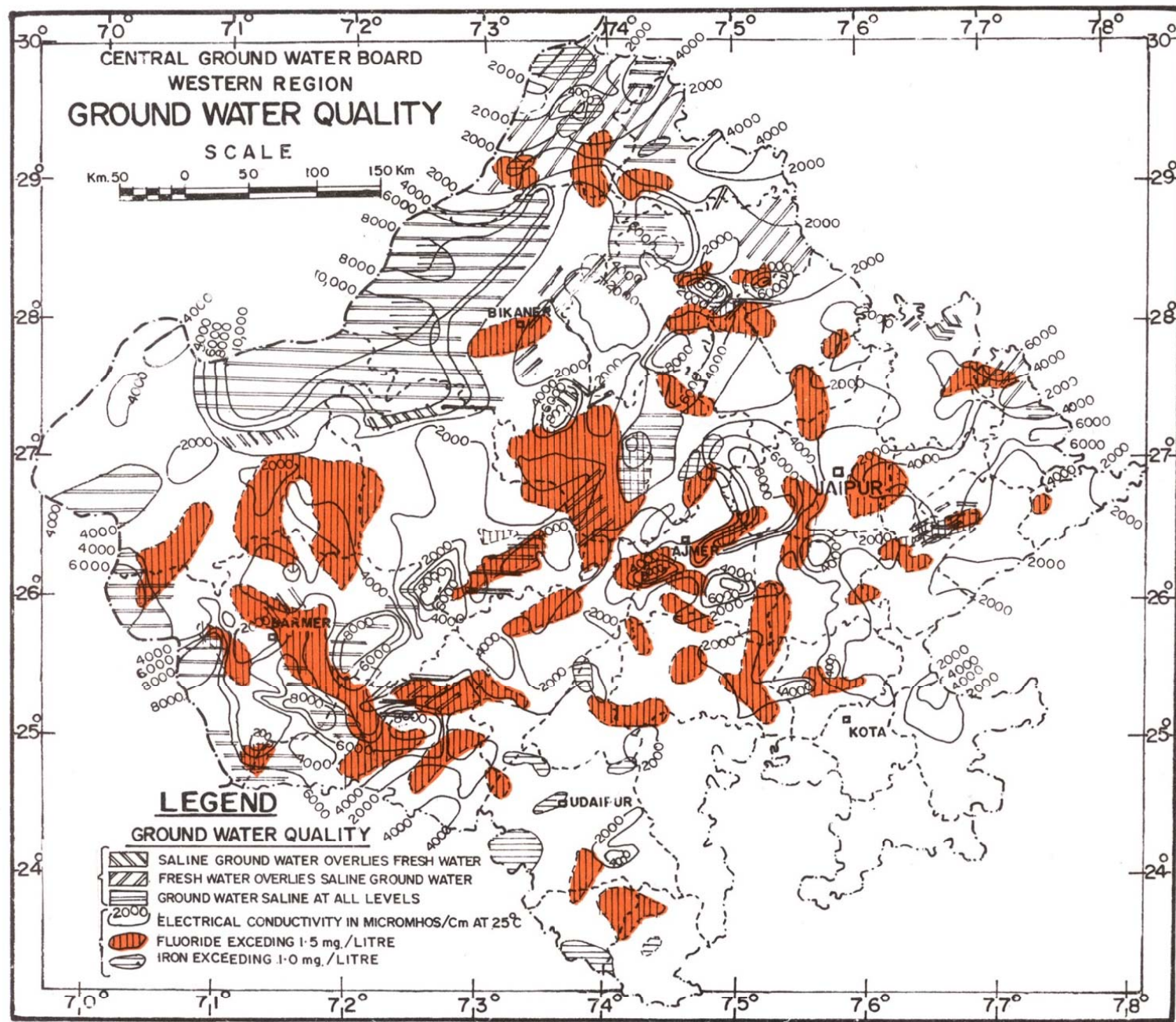
Source: Jat, Mahesh K., et al, 2008, Urbanization and its impact on groundwater: a remote sensing and GIS based assessment approach, Pg 13.



Source: Central Groundwater Board

Towns and cities in Rajasthan as per 2001 census



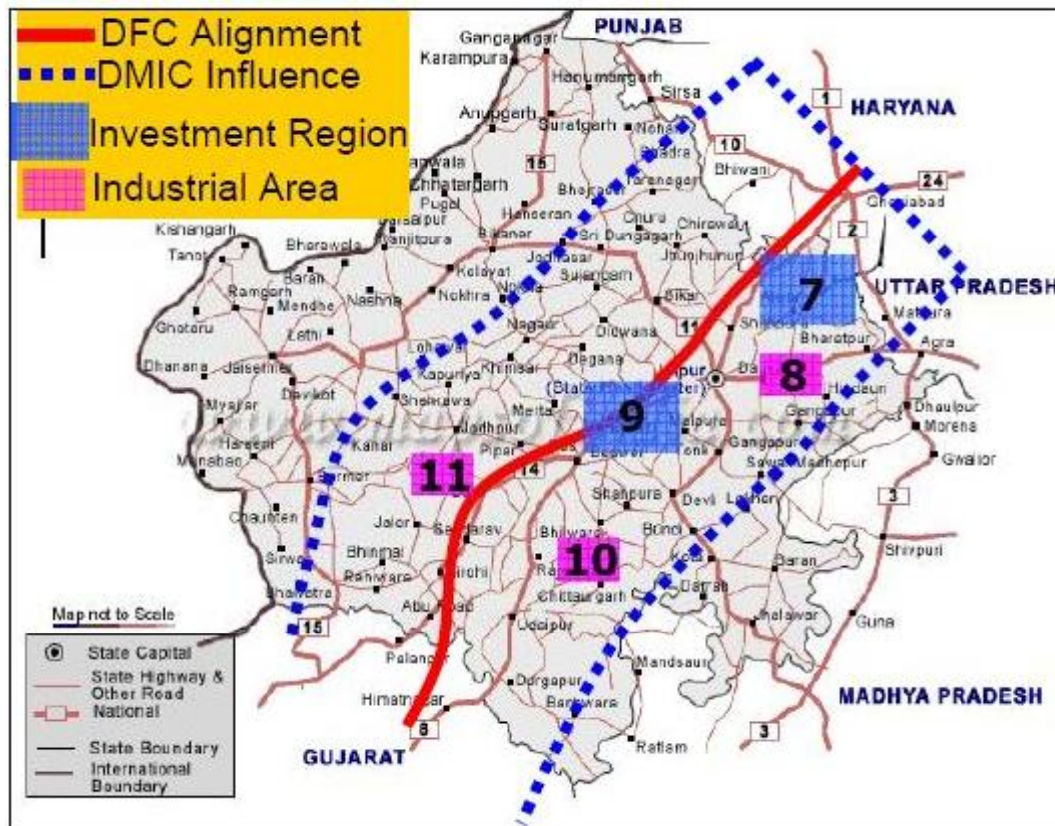


C.G.W.B., W.R.(KK) Drg. No 5491/98



Source: Central Groundwater Board

New development in Rajasthan 2008-16



Location Map for Proposed Development Nodes in DMIC-Rajasthan

Node No.7: Khushkhera-Bhiwadi-Neemrana Investment Region

Node No.8: Jaipur-Dausa Industrial Area

Node No.9: Ajmer-Kishangarh Investment Region

Node No.10: Rajsamand-Bhilwara Industrial Area

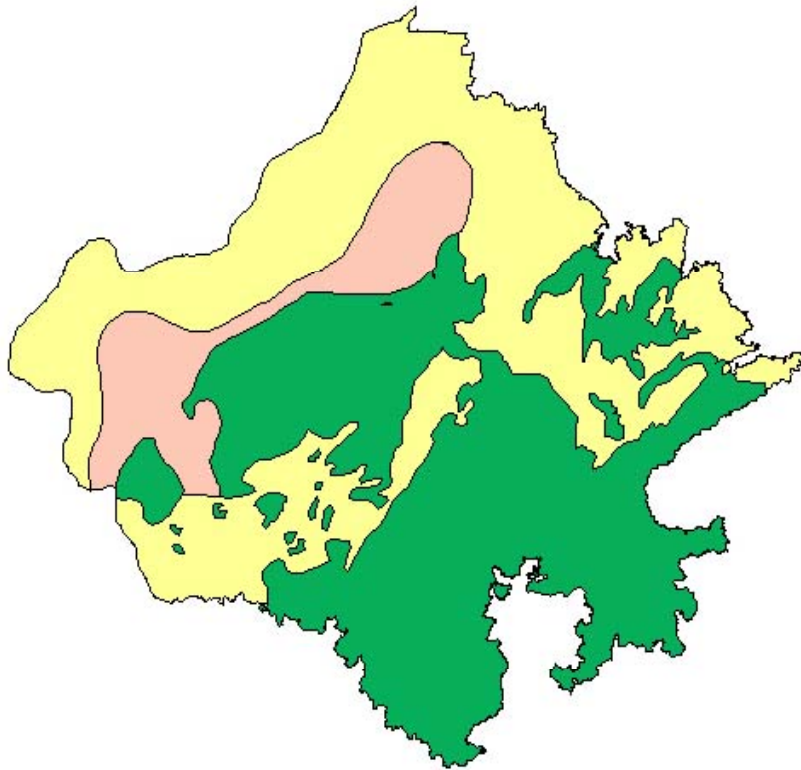
Node No.11: Pali-Marwar Industrial Area

<http://www.delhimumbaiindustrialcorridor.com/dmic-rajasthan.php>



CENTRAL GROUND WATER BOARD

TYPES OF FORMATIONS, RAJASTHAN



LEGEND

- Unconsolidated Formations
- Semi Consolidated Formations
- Consolidated Formation

- ☐ Unconsolidated areas are areas of low rainfall
- ☐ Consolidated areas receive comparatively higher rainfall



Source: Central Groundwater Board

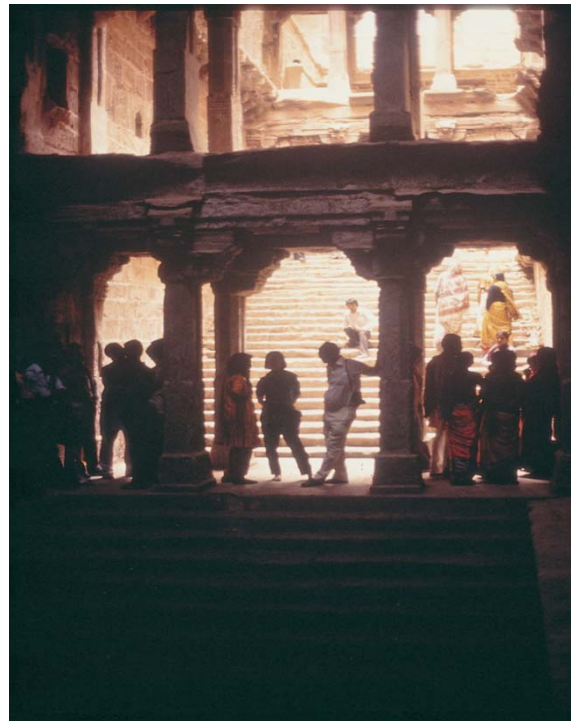
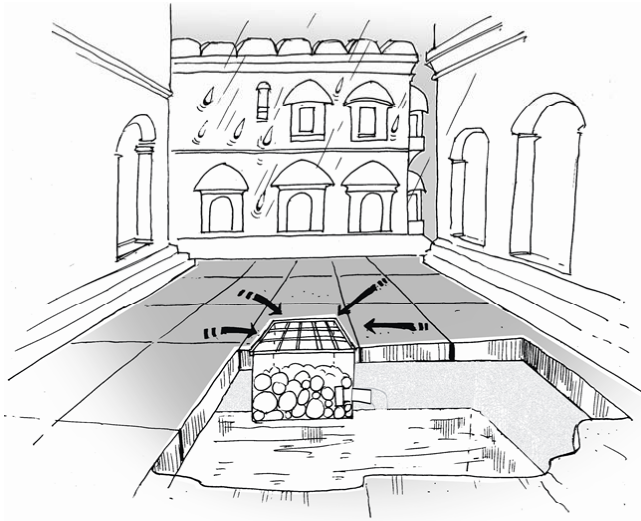
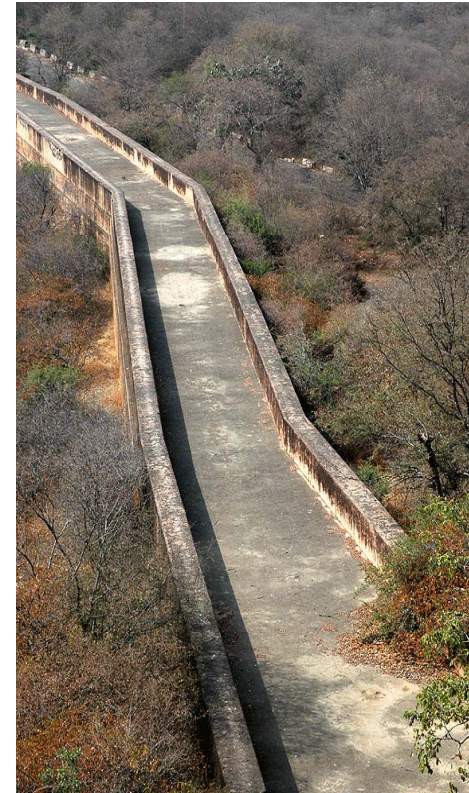
Water and society in Rajasthan

An integral part of the web of life

- In Rajasthan only **special guests offered water**; that too, only one glass; second glass will be milk
- In Jaisalmer, people **bathe on a wooden platform**; water collected from underneath is given to cattle
- Rajasthan has **maximum number of folk songs with water/clouds** as theme
- **Agors (catchment)** considered sacred.
- **Digging of a tank/silting** was considered one of the seven great meritorious acts in a lifetime
- Divided the entire Rajasthan into two areas – ***palar water & wakar water***. *Palar* is rainwater can be stored in underground tankas for up to 3-5 years. *Wakar* water underground water which has oozed out of earth with minerals etc



Traditional ways of harvesting rain

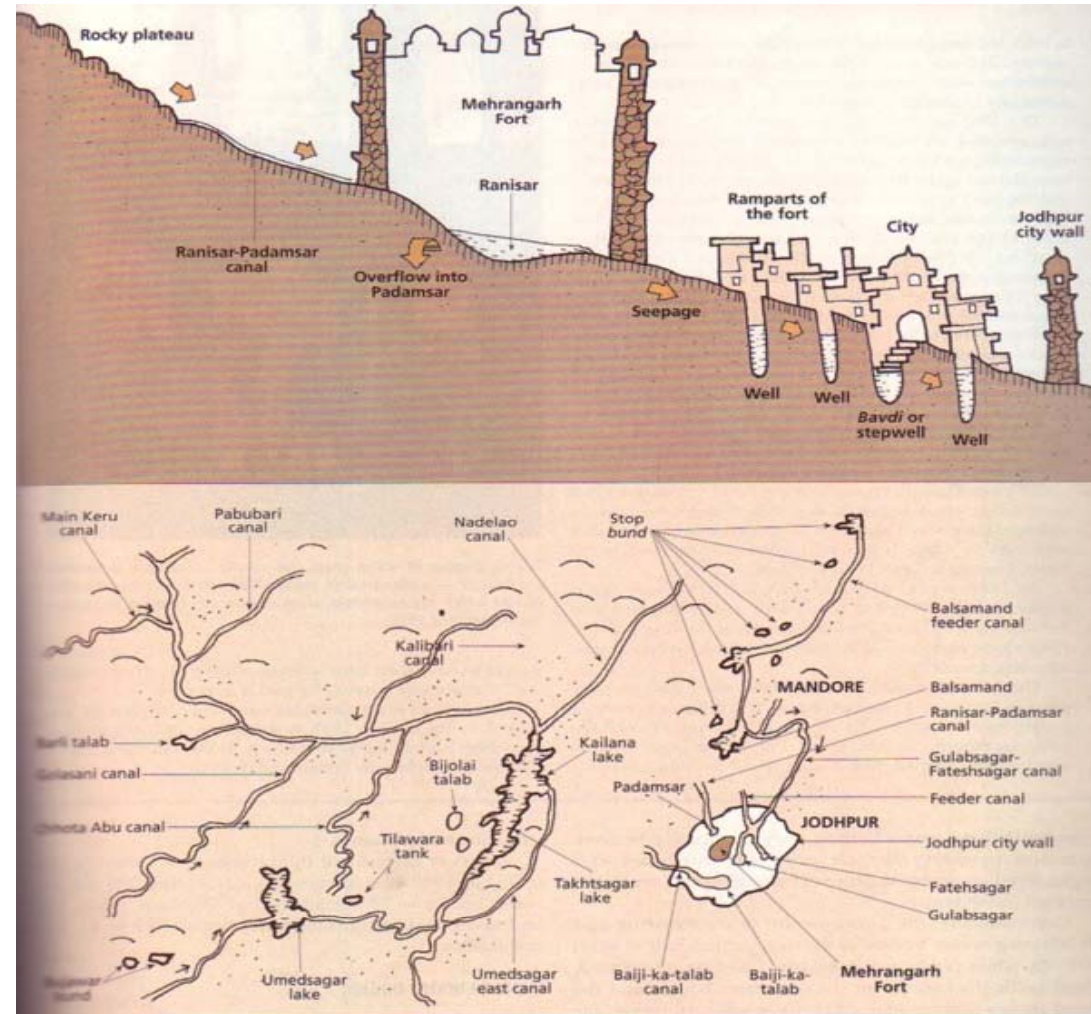


Traditional ways of harvesting rain

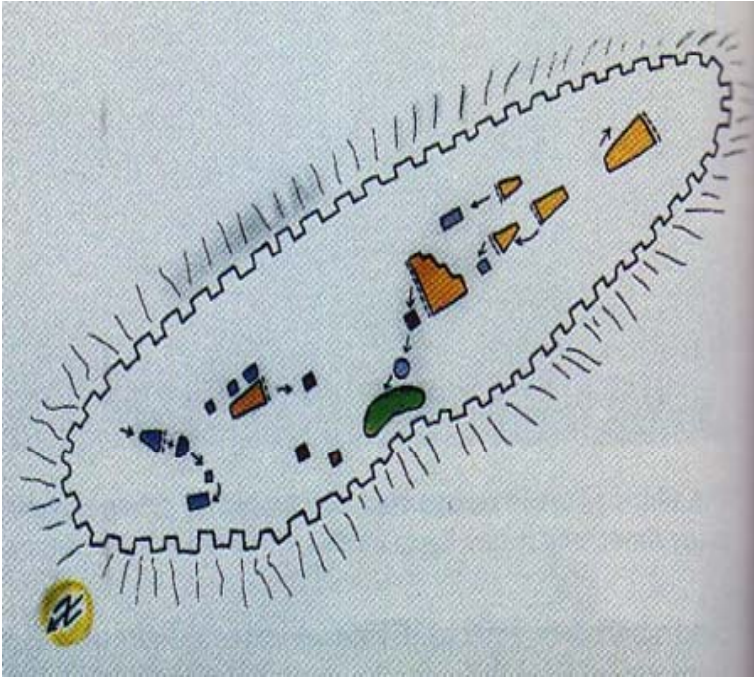
- Jodhpur

At the time of independence, there were over 200 water bodies in all, many of them over 500 years old. The city's 40-odd *talabs* in the city still exist today and many of them are over 300 years old.

Jodhpur was perhaps the only city in India where an all out effort was made to capture all available rainwater.



Traditional ways of harvesting rain

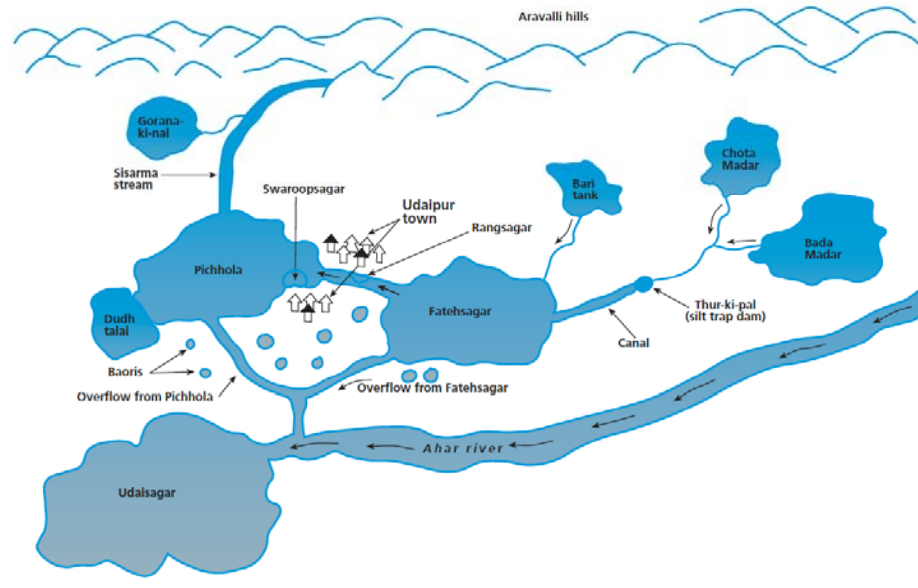


Water bodies in Chittor Fort

More than 80 water bodies. Could last up to 5 years. 50000 people

MAP: AWASH – UDAIPUR'S WATER WEALTH

A system of wells and lakes ensured intelligent rainwater harvesting within the basin



Water wealth of Udaipur

City of lakes. Provided water for drinking and irrigation

Traditional ways of harvesting rain



State of traditional water harvesting structures



Rajasthan's water resources

- Average rainfall in the state is 531 mm against national average of 1200 mm. This too is **erratic** in occurrence, resulting in frequent drought conditions.
- According to the Rajasthan State Action Plan on Climate Change (2011), **the state has the highest probability of drought occurrence in the country.**
- In absence of adequate surface water sources, there is **over reliance on ground water**. Gross annual draft of ground water in the state is 13 BCM against recharge of only 10.4 BCM. The stage of **groundwater exploitation which was 35% in 1984 has reached a level of 138% in 2008.**
- Rajasthan accounts for 51% of fluoride and 42% of saline-affected areas in the country. In fact, based on the WHO guidelines for drinking water quality, **56% of the water sources in the state are un-potable.**



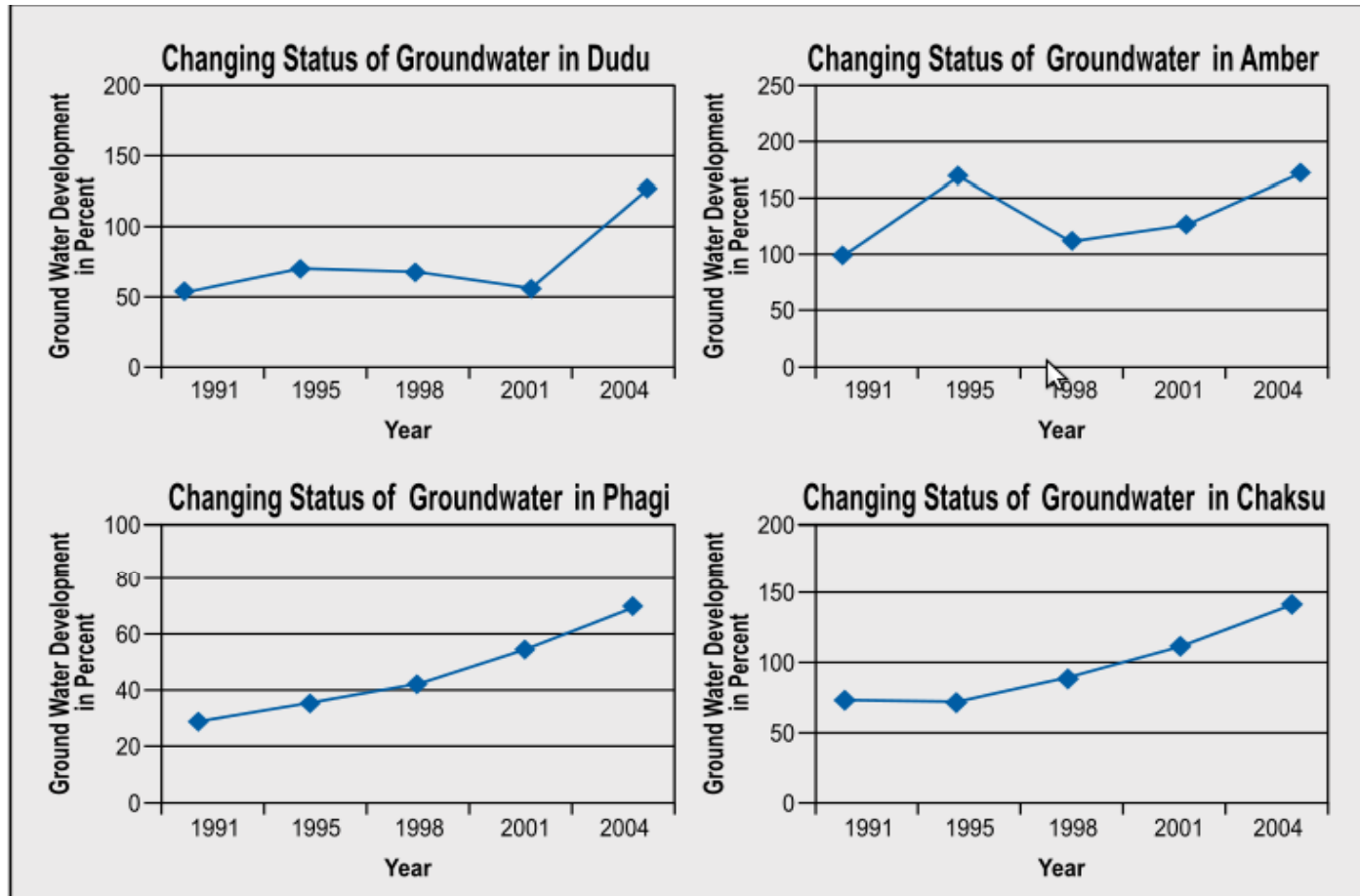
Water stress in the state of Rajasthan

Category	1984	1988	1998	2001	2004	2008
Over-Exploited (>100%)	12	44	41	86	140	164
Critical (90 to 100%)	11	18	26	80	50	34
Semi Critical (70 to 90%)	10	42	34	21	14	8
Safe (<70%)	203	122	135	49	32	30

Source: State water policy, 2010



Groundwater extraction from different parts of Jaipur city

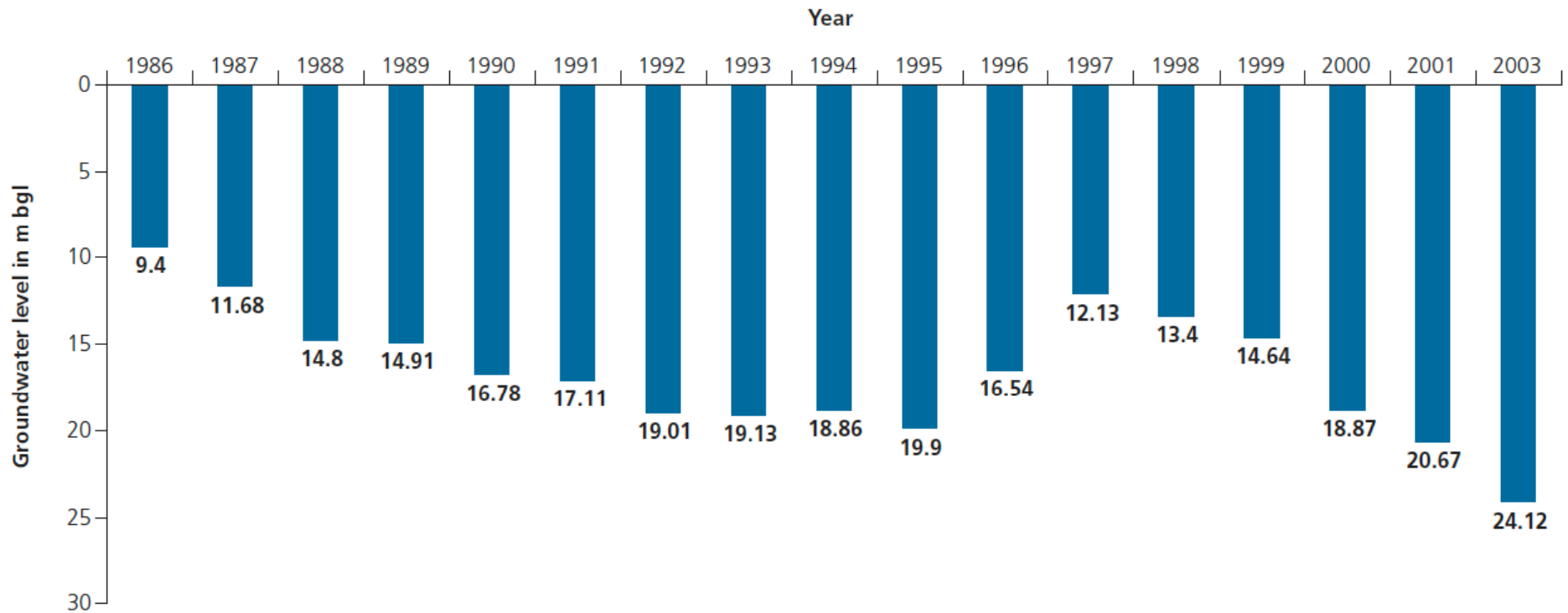


Source: Report by Institute for Social and Environmental Transition & Centre for Environment and Development Studies, Jaipur, 2011

Groundwater decline in Alwar

GRAPH: CGWB GROUNDWATER CHECK

In 1986, Alwar's water level was a little over 9 metre below ground level (m bgl); in 2003, the level declined to 24 m bgl. Thus, in 17 years, the town's water level declined by about 15 m, at the rate of 0.87 m per year



Source: National Data Centre, Central Ground Water Board (CGWB), Faridabad, 2005-06



Encroached and polluted waterbodies



Policies and laws on rainwater harvesting and preservation of waterbodies

- State water policies, Rajasthan State Action Plan on Climate Change, Rajasthan's Water Vision 2045 and State Environment policy talk about making rainwater harvesting compulsory at building level
- Jaipur has made rainwater harvesting compulsory in building bye-law
- Draft on Rajasthan Lake development Authority bill 2012 formulated



Planning RWH at city level

Short-term measures

- Legal measures
- Administrative and fiscal instruments
- Education, awareness creation and capacity building
- Pricing of water

Prioritise

- Target bulk users
- Target critically depleted areas

Long-term measures

- Research for city-level detailed hydro-geology, rainfall mapping, filters, technological tools
- Setting up a inspection, maintenance and monitoring programme
- Awareness creation, education and capacity building



JNNURM report card in mission cities of Rajasthan

- ☐ Rainwater harvesting compulsory in different cities of Rajasthan post launch of JNNURM mission I.
- ☐ Jaipur has included rainwater harvesting in the building bye-law
- ☐ JDA implemented RWH structures in the cities
- ☐ Are other cities following?



Initiatives in Jaipur

- Jaipur Development Authority (JDA) identified and registered 28 JALDOOTs to provide technical support to make rainwater harvesting within the city.
- 52 Rooftop rainwater harvesting structures made in year 2010-11 including JDA campus.
- 92 storm water harvesting structure made till 2011-12
- Restoration of traditional structures (in and around Amber) under Suaraj project of Jaipur Municipal Corporation



Thank you

