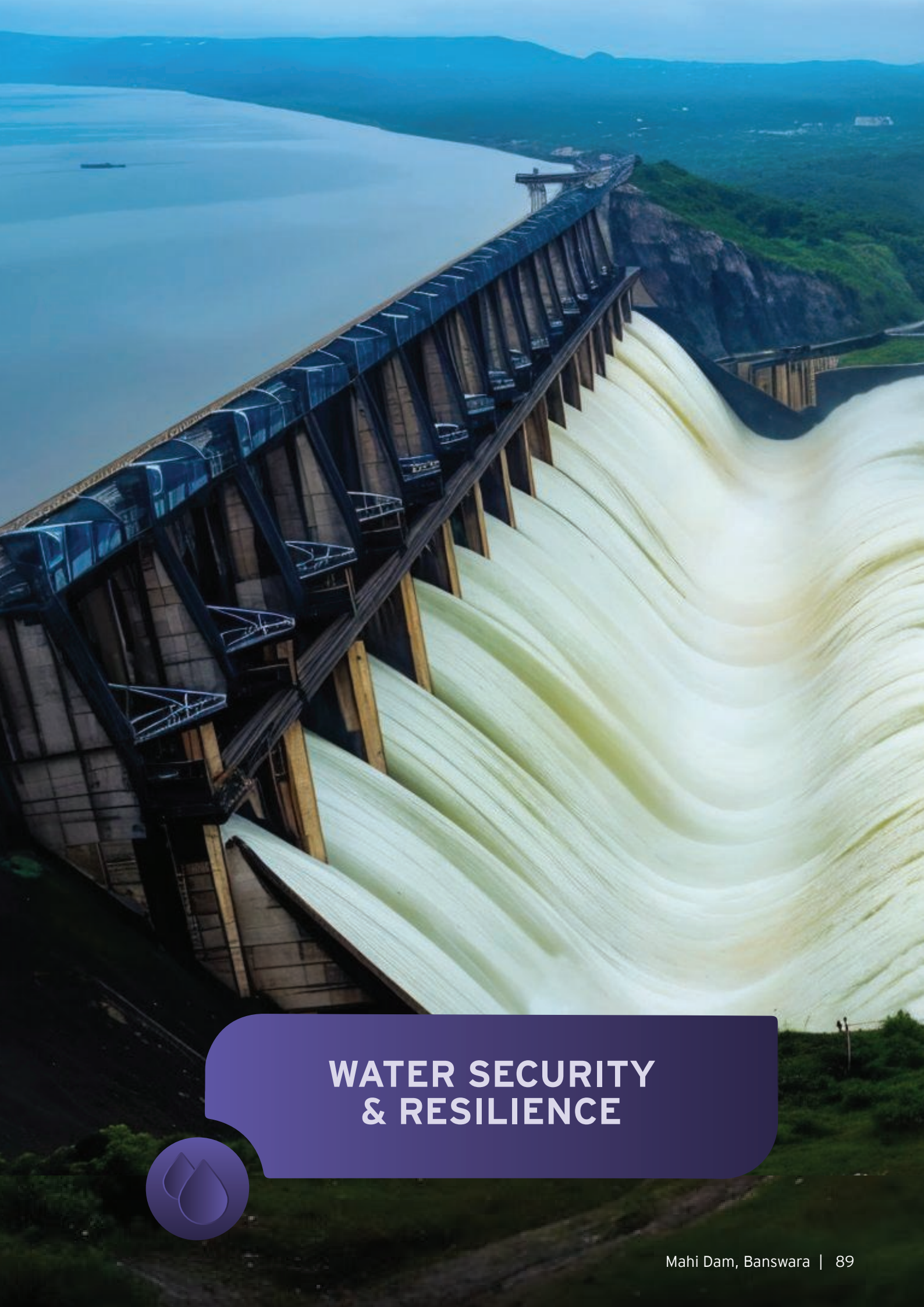


WATER SECURITY & RESILIENCE

MAKING WATER SECURE RAJASTHAN **THROUGH IMPROVED WATER GOVERNANCE**

Rajasthan, India's largest state, faces **severe water scarcity,** with per capita availability projected to **drop to 450 cubic meters by 2050**. Despite covering **10.41% of India's area, it has only 1.16% of the country's surface water.**

The state is implementing **Jal Shakti Abhiyan and MJSA 2.0** to ensure **sustainable water management and source sustainability** for drinking, agriculture and industrial use.

Rajasthan's surface water availability
25.38 BCM

Inter-State agreements allocate an additional
17.88 BCM of water.

Thar Desert
covers two-third of the state, worsening water scarcity.

Severe famine conditions occur due to erratic monsoon patterns.

Only two river basins,
Mahi and Chambal,
have excess water.

Average annual rainfall
531 mm, nearly half of India's average.

Non-agricultural water demand projected to rise to
8.07 BCM by 2045.

Jal Jeevan Mission targets
100% household tap water coverage by 2028

Mukhya Mantri Jal Swavlamban Abhiyan (MJSA) 2.0 focuses on groundwater recharge.

Rajasthan supports
18.70%
of India's livestock with limited water.

Bisalpur Dam

VISION 2047

By 2047, Rajasthan will achieve **water security through robust governance, sustainable conservation and equitable utilisation.**

Ensuring **availability, quality and resilience, the state will empower agriculture, communitiest and ecosystems,** fostering long-term sustainability and prosperity while **adapting to climate challenges for a water-secure and thriving Rajasthan**.

Rana Pratap Sagar Dam, Rawatbhata

Thrust Areas

Water secure Rajasthan through improved water management

MJSA 2.0 Expansion
The INR11,200 crore budget under MJSA 2.0 aims to build 5 lakh water harvesting structures in 20,000 villages by 2030 to enhance water conservation.

Modified Parbati-Kalisindh-Chambal Project (Ram Jal Setu Link Project)
Modified PKC, now part of India's River Linking Projects, will cost more than INR 80,000 crore and improve water availability for 17 districts, benefiting irrigation and industrial needs.

Severe Water Scarcity
50% of drinking water relies on groundwater, but demand surge, surface water depletion and encroachment intensify Rajasthan's water crisis.

Groundwater Over-Extraction
In 2024, Rajasthan extracted 17.05 BCM groundwater while only 11.37 BCM was recharged, reducing safe groundwater blocks from 203 (1984) to 37 (2024).

Declining Surface Water Availability
Catchment area encroachments, untreated sewage discharge and anicuts have reduced Rajasthan's surface water sources, worsening shortages for the growing population.

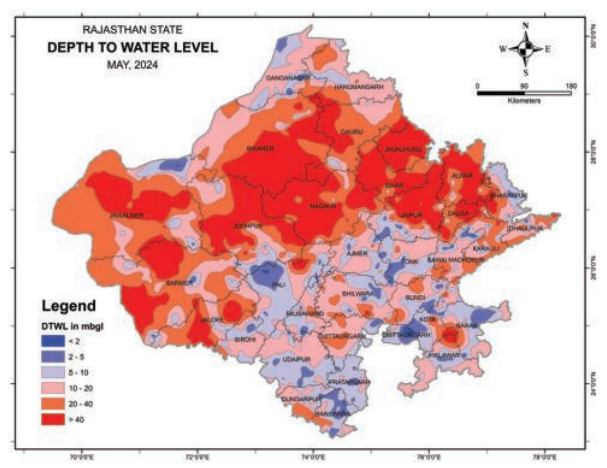
Groundwater Contamination
As of April 2024, 4.20 lakh households (24.52 lakh people) face water contamination from salinity, fluoride and nitrate due to excessive groundwater use.

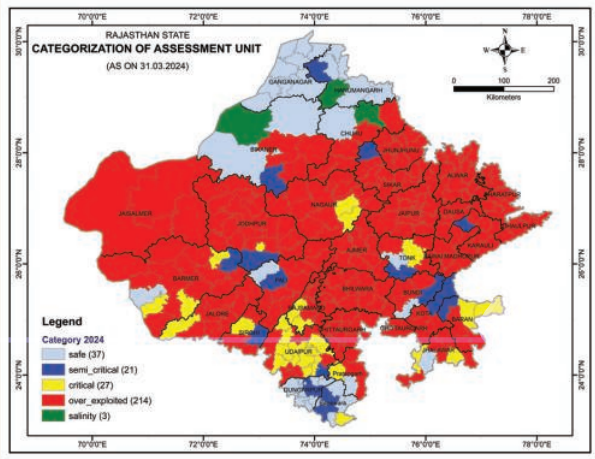
Climate Change Impact
Frequent heat waves, erratic monsoons and geological limitations disrupt groundwater recharge, worsening water scarcity and increasing drought vulnerability.

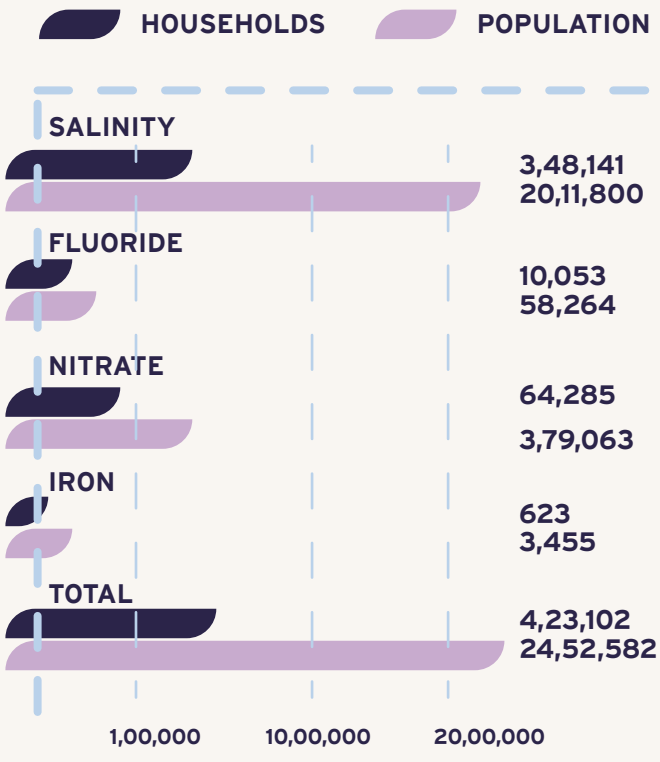
Monsoon Dependency
Rajasthan's rainfall variability directly impacts agriculture, groundwater recharge and drinking water supply, making the state prone to droughts and seasonal water shortages.

Revitalisation of Traditional Rainwater Harvesting
Rajasthan's historic rainwater systems (Johads, Kunds, Baoris, Talabs, etc.) require urgent rejuvenation to enhance rainwater storage and climate resilience.

Need for Stronger Community Participation
Lack of public engagement in water management hinders sustainable solutions; enhanced community participation is crucial for effective water conservation.







Above position is as on 01.04.2024

Key Trends

Expansion of Irrigation Projects
Rajasthan's irrigation potential increased from 4 lakh ha (pre-independence) to 39.20 lakh ha with 108 Major and Medium, 4000+ minor projects, yet demand still outpaces supply.

Modified Parbati-Kalisindh-Chambal Project (Ram Jal Setu Link Project)
More than INR 80,000 crore Modified PKC will transfer surplus monsoon water to 17 districts, providing drinking and industrial water and 2.82 lakh ha irrigation coverage.

Declining Per Capita Water Availability
Water availability dropped from 500 cubic meters per person and is projected to reach 450 cubic meters by 2050, far below the 1,000 cubic meter global standard.

Water Supply Uncertainty
Rainfall is highly variable and Rajasthan depends on inter-state water-sharing agreements, while only Mahi and Chambal basins have surplus water.

Inequity in Water Access
Rural-urban disparities, sectoral allocation imbalances and geographical inequalities lead to uneven drinking, agriculture and industrial water access.

Groundwater Depletion & Overextraction
80% of Rajasthan's area faces groundwater depletion; 50% of drinking water and 60% of irrigation rely on rapidly declining aquifers.

Deteriorating Groundwater Quality
Over-extraction leads to high salinity, fluoride and nitrate contamination, causing serious health risks in many regions.

Inefficient Water Management
Significant losses in drinking and irrigation sectors due to low operational efficiency, aging infrastructure and poor maintenance.

High Service Costs & Low Recovery
Water rates do not reflect scarcity, causing poor revenue collection, limited budget for repairs and outdated reservoir maintenance.

Lack of Stakeholder Participation
Weak ownership among Water User Associations (WUAs) results in poor irrigation project maintenance, canal mismanagement and revenue collection challenges.

Goals

INDICATORS	CURRENT STATUS	TARGET (2030)	TARGET (2047)
Universal access to safe water for all (%)	56	100	100
Universal access to safe water for all government institutions (%)	65	100	100
Groundwater extraction /Freshwater withdrawal (%)	149.86	<125	<100
Non-revenue Water loss (%)	40	<25	<15
Storage of rain water (Billion Cubic Meter)	14.55	16.05	20.00
Total Command Area (Lakh ha.)	39.20	45.00	50.00
Micro Irrigation System, under the command area (Lakh ha.)	6.04	10.00	20.00
Water Use Efficiency (%)	35- 40	50	60
Formation of Water User Association	About 4000	Water User Association in all irrigation projects	Water User Association in all irrigation projects
Automation of Dams and Canals	Automation of gates at Mahi, Jawai, Narmada Canal, Chhapi, Gudha, Jawahar Sagar, RPS, Kalisindh and Rajgarh dams has been completed	All Major irrigation projects	All medium Irrigation projects

Mid-Term Action Plan 2030

Har Ghar Jal Certification
Achieve 100% rural household tap water coverage, ensuring safe drinking water, sanitation and hygiene facilities in all schools, anganwadis and healthcare institutions.

Strengthened Water Governance
Establish institutional frameworks for bulk water transmission, village distribution management and promote Public-Private Partnerships (PPPs) for sustainable water infrastructure development.

Advanced Technology Integration
Implement AI, IoT sensors and Decision Support Systems (DSS) to optimize water demand, monitor groundwater extraction and enhance data-driven governance.

Real-Time Water Quality Monitoring
Deploy sensor-based monitoring and dashboard integration to detect water impurities and ensure safe drinking water for 4.20 lakh affected households by 2027.

Digital Water Metering
Introduce prepaid water meters in urban areas first, later expanding to rural regions for efficient monitoring and cost recovery.

Non-Revenue Water (NRW) Reduction
Establish NRW Cells at state and district levels, ensuring minimal water loss through smart metering, leak detection and volumetric water usage control.

Smart Water Dispensing Systems
Install smart-card-operated water kiosks in areas where piped networks are not feasible, ensuring safe drinking water access.

Grey Water Management & Recycling
Encourage wastewater reuse in agriculture and industry, ensuring Zero Liquid Discharge (ZLD) compliance in Pali, Bhilwara, Balotra, Udaipur and Kota.

Circular Economy in Water
Promote wastewater treatment for irrigation, industry and horticulture, with quality standards developed by IIT Jodhpur & ICAR.

Rainwater Harvesting & Storage
Construct 5 lakh water harvesting structures under MJSA 2.0 by 2030, including stormwater collection along roads and rooftop rainwater harvesting.

Groundwater Recharge & Control
Implement scientific deep exploration, aquifer testing, hydro-fracturing and Telemetry Digital Water Level Recorders (TDWLR) at gram panchayat levels.

Water Conservation Awareness
Establish Water Harvesting Theme Parks and launch rainwater harvesting awareness programs in schools, colleges and rural communities.

Inter-Basin Water Transfer Projects
Prioritise Sabarmati-Jawai floodwater diversion, Dewas III & IV projects and Chambal-Banas transfers to address district-level water deficits.

Climate Resilience & River Health
Implement downstream water release mandates, strengthen environmental protection and study Ghaggar floodwater harvesting for groundwater augmentation.

Smart Water Resource Management
Develop the Rajasthan State Water Informatics Center (RSWIC) to provide real-time hydrological forecasts and decision support systems for efficient water governance.

Automation in Water Infrastructure
Automate canals and dams using Supervisory Control and Data Acquisition (SCADA) to enhance water distribution efficiency.

Efficient Irrigation & Agriculture Water Use
Expand drip, sprinkler and pressurized irrigation, integrate solar-powered micro-irrigation and promote low-water-consuming, high-value crops.

Equitable Water Distribution System
Implement water-sharing policies among sectors and regions, prioritizing critical shortage areas for balanced distribution.

Micro-Watershed-Based Project Planning
Develop Upper High-Level Canal Project (42,000 ha. irrigation), Parwan Project (2.01 lakh ha. irrigation + drinking water) and Dholpur Lift Project (39,980 ha. irrigation).

Community Participation & Water User Associations
Strengthen Participatory Irrigation Management (PIM), train Water User Organizations and return 50% of collected water charges for irrigation system maintenance.

Long-Term Action Plan — 2047

Sustaining Har Ghar Jal Status
100% rural households will continue to have regular and safe drinking water, along with functional tap connections, sanitation and hygiene facilities in all institutions.

Strengthening Water Governance
A State Planning Organisation will oversee water resources, demand assessment, inter-sectoral allocation, overall water budgeting and State Water Policy implementation with scientific and GIS-based studies.

Advanced AI & IoT-Based Water Monitoring
AI-driven leak detection, satellite-based geospatial analysis and IoT sensors will optimize water management, minimize losses and improve water distribution efficiency.

Groundwater Recharge & Management
GIS-based aquifer mapping, Hydro Geo-Morphological (HGM) modelling and artificial recharge will restore over-exploited groundwater resources.

Reduction in Non-Revenue Water (NRW)
Every urban water supply zone will reduce NRW by 15% through smart metering, automated leak detection and AI-powered water loss prevention systems.

Universal Prepaid Water Meters
100% water supply metering in urban and rural areas will improve cost recovery, conservation and equitable distribution.

Treated Wastewater Recycling
100% wastewater treatment by 2047, with recycling for agriculture, industries and urban usage, as emphasized in the PM's 2023 Chief Secretaries Conference.

Decentralised Wastewater Management
City Water Balance Plans (CWBP) and City Sanitation Plans (CSP) will promote local reuse of treated water and wastewater-to-resource recovery transformation.

Paleo Drainage Network Rejuvenation
Revival of defunct Saraswati and other paleo channels to strategically store groundwater for climate resilience and emergency water supply.

Interlinking of Canals & River Basins
Diversion of Chambal, Mahi and Brahmani basin surplus water to deficit regions, ensuring year-round water supply and agricultural stability.

Floating Solar Panels on Dams & Canals
Reservoir-based floating solar farms and solar-covered irrigation canals will reduce evaporation losses and generate renewable energy.

Expansion of Alternative Water Sources
Rainwater harvesting, aquifer recharge and stormwater collection will be mandatory in urban and rural areas to ensure uninterrupted water supply.

Farmer Training & Efficient Irrigation
Drip, sprinkler and precision irrigation techniques will improve agricultural water efficiency, reducing dependency on groundwater extraction.

Data-Driven Irrigation Planning
SCADA-based irrigation monitoring, mobile apps, and crop-specific water norms will ensure demand-based water supply.

Expansion of Storage Infrastructure
New reservoirs, canal upgrades and increased dam heights will enhance water security and supply reliability.

Sustainable River Basin Management
Periodic river cross-section analysis, rainfall-runoff models and discharge rating updates will improve long-term water resource planning.

Automation of Canals & Dams
SCADA automation for all major irrigation projects will enable efficient water release and reduce manual inefficiencies.

Formation of Water User Regulatory Authority
A Water User Authority will set tariffs covering operation & maintenance (O&M) costs, ensuring financial sustainability of water infrastructure.

Strengthening Community Participation
Water User Associations (WUAs) in all irrigation projects will be empowered for decision-making, fee collection and maintenance.

Exploring Abandoned Mine-Pit Storage
Feasibility studies on storing water in abandoned mines will create new groundwater reserves for future climate resilience.

This strategic roadmap will make Rajasthan to lead with innovation, sustainability, resilience and technology for a greener future.