GOVERNMENT OF INDIA

MINISTRY OF JAL SHAKTI

DEPARTMENT OF WATER RESOURCES, RIVER DEVELOPMENT & GANGA REJUVENATION

RAJYA SABHA

UNSTARRED QUESTION NO. 2793

ANSWERED ON 18.08.2025

USING MODERN TECHNOLOGY FOR WATER MANAGEMENT AND CONSERVATION

2793. SHRI KARTIKEYA SHARMA

Will the Minister of **JAL SHAKTI** be pleased to state:

(a) progress made in digitizing water resource management using IoT sensors, GIS mapping and real-time monitoring for effective water conservation;

(b) whether there are pilot projects leveraging AI or remote sensing to predict water availability and optimize irrigation scheduling;

(c) manner in which Government is using data analytics and digital platforms to enhance transparency in water supply schemes and rural water delivery;

(d) support extended for adoption of smart water metering and leakage detection technologies in urban and rural areas; and

(e) whether Government is collaborating with startups or research institutions to develop indigenous water-saving and purification technologies?

ANSWER

THE MINISTER OF STATE FOR JAL SHAKTI

(SHRI RAJ BHUSHAN CHOUDHARY**)**

(a) & (b) Water being a State subject, the aspects related to water resources including their conservation are studied, planned, evaluated, funded, and executed by the State Governments themselves as per their own resources and priorities. The Central Government supplements the efforts of the States through various technical, financial, and policy-level interventions.

Under the Jal Shakti Abhiyan: Catch the Rain (JSA: CTR) campaign, implemented by the National Water Mission, Ministry of Jal Shakti, technology is leveraged to enhance the impact of artificial recharge structures. One of the key interventions under JSA: CTR is the enumeration, geo-tagging and inventorization of water bodies to facilitate the preparation of scientific water conservation plans. District Collectors and Magistrates have been requested to enumerate water bodies using old revenue records, remote sensing data from the National Remote Sensing Agency (NRSA) and Geographic Information System (GIS) mapping technology to mark boundaries, geo-tag structures and integrate data from the National Water Informatics Centre (NWIC) and State Water Resources Information Systems. This approach enables the development of data-driven scientific conservation plans. As per the JSA: CTR portal (jsactr.mowr.gov.in), 639 districts have prepared District Plans.

The Central Ground Water Board (CGWB) developed the India-Groundwater Resource Estimation System (IN-GRES), a web-based application that provides a standardized platform for groundwater resource assessment across the country, enabling consistent implementation by both Central and State Governments. CGWB conducts real-time groundwater level monitoring through a nationwide network of 5,260 Digital Water Level Recorders (DWLRs) equipped with telemetry systems, with data accessible via its online portal (https://gwdata.cgwb.gov.in). Advanced tools such as Geographic Information Systems (GIS) and remote sensing are integrated for aquifer mapping, identifying recharge zones, assessing source sustainability, and conducting spatial groundwater analyses. Additionally, satellite data from platforms like GRACE (Gravity Recovery and Climate Experiment) are leveraged for large-scale groundwater storage assessment, while collaborations with missions such as NISAR (NASA-ISRO Synthetic Aperture Radar) aims to enhance the detection of groundwater changes at the macro level.

As part of its ongoing initiatives to support States in sustainable water management and conservation, the Ministry of Jal Shakti takes several steps towards documenting and promoting traditional and conventional water harvesting systems across the country. The Ministry conducted India's first Census of Water Bodies during 2018–19, the findings of which were published in 2023. The census provides comprehensive data on more than 24.24 lakh water bodies across the country, including details on their use, status, condition, storage, and encroachments. These water bodies include ponds, tanks, reservoirs, lakes, check dams, and others, thereby offering a broad database for analysis and planning purposes.

In addition, a notable initiative in this regard is the development of the GIS-based sub-portal "Jal Dharohar", operational in its beta version since 1st November 2023, under the India-WRIS Portal. This portal presents a consolidated and geo-tagged database of water bodies across India and integrates data from multiple national programmes and sources, including the Jal Shakti Abhiyan, Atal Bhujal Yojana, Minor Irrigation Statistics, the First Census of Water Bodies, and the National Water Informatics Centre (NWIC). It serves as a visual and spatial tool for awareness creation, planning, and monitoring of water resources.

The Modernization of Command Area Development and Water Management (MCAD) scheme leverages innovation and technology for water management, audit and performance assessment. The Scheme uses GIS and satellite data for planning, use of SCADA/IoT based systems for service level monitoring, volumetric measurement of water used, measuring WUE/water productivity of each field amongst other applications.

Under the National Hydrology Project (NHP), 6457 nos. of Real Time Data Acquisition System (RTDAS) for Surface Water and 17,105 nos. of RTDAS for Ground Water are Installed across the country to monitor the surface water level and ground water level respectively in real time.

Further, under the Surface Minor Irrigation (SMI) component of PMKSY-HKKP, close monitoring of minor irrigation projects undertaken by the State Government is conducted using Geographic Information System (GIS) maps. Each project included under the SMI scheme is assigned a Unique Identification Code (UIC). Monitoring by the State Government is carried out through agencies that are independent of the construction agencies.

Additionally, Smart elements, components and technologies are part of AMRUT projects which aims to promote sustainable urban development. AMRUT guidelines provides for smart elements such as Supervisory Control and Data Acquisition (SCADA) as part of the water supply and sewerage projects. As reported by States/UTs 230 Water supply projects and 146 Sewerage projects have been implemented with SCADA. Under AMRUT/ AMRUT 2.0, States/UTs are empowered to select, design, and implement projects tailored to local conditions and constraints. MoHUA supports States through spatial planning and performance tracking, with NRSC facilitating GIS and remote sensing-based mapping. Under Urban Waterbody Information System (UWAIS), NRSC has mapped over 28,761 water bodies covering 7.13 lakh hectares to support informed decision-making.

(c) & (d) Water being a State subject, the aspects related to water resources including their conservation are studied, planned, evaluated, funded, and executed by the State Governments themselves as per their own resources and priorities. The Central Government supplements the efforts of the States through various technical, financial, and policy-level interventions.

The Government of India issued advisory to all States/ UTs to consider sensor based IoT solutions to measure and monitor water supply in rural areas. States have been allowed to utilize Support funds of JJM for all such activities.

To encourage States/ UTs for promoting usage of IoT sensors, Department of Drinking Water and Sanitation in collaboration with Ministry of Electronics and Information Technology (MEITY) conducted an Information and Communication Technology (ICT) Grand Challenge wherein IoT sensors were deployed at 100 locations across the country. These sensors have been integrated with JJM dashboard and provides real time data of water service delivery.

(e) Water being a State subject, the aspects related to water resources including their conservation and purification are studied, planned, evaluated, funded, and executed by the State Governments themselves as per their own resources and priorities. The Central Government supplements the efforts of the States through various technical, financial, and policy-level interventions.

The Modernization of Command Area Development and Water Management (MCAD) scheme under the Ministry of Jal Shakti encourages innovative solutions including engagement with startups, Agricultural Universities and collaboration with FPOs, PACS, and research institutions for water-saving technologies to meet the objective of integrated, sustainable, efficient and inclusive water management. The Online Program Management Information System portal and India Irrigation Management System (IIMS) Portal captures project progress and water accounting. Participation of users through Water User Societies (WUS) with regular third-party audits ensures transparency.

Also, Technology Sub-Mission is an important component of AMRUT 2.0 to encourage start-up ideas, private entrepreneurship and commissioning them into the pilot projects. Under this Sub-Mission, 120 Start-ups were shortlisted and mapped with 82 AMRUT cities.

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