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Ripples

India's Sustainable Water Management Story

March 2023

Ekansha Khanduja,
Upasana Negi,
Kartikey Chaturvedi,
Saiba Gupta, and
Nitin Bassi

India has taken extensive steps towards sustainable water resource management in recent years. Our water management narrative is uniquely tied to our economic story. This book decodes India's water story and how its ripples are felt in other spheres of sustainable development. It also reflects India's strategic importance in driving sustainable water management on the global stage.

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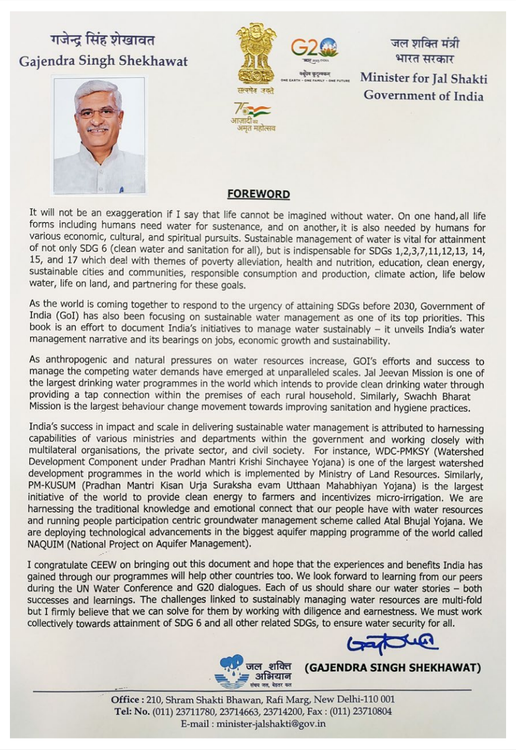
Foreword



गजेन्द्र सिंह शेखावत
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FOREWORD

It will not be an exaggeration if I say that life cannot be imagined without water. On one hand, all life forms including humans need water for sustenance, and on another, it is also needed by humans for various economic, cultural, and spiritual pursuits. Sustainable management of water is vital for attainment of not only SDG 6 (clean water and sanitation for all), but is indispensable for SDGs 1,2,3,7,11,12,13, 14, 15, and 17 which deal with themes of poverty alleviation, health and nutrition, education, clean energy, sustainable cities and communities, responsible consumption and production, climate action, life below water, life on land, and partnering for these goals.

As the world is coming together to respond to the urgency of attaining SDGs before 2030, Government of India (GoI) has also been focusing on sustainable water management as one of its top priorities. This book is an effort to document India's initiatives to manage water sustainably – it unveils India's water management narrative and its bearings on jobs, economic growth and sustainability.

As anthropogenic and natural pressures on water resources increase, GOI's efforts and success to manage the competing water demands have emerged at unparalleled scales. Jal Jeevan Mission is one of the largest drinking water programmes in the world which intends to provide clean drinking water through providing a tap connection within the premises of each rural household. Similarly, Swachh Bharat Mission is the largest behaviour change movement towards improving sanitation and hygiene practices.

India's success in impact and scale in delivering sustainable water management is attributed to harnessing capabilities of various ministries and departments within the government and working closely with multilateral organisations, the private sector, and civil society. For instance, WDC-PMKSY (Watershed Development Component under Pradhan Mantri Krishi Sinchayee Yojana) is one of the largest watershed development programmes in the world which is implemented by Ministry of Land Resources. Similarly, PM-KUSUM (Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan Yojana) is the largest initiative of the world to provide clean energy to farmers and incentivizes micro-irrigation. We are harnessing the traditional knowledge and emotional connect that our people have with water resources and running people participation centric groundwater management scheme called Atal Bhujal Yojana. We are deploying technological advancements in the biggest aquifer mapping programme of the world called NAQUIM (National Project on Aquifer Management).

I congratulate CEEW on bringing out this document and hope that the experiences and benefits India has gained through our programmes will help other countries too. We look forward to learning from our peers during the UN Water Conference and G20 dialogues. Each of us should share our water stories – both successes and learnings. The challenges linked to sustainably managing water resources are multi-fold but I firmly believe that we can solve for them by working with diligence and earnestness. We must work collectively towards attainment of SDG 6 and all other related SDGs, to ensure water security for all.

(GAJENDRA SINGH SHEKHAWAT)

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Context

The global water sector has two important forums in 2023. One, the United Nations (UN) Water Conference, which resumes after 46 years on World Water Day (22 March 2023) in New York, and two, India's G20 Presidency, which has included water management as a theme for the Environment and Climate Sustainability Working Group (ECSWG). Both forums are expected to bring substantial focus on the way water is managed worldwide and whether countries are on target to meet the water-specific Sustainable Development Goals.

India has a unique water resource endowment. It receives almost 75 per cent of its water from the south-west monsoon (June-September) every year. It also has high spatial variability in water distribution: Rivers originating from the Himalayas, such as the Ganga and Brahmaputra, are perennial, whereas those in the Indian peninsula, such as Krishna and Cauvery, are mostly seasonal. In many parts of India, groundwater is the major water source during the non-monsoon months. In fact, with an average annual withdrawal of about 239 billion cubic metres[1], India is the largest consumer of groundwater in the world. Almost 2 million habitations[2] (about 85 per cent of total habitations) have groundwater-based public water supply services. Groundwater is also used for irrigating about 65 million hectares[3] (about 63 per cent) of gross cropped area. Further, India generates about 72,000 million litres[4] of domestic wastewater per day that needs to be managed properly to ensure that the surface water bodies (such as lakes and rivers) are not polluted. Considering these aspects, India's efforts to manage water, in terms of quantity and quality, hold interesting learnings for the world.

This book covers the ongoing efforts of the Government of India to manage water in sustainable and equitable ways, and provides a snapshot of the major policies, schemes, and missions adopted by India in the last two decades. These are organised within seven themes: **Water, Sanitation and Hygiene (WASH); Water Data and Information; Water Harvesting; Water Conservation and River Rejuvenation; Climate Proofing; Water Use Efficiency; and Groundwater Management**. For each scheme, this book details the objectives, financial allocation, implementation, achievements, growth, jobs potential, and contribution to sustainable development. The report is a handy reference for national and international stakeholders to glean insights into India's water management.

1 Central Ground Water Board.2022. "Dynamic Ground Water Resource of India, 2022." Faridabad: Ministry of Jal Shakti, Government of India. http://cgwb.gov.in/documents/2022-11-11-GWRA%202022.pdf

2 Government of India. 2018. "Ground/Surface Water Based Schemes: Format B26- List of Schemes." Ejalshakti.gov.in. National Rural Drinking Water Programme, Ministry of Jal Shakti. Accessed February 27, 2023.https://ejalshakti.gov.in/IMISReports/Reports/BasicInformation/rpt_SchemesSourcesGWSW_S.aspx?Rep=0&RP=Y

3 Author's calculation based on - Directorate of Economics and Statistics. 2021. "Agricultural Statistics at a Glance 2021." New Delhi: Ministry of Agriculture and Farmers Welfare. Government of India. https://eands.dacnet.nic.in/PDF/Agricultural%20Statistics%20at%20a%20Glance%20-%202021%20(English%20version).pdf and Jain, Rajni, Prabhat Kishore, and Dhirendra Kumar Singh. 2019. "Irrigation in India: Status, Challenges and Options." Journal of Soil and Water Conservation 18 (4): 1–11. https://doi.org/10.5958/2455-7145.2019.00050.x.

4 Central Pollution Control Board. 2021. "National Inventory of Sewage Treatment Plants." Delhi: Ministry of Environment, Forest and Climate Change, Government of India. https://cpcb.nic.in/openpdffile.php?id=UmVwb3J0RmlsZXMvMTIyOF8xNjE1MTk2MzIyX21lZGlhcGh-vdG85NTY0LnBkZg==

Contents

Acronyms

AMRUT	Atal Mission for Rejuvenation and Urban Transformation
ADB	Asian Development Bank
CGF	Clean Ganga Fund
CGWB	Central Ground Water Board
CPI	consumer price index
CPMU	central project management unit
CSR	corporate social responsibility
CT/PTs	community/public toilet seats
CTR	Catch The Rain
CWAP	city water action plan
CWC	Central Water Commission
DoWR,RD&GR	Department of Water Resources, River Development and Ganga Rejuvenation
DRIP	Dam Rehabilitation and Improvement Project
EAP	emergency action plan
ECSWG	Environment and Climate Sustainability Working Group
FHTC	functional household tap connection
FTE	full-time equivalent
G20	Group of Twenty
GDP	gross domestic product
GIS	geographic information system
GP	gram panchayat
GPIs	grossly polluting industries
GW	gigawatt
HP	horsepower
IBWT	inter basin water transfer
ICRISAT	The International Crops Research Institute for the Semi-Arid Tropics
IEC	information, education, and communication
INR	Indian Rupee
JJM	Jal Jeevan Mission
JJM(U)	Jal Jeevan Mission (Urban)
JSA	Jal Shakti Abhiyaan
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Scheme
MLD	million litres per day
MMT	million metric tonnes
MNRE	Ministry of New and Renewable Energy
MoAFW	Ministry of Agriculture and Farmer Welfare
MoEFCC	Ministry of Environment, Forest and Climate Change
MoHUA	Ministry of Housing and Urban Affairs
MoJS	Ministry of Jal Shakti
MoRD	Ministry of Rural Development
MW	megawatt
NAQUIM	National Aquifer Mapping and Management Programme
NGP	Namami Gange Programme
NHP	National Hydrology Project
NLCP	National Lake Conservation Programme
NMCG	National Mission for Clean Ganga
NPCA	National Plan for Conservation of Aquatic Ecosystems
NPP	National Perspective Plan
NWCP	National Wetland Conservation Programme
NWDA	National Water Development Agency
NWIC	National Water Informatics Centre
NWM	National Water Mission
O&M	operations and maintenance
OCEMS	online continuous effluent monitoring stations
ODF	open defecation free
PDMC	Per Drop More Crop
PMKSY	Pradhan Mantri Krishi Sinchayee Yojana
PM-KUSUM	Pradhan Mantri Kisan Urja Suraksha Evam Utthaan Mahabhiyan
PPP	public-private partnership
RRP	River Rejuvenation Plan
SAP	state action plan
SBM(G)	Swachh Bharat Mission - Gramin (Rural)
SBM(U)	Swachh Bharat Mission (Urban)
SCADA	Supervisory Control and Data Acquisition
SDG	Sustainable Development Goal
SPMG	state program management group
SWIC	state water information centre
ULB	urban local body
UN	United Nations
USD	United States Dollar
UT	Union Territory
VGF	viability gap funding
WASH	Water, Sanitation and Hygiene
WDC	Watershed Development Component
WIMS	Water Information Management System
WB	World Bank
WRIS	Water Resource Information System

Timeline of India's Water Action

2008
- National Action Plan on Climate Change
- Web enabled Water Resources Information System
- National Urban Sanitation Policy

2011
- National Water Mission

2012
- Revised National Water Policy 2012
- Dam Rehabilitation and Improvement Project (Phase -I)
- National Aquifer Mapping and Management (NAQUIM) Programme

2013
- Hydrometeorological Data Dissemination Policy 2013

2014
- Namami Gange Programme
- Swachh Bharat Mission (Rural) Phase 1
- Swachh Bharat Mission (Urban) Phase 1

2015
- Atal Mission for Rejuvenation and Urban Transformation (AMRUT) Phase 1
- Watershed Development Component - Pradhaan Mantri Krishi Sinchayi Yojana (PMKSY)
- Per Drop More Crop - Rashtriya Krishi Vikas Yojana
- National Plan for Conservation of Aquatic Ecosystem

2016
- First State Policy on Wastewater Reuse - Rajasthan
- National Hydrology Project
- National Council for Rejuvenation, Protection and Management of River Ganga (National Ganga Council)
- National Mission for Clean Ganga as an Authority under Environment (Protection) Act, 1986

2018
- Dedicated Micro-Irrigation Fund
- First Composite Water Management Index Report
- National Water Informatics Centre
- Revised Hydrometeorological Data Dissemination Policy 2018

2019
Ministry of Jal Shakti formed by merging Ministry of Water Resources,River Development & Ganga Rejuvenation, and Ministry of Drinking Water and Sanitation
- Jal Jeevan Mission
- Atal Bhujal Yojana
- Pradhan Mantri Kisan Urja Suraksha Evam Utthaan Mahabhiyan (PM KUSUM)
- Jal Shakti Abhiyaan-I

2020
- Revised Master Plan for Artificial Recharge of Ground Water, 2020
- Swachh Bharat Mission (Rural) Phase 2

2021
- Swachh Bharat Mission (Urban) Phase 2
- Atal Mission for Rejuvenation and Urban Transformation (AMRUT) Phase 2
- National Aquifer Mapping and Management (NAQUIM) Programme
- Dam Rehabilitation and Improvement Project (DRIP) - Phase II
- Ken-Betwa River Interlinking Project
- The Dam Safety Act, 2021
- Jal Shakti Abhiyan: Catch The Rain - 2021

2022
- Jal Shakti Abhiyaan: Catch the Rain - 2022
- National Framework on Safe Reuse of treated water
- River Rejuvenation Plan
- Bureau of Water Use Efficiency
- National Framework for Silt Management

2023
- India's first Annual Ministerial Conference on Water and India Water Vision 2047 announced
- Jal Shakti Abhiyan: Catch The Rain - 2023 launched by Hon'ble President of India

Each drop represents a milestone in India's sustainable management journey that directly contribute to the colour-coded category of SDGs.

The more the number of drops, the more goals are targeted by the scheme across different categories.

- SDG 1
- SDG 2
- SDG 3
- SDG 4
- SDG 5
- SDG 6
- SDG 7
- SDG 8
- SDG 9
- SDG 10
- SDG 11
- SDG 12
- SDG 13
- SDG 14
- SDG 15
- SDG 16
- SDG 17

WATER, SANITATION AND HYGIENE (WASH)

Jal Jeevan Mission

Swachh Bharat Mission
Gramin (Rural)

Swachh Bharat Mission
Urban

Atal Mission for Rejuvenation and Urban Transformation

Water, Sanitation and Hygiene (WASH)

Jal Jeevan Mission

OBJECTIVES

The Jal Jeevan Mission (JJM) was launched on 15 August 2019, India's 73rd Independence Day, with the objective to provide safe drinking water to every rural household through a functional household tap connection (FHTC) by 2024. It aims to cover **190 million households** with a population of about 900 million people. JJM marked a shift in water supply focus from 'habitations to households'.

In addition to creating water supply infrastructure, JJM aims to ensure regular water supply of prescribed quality (as per Bureau of Indian Standards:10500) and in adequate quantity (minimum 55 litres per person per day).

FINANCIAL ALLOCATION

INR 3,60,000 crore (USD 43.51 billion)

The outlay of the Mission, with the central and state governments contributing INR 2,08,652 crore (USD 25.22 billion) and INR 1,51,348 crore (USD 18.29 billion) respectively. [5]

IMPLEMENTATION

The Department of Drinking Water and Sanitation, Ministry of Jal Shakti (MoJS)
The nodal department responsible for implementing the mission, in partnership with states and Union Territories for five years (2019-2024).

The operational guidelines provide for an institutional mechanism at the national, state, district, and village levels, and allow the formulation of action plans for each. The State Water and Sanitation Mission, which is a society registered under the state or Union Territory with the State Chief Secretary as its head, is the organisation responsible for implementing JJM in each state, including the overall planning, strategising, and finalising of the State Action Plan (SAP) to provide FHTC to every rural household by 2024.

JOBS
JJM has tremendous potential to create jobs in rural areas, in areas such as plumbing, water quality testing, community mobilisation, water supply and wastewater treatment operations. In 2020, during the Covid-19 pandemic, JJM activities were identified among the 25 target-driven works to provide employment to the impacted migrant labourers in the rural areas of **116 districts** in six states, namely Bihar, Jharkhand, Madhya Pradesh, Odisha, Rajasthan, and Uttar Pradesh. The target was to provide 125 days of employment to 6.7 million migrant workers.[8]

GROWTH
INR 1,000 crore[9] (USD 120.86 million) The potential of savings from JJM. This is estimated as the income lost per annum on account of workdays spent by women in collecting water from distant sources. Additionally, India can save large parts of the economic cost of waterborne diseases, which is estimated to be about **INR 11,120 crore[10] (USD 1.34 billion)** per annum.

SUSTAINABILITY
JJM contributes to SDG 6 (ensure access to clean water and sanitation for all), specifically aligning with **target 6.1** (achieving universal and equitable access to safe and affordable drinking for all by 2030), and partially with **target 6.3** (improving water quality by reducing pollution, eliminating dumping and minimising the release of hazardous chemicals and materials, halving the proportion of untreated wastewater, and substantially increasing recycling and safe reuse globally by 2030). Further, it addresses **SDG 3.3**, on ending the occurrence of water-borne diseases by 2030. The JJM intends to achieve SDG 6.1 by 2024.

5 Government of India. 2019. "Operational Guidelines for the Implementation of Jal Jeevan Mission." New Delhi: Department of Drinking Water and Sanitation, Ministry of Jal Shakti. https://jaljeevanmission.gov.in/sites/default/files/guideline/JJM_Operational_Guidelines.pdf. (Conversion rate used in this section: 1 USD = INR 82.74).

6 Government of India. 2023. "Jal Jeevan Mission Dashboard." Ejalshakti.gov.in. Ministry of Jal Shakti. Accessed January 5, 2023 https://ejalshakti.gov.in/jjmreport/JJMIndia.aspx.

7 Government of India. 2022. "National Report Functionality Assessment of Household Tap Connections." New Delhi: Department of Drinking Water and Sanitation, Ministry of Jal Shakti. https://jaljeevanmission.gov.in/sites/default/files/2022-10/ national_report_of_ functionality_assessment_ 2022.pdf.

8 Deb, Rouhin. "Opinion | Understanding Garib Kalyan Rojgar Yojana and Its Implications." Mint, June 29, 2020. https://www.livemint.com/opinion/online-views/opinion-understanding-garib-kalyan-rojgar-yojana-and-its-implications-11593420501668.html.

9 International Development Enterprises - India. 2016. "Water." Ide-India.org. Accessed February 25, 2023. https://www.ide-india.org/.

10 Khurana, Indira, and Romit Sen. 2009. "Drinking Water Quality in Rural India: Issues and Approaches - Background Paper." India: Water Aid. Drinking%20water%20quality%20in%20rural%20India%20-%20Issues%20and%20approaches.pdf. (Price has been adjusted to year 2021 using CPI for 2015 as the base year).

11 ibid.

12 Government of India. 2023. "Jal Jeevan Mission Dashboard." Ejalshakti.gov.in. Ministry of Jal Shakti. Accessed January 31, 2023. https://ejalshakti.gov.in/jjmreort/JJMIndia.aspx.

ACHIEVEMENTS

As per the JJM dashboard, as of 30 January 2023, about
110.4 million rural households
in India (57 per cent of the total aim) have been provided tap water connections. Only 17 per cent rural households had tap water connections in 2019, prior to the launch of JJM.[6]

The 2022 functionality assessment found that out of the total households surveyed,
86 per cent of households had working tap connections.
Of these, 80 per cent received water regularly as per the schedule of their piped water supply scheme, 87 per cent received water of the prescribed quality standards, and 85 per cent received adequate quantity.[7]

At the start of Jal Jeevan Mission in 2019, about 17 per cent (32.3 million) rural Indian households had tap water connections[11]

As of 2023,
more than 80 million
households have been given tap water connections, accounting for a total of 57.6 per cent (111.2 million) rural households with tap water connections.[12]

Water, Sanitation and Hygiene (WASH)

Swachh Bharat Mission

Gramin (Rural)

OBJECTIVES

The first phase of Swachh Bharat Mission- Gramin [SBM(G)] was implemented from 2014 to 2019 with the objective to **make rural India open defecation free (ODF)** by covering all households with improved sanitation facilities. On 2 October 2019, the 150th birth anniversary of Mahatma Gandhi, all villages **(more than 6,00,000)** in India declared themselves ODF. [13]

In 2020, the Mission entered its second five-year phase, with the primary objective to **move from ODF to ODF-Plus** by sustaining the ODF status and ensuring the safe management of solid and liquid waste in all villages of India.

FINANCIAL ALLOCATION

INR 1,40,881 crore[14] (USD 17.03 billion)

The financial outlay for SBM(G) phase 2. In addition to the central allocation and the corresponding state shares, funds are raised from sources such as the 15th Finance Commission grants to rural local bodies, Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGA), corporate social responsibility (CSR) funds, etc.[15] The 15th Finance Commission has recommended an allocation of **INR 2,36,805 crore** (USD 28.62 billion) to rural local bodies for the period of 2021-22 to 2025-26 for water and sanitation services.[16]

IMPLEMENTATION

The Department of Drinking Water and Sanitation, Ministry of Jal Shakti (MoJS)
The nodal agency for implementing the mission's ongoing phase 2 in partnership with states and Union Territories in five years (2020-25). The mission guidelines have provisions for institutional arrangements at the national, state, district, and village levels.

- In addition to the State Water and Sanitation Mission set up under the Jal Jeevan Mission, the State Swachh Bharat Mission, supervises the implementation of the scheme in the project districts of a state.
- Further, the district Swachh Bharat Mission headed by the chairperson of the *Zilla Parishad* is responsible for implementation at the district level.
- The village or *gram panchayat* (GP) leads the planning and implementation of construction and maintenance of all solid and liquid waste management infrastructure at the village level. The GP also carries out Information, Education, and Communication (IEC) activities with local Non-Government Organisations. These activities are undertaken by the GPs with funds from the 15th Finance Commission.

The village-level interventions under SBM(G) are to be in accordance with the Village Action Plan, formulated by each GP under the JJM. Further, the MoJS has prepared a 10-year Rural Sanitation Strategy (2019-2029) to ensure solid and liquid waste management in the villages.

JOBS
SBM (G) created jobs in rural areas
related to plumbing, construction, material supply, community and mobilisation. As per UNICEF estimates, the employment of 7.5 million Full-Time Equivalents (FTE) workers was created by SBM(G) by 2019, and another 5.63 million is expected to be generated by 2023-24.[20]

GROWTH
INR 3,12,120 crore[21] (USD 37.72 billion)
saved from 2014-15 to 2019-20 at the national scale mainly on account of public health benefits due to access to improved latrines created under SBM(G) phase 1.

SUSTAINABILITY
India has helped reduce global open defecation by over 50 per cent[22]
This has progressed the country towards achieving **SDG 6.2**, which aims for adequate and equitable sanitation access for all and ending open defecation, with a focus on women and girls and other vulnerable groups.

13 Government of India. 2020. "One Year of Jal Shakti 2019 - 20." Delhi: Ministry of Jal Shakti. https://jalshaktiddws.gov.in/sites/default/files/1_year_of_ministry_booklet_English.pdf.

14 Government of India. 2020. "Swachh Bharat Mission (Grameen) Phase II Operational Guidelines." Delhi: Department of Drinking Water and Sanitation, Ministry of Jal Shakti. https://swachhbharatmission.gov.in/SBMCMS/writereaddata/portal/images/pdf/sbm-ph-II-Guidelines.pdf. (Conversion rate used in this section: 1 USD = INR 82.74).

15 ibid.

16 Government of India. 2021. "Manual for the Utilization of 15th Finance Commission Tied Grants to Rural Local Bodies/ PRIs for Water & Sanitation (2021-22 to 2025-26)." Delhi: Department of Drinking Water and Sanitation, Ministry of Jal Shakti. https://swachhbharatmission.gov.in/SBMCMS/writereaddata/portal/images/pdf/Manual_for_utilisation_of_15th_FC_tied_funds.pdf.

17 Government of India. 2020. "One Year of Jal Shakti 2019 - 20." Delhi: Ministry of Jal Shakti. https://jalshakti-ddws.gov.in/sites/default/files/1_year_of_ministry_booklet_English.pdf.

18 ibid.

19 Government of India. n.d. "SBM-G Dashboard." Sbm.gov.in. Ministry of Jal Shakti. Accessed January 5, 2023. https://sbm.gov.in/sbmgdashboard/statesdashboard.aspx.

20 UNICEF. 2020. "National Economic Impact Evaluation of the Swachh Bharat Mission." https://drive.google.com/file/d/1ASPEWD-bpSvPcFE_WkZeZ6oSEcHSFV6i/view.

21 ibid.

22 Government of India. 2020. "One Year of Jal Shakti 2019 - 20." Delhi: Ministry of Jal Shakti. https://jalshakti-ddws.gov.in/sites/default/files/1_year_of_ministry_booklet_English.pdf.

ACHIEVEMENTS

The rural sanitation coverage in India increased from
less than 40 per cent in 2014 to 100 per cent,
that is, universal coverage, in 2019.[17]

Over 105 million toilets were constructed across the states and UTs, with more than 6,00,000 villages declaring themselves ODF by 2019.[18]

As per the SBM(G) 2.0 dashboard,
1,74,462 villages
(about 30 percent of the 6,00,000 villages) have been declared ODF-Plus by January 2023.[19]

The world's largest sanitation and behaviour change movement, the
Swachh Bharat Mission made history
when all states and Union Territories of India declared themselves open defecation free (ODF) in 2019.

Water, Sanitation and Hygiene (WASH)

Swachh Bharat Mission Urban

OBJECTIVES

The Swachh Bharat Mission- Urban [SBM(U)] is a replica of Swachh Bharat Mission (Rural) for urban areas. While the first phase (2014-2019) focussed on making urban India open defecation free (ODF) through the adoption of improved sanitary facilities by 2019, the second phase (2021-2026, SBM 2.0) aims to achieve **'garbage free' status in all cities by 2026**, with a focus on:

- **Sustainable solid waste management,** including **100 per cent** source segregation, door to door collection and transportation of segregated waste, processing, and safe disposal, and remediation of all legacy dumpsites
- **Sustainable used-water management,** covering treatment of used water, including faecal sludge, before discharge into water bodies, and maximum reuse of treated used water
- ***'Jan Andolan'***, that is, citizen outreach through Information, Education and Communication (IEC) and behaviour change campaigns, and capacity building and skilling of all relevant stakeholders.

FINANCIAL ALLOCATION

INR 1,41,600 crore (USD 17.11 billion)

The total outlay of SBM(U) 2.0, including the Union government's share of INR 36,465 crore (USD 4.41 billion) for the period of 2021-22 to 2025-26.[23] The remaining funds are to be contributed by states and Union Territories, urban local bodies (ULBs), and the private sector via avenues such as public-private partnership (PPP) and CSR. States, UTs and ULBs can also leverage grants from the 15th Finance Commission.

IMPLEMENTATION

The Ministry of Housing and Urban Affairs (MoHUA)
The nodal ministry for SBM(U). States and UT are implementing the scheme in all statutory towns[24] (as per Census 2011, and statutory towns added subsequent to that), as per the SBM(U) 2.0 guidelines.

ULBs are key to the implementation, especially developing infrastructure and delivery of urban services by leveraging public-private partnership (PPP) models, because they can claim viability gap funding (VGF) for PPP projects from the Union government.

ULBs also have to prepare city solid waste action plans and city sanitation action plans. These plans are to provide details on the existing infrastructure for solid waste management and used-water management respectively, along with gap assessment and proposed projects/interventions with timelines.

JOBS
SBM (U) created jobs in urban areas related to plumbing, construction, material supply, community mobilisation, solid waste management and wastewater treatment operators.

GROWTH
INR 25.8 lakh crore[32] (USD 312 billion) Saved from 2014-15 to 2019-20 at the national scale, mainly on account of public health benefits due to access to improved latrines created under SBM (U) phase 1.

SUSTAINABILITY
SBM addresses SDG 6, with special emphasis on **target 6.2** that aims for adequate and equitable sanitation access for all and ending open defecation, with a focus on women and girls and other vulnerable groups. It also addresses **SDG 11.6**, which focuses on municipal solid waste and other waste management.

23 Government of India. 2021. "Swachh Bharat Mission - Urban 2.0 Operational Guidelines." Delhi: Ministry of Housing and Urban Affairs. https://sbmurban.org/storage/app/media/pdf/swachh-bharat-2.pdf (Conversion rate used in this section: 1 USD = INR 82.74).

24 As per the Census of India 2011, statutory towns refer to all urban settlements having a municipality, corporation, cantonment board or notified town area committee.

25 Government of India. 2023. "Swachh Bharat Mission Urban Mission Progress." Sbmurban.org. Ministry of Housing and Urban Affairs https://sbmurban.org/mission-progress.

26 ibid.

27 ibid.

28 ibid.

29 ibid.

30 ibid.

31 Government of India. 2023. "Swachh Survekshan 2022." Sbmurban.org. Ministry of Housing and Urban Affairs. Accessed January 3, 2023. https://sbmurban.org/ss-2022-result-dashboard.

32 UNICEF. 2020. "National Economic Impact Evaluation of SBM." https://drive.google.com/file/d/1ASPEWD-bpSvPcFE_WkZeZ6oSEcHSFV6i/view.

ACHIEVEMENTS

By 2019,
4,371 ULBs (out of 4372 ULBs) had become ODF
under SBM(U) phase-I, with 6.7 million individual household toilets and 6,40,000 community/public toilet seats (CT/PTs) constructed. [25]

Under SBM(U) 2.0, standardised protocols for assessment have been established:

- **ODF focus on robust monitoring mechanism:** in 4,371 ULBs[26]
- **ODF+ ensuring proper functioning** and operations & maintenance of CT/PTs in 3,447 cities[27]
- **ODF++ ensuring proper management** of faecal sludge in 1,062 cities[28]
- **Water+ ensuring proper used-water treatment before discharge into water bodies:** in 14 cities, such as New Delhi, Hyderabad, and Mumbai etc.[29]

Almost 30 per cent of legacy waste has been remediated,
with 16 per cent of area under legacy dumpsites reclaimed.[30]

'Swachh Survekshan',
an urban sanitation survey conducted by MoHUA under SBM(U), covered 4,354 ULBs by 2022. [31]

Water, Sanitation and Hygiene (WASH)

Atal Mission for Rejuvenation and Urban Transformation

OBJECTIVES

Atal Mission for Rejuvenation and Urban Transformation (AMRUT) was launched in 2015 for five years to provide universal water supply and substantial improvement in sewerage coverage in **500** select AMRUT cities, accounting for 60 per cent of India's urban population.

Building upon the Mission's progress, AMRUT 2.0 was launched in 2021 for another five years. A key objective of AMRUT 2.0 is to make cities **'water secure'** by providing water supply to all urban households. This will be done by construction of **26.8 million new tap water connections across 4,800 statutory towns**. Other components include:

- **Providing 26.4 million** new sewer connections/septage services in 500 AMRUT cities
- **Rejuvenation of water bodies** and developing green spaces and parks projects

AMRUT's reform agenda includes developing a City Water Balance Plan for each city to promote the adoption of circular economy of water, and a city water action plan (CWAP) focusing on recycling/reuse of treated sewage, rejuvenation of water bodies, and water conservation. The scheme has targeted treated wastewater reuse to meet **20 per cent** of city water demand and **40 per cent** of total industrial water demand in the states. It also aims to reduce non-revenue water to below 20 per cent (from the current level of around 38 per cent[33]) and provide 24X7 water supply with 'drink from tap facility' in the 500 AMRUT cities.

FINANCIAL ALLOCATION

INR 2,99,000 crore (USD 36.14 billion)

The total outlay for AMRUT 2.0. This includes the initial outlay of INR 2,77,000 crore (USD 33.48 billion) from FY 2021-22 to FY 2025-26.[34] This also covers the additional allocation of INR 22,000 crore (USD 2.66 billion) made later to complete the ongoing AMRUT projects up to 31 March 2023.[35] From this, INR 86,800 crore (USD 10.49 billion) is the Union government's share, and the balance funds are contributed by the states, Union Territories (UT) and the urban local bodies (ULBs).[36]

IMPLEMENTATION

The Ministry of Housing and Urban Affairs (MoHUA)
The nodal ministry for AMRUT/JJM(U). States, UTs and ULBs have tripartite Memoranda of Understanding (MoU) with MoHUA.

ULBs play a key role in implementation of AMRUT projects. The ULBs develop their CWAP that consists a list of projects for implementation in priority sectors of water supply, sewerage and septage management, and rejuvenation of water bodies, including green spaces and parks. Projects as per the approved state water action plan (aggregation of CWAPs) are planned, tendered, awarded and implemented by ULBs.

JOBS
AMRUT 2.0 has tremendous potential for creating jobs in urban areas, including in plumbing, water supply, wastewater treatment operations and urban planning.

GROWTH
INR 63 crore (USD 7.61 million)[41] The market value of treated wastewater available in 2021 in India, as per CEEW analysis, assuming that it is sold at the standard market rate for reuse in different sectors.

SUSTAINABILITY
AMRUT addresses SDG 6, (ensure access to water and sanitation for all), specifically aligning with **target 6.1**, which focuses on achieving universal and equitable access to safe and affordable drinking water for all, **target 6.3**, which focuses on reducing water pollution through treatment and reuse of wastewater, and **target 6.4**, which focuses on increasing water-use efficiency. AMRUT also promotes circular economy of water, thereby addressing **SDG 12.4**, which focuses on managing all types of wastes to reduce their adverse impacts on the environment and human health.

ACHIEVEMENTS

As of December 2022, AMRUT has:

- **Provided 13.4 million tap connections and 10.2 million sewer connections** against the targeted 13.9 million water connections and 14.5 million sewer connections.[37]
- **Created sewage treatment plants of 2,840 million litres per day** (MLD) treatment capacity, against a target of 6,340 MLD, of which 1,437 MLD has been developed for reuse.[38]
- **Developed 2,299 parks,** adding 4,480 acres of green space.[39]
- **Completed 666 storm water drainage projects,** eliminating 2,434 water logging points.[40]

Rajasthan became the first Indian state

to adopt a sewerage and wastewater policy in 2016. India adopted the National Framework on Safe Reuse of Treated Water in January 2023. As per CEEW research, currently 10 out of 28 Indian states have adopted wastewater treatment and reuse policies.[42]

33 Nideshna V. 2020. "Non-Revenue Water – A Fundamental Challenge in India's Water Utility Sector." Industrial Automation, March 24, 2020. https://www.industrialautomationindia.in/articleitm/9351/Non-Revenue-Water-%E2%80%93-A-Fundamental-Challenge-in-India%E2%80%99s-Water-Utility-Sector/articles#:~:text=Average%20NRW%20in%20India%20is,reported%20by%20the%20World%20Bank.

34 Government of India. 2021. "Atal Mission for Rejuvenation and Urban Transformation 2.0 Operational Guidelines." Delhi: Ministry of Housing and Urban Affairs. https://mohua.gov.in/upload/uploadfiles/files/AMRUT-Operational-Guidelines.pdf (Conversion rate used in this section: 1 USD = INR 82.74).

35 ibid.

36 ibid.

37 Press Information Bureau. 2022. "Status of AMRUT." December 8, 2022. Accessed January 12, 2023. https://pib.gov.in/PressReleasePage.aspx?PRID=1881751.

38 ibid.

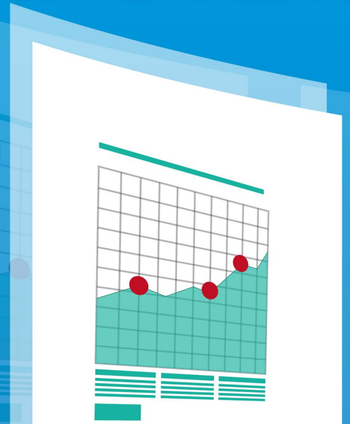
39 ibid.

40 ibid.

41 Bassi, Nitin, Saiba Gupta, and Kartikey Chaturvedi. 2023. "Reuse of Treated Wastewater in India: Market Potential and Recommendations for Strengthening Governance". New Delhi: Council on Energy, Environment and Water.

42 ibid.

WATER DATA AND INFORMATION



Water Data and Information

National Hydrology Project

Image credit: iStock

OBJECTIVES

The National Hydrology Project (NHP) was launched in 2016 for eight years with two objectives – first, to improve the extent, quality and accessibility of **water resources information and decision support systems** for floods and basin-level resource assessment and planning; second, to **strengthen the capacity** of targeted water resource professionals and management institutions in India.

India's Hydrological Information System (HIS) was established and strengthened by two World Bank-funded projects called Hydrology Project Phase I (1995-2003) and Hydrology Project Phase II (2006-14). Web-enabled Water Resource Information System (India-WRIS), established in 2008 under Hydrology Project Phase II, is a 'single-window solution' for India's water resources along with allied natural resources in a standardised national geographic information system (GIS) framework.

FINANCIAL ALLOCATION

INR 3,680 crore[43] (445.87 million USD)

The outlay of the project. NHP is a Central Sector Scheme with World Bank providing a loan assistance of about USD 160 million.[44]

IMPLEMENTATION

Department of Water Resources, River Development, and Ganga Rejuvenation, Ministry of Jal Shakti (MoJS)
The nodal implementation agency for NHP. In addition, there are 9 central agencies[45], 3 river basin-level institutions, and 36 state and UT agencies dealing with surface water and groundwater development and management. Four categories of works are being undertaken within the NHP:

- Establishment of new and strengthening of existing water resource monitoring systems, including setting up hydrometeorological observation networks, Supervisory Control and Data Acquisition (SCADA) systems for water infrastructure, and hydro-informatics centres.
- Strengthening national and establishing regional water resource information systems.
- Developing water resource operations and planning systems, such as analytical tools and decision support platforms (river basin modelling, streamflow forecasting, reservoir operation systems, and irrigation management and operations), and piloting innovative knowledge products.
- Institutional capacity enhancement for knowledge-based water resource management of selected staff of implementing institutions, and establishing national and regional 'Centres of Excellence'.

JOBS
NHP has the potential to boost jobs in geospatial research and technology, and manufacturing components and assembly of real time data acquisitions systems, along with its installation at site and maintenance. As per authors' analysis, the geospatial market in irrigation and water sector currently employs at least **2,450 people.**[51]

GROWTH
INR 566 crore (USD 68.41 million) Was the estimated size of geospatial market in the water and irrigation sector in 2021 in India.[52] It is expected to grow to INR 1,215 crore by 2025 and employ at least 28,000 people.[53]

SUSTAINABILITY
NHP contributes to SDG 6.5 to implement integrated water resources management at all levels by 2030 and **SDG 17** to strengthen the means of implementation and revitalise the Global Partnership for Sustainable Development.

43 Government of India.2023. "National Hydrology Project Dashboard." nhp.mowr.gov.in. Ministry of Jal Shakti. Accessed January 25, 2023. https://nhp.mowr.gov.in/Home/nhp_Dashboard.aspx (Conversion rate used in this section: 1 USD = INR 82.74).

44 ibid. (Not adjusted for current year value).

45 These 9 central agencies are: Department of Water Resources, River Development, and Ganga Rejuvenation; Central Water Commission; Central Ground Water Board; National Institute of Hydrology; Central Water and Power Research Station; Central Pollution Control Board; Ministry of Environment, Forest & Climate Change; Survey of India; National Remote Sensing Centre; and National Water Informatics Centre.

46 Ministry of Jal Shakti, email message to CEEW, March 16, 2023.

47 ibid.

48 Government of India. n.d. "MIS WIMS." India-Water.gov.in. Accessed January 5, 2023. https://india-water.gov.in/mis/.

49 ibid.

50 Ministry of Jal Shakti, email message to CEEW, March 16, 2023.

51 Geospatial World. 2021. "Geospatial artha: Indian Geospatial Market, Economy and Industrial Development Strategy." New Delhi. https://www.geospatialworld.net/artha-summit/2021/pdf/artha-report-2021.pdf.

52 ibid.

53 ibid.

54 Hydro-Meteorological Data Dissemination Policy,2018. Ministry of Water Resources, GOI. https://cgwb.gov.in/e-Granthalaya/HMper cent20Dataper cent20disseminationper cent20Policyper cent202018.pdf.

ACHIEVEMENTS

Established the National Water Informatics Centre (NWIC) in 2018, a nationwide repository of water resources data, which supports the infrastructure required to maintain the India-WRIS. At present, NWIC collects data from all implementing agencies.[46]

Developed 7 products, namely, Early Flood Warning System, National Evaporative Flux Monitoring System, Himalayan Glacial Lake Information System, Himalayan Snow-Cover Information System, National Hydrological Modelling System, Irrigation Decision Support System, and Geoid Model over the entire country as well as Continuously Operating Reference System for Indian states of Uttar Pradesh and Uttarakhand.[47]

Established the Water Information Management System (WIMS), an integrated web-based data collection platform for official surface water and groundwater data, sourced from more than **78,000 groundwater**[48] and more than **17,000 surface water**[49] monitoring stations.

Upscaled the India-WRIS, a public domain platform that allows users to search, access, visualise, understand, and analyse comprehensive water data.

Signed Memoranda of Agreement to establish state water information centres (SWIC) with **16 states** as of February 2023.[50]

All hydrometeorological data collected by the Central Water Commission and Central Ground Water Board in India is governed under

The Hydrometeorological Data Dissemination Policy 2018 of MoJS.[54]

The policy categorises data as classified (data on rivers and tributaries that discharge into Pakistan, Myanmar, and Bangladesh) and unclassified (data on remaining rivers and tributaries). Data dissemination rules are further differentiated across 3 types of users – Indian commercial, Indian non-commercial, and foreign.

WATER HARVESTING SCHEMES

Image credit: istock

Jal Shakti Abhiyaan

Watershed Development Component - Pradhan Mantri Krishi Sinchayee Yojana

Water Harvesting Schemes

Jal Shakti Abhiyaan

OBJECTIVES

The Jal Shakti Abhiyaan (JSA) was launched in 2019 in **256 water-stressed districts** in India, with the objective to **promote water conservation and water resource management** through the accelerated implementation of five targeted interventions: water conservation and rainwater harvesting, renovation of traditional and other water bodies, reuse and recharge of bore wells, watershed development, and intensive afforestation.[55] The JSA aims to make water conservation a *Jan Andolan* **(people's movement)** through asset creation and extensive communication. In 2021, JSA's scope was expanded to cover urban and rural areas of **all districts.** It was launched as a recurring annual campaign by the name of Jal Shakti Abhiyan: Catch the Rain (JSA: CTR), with additional goals of **geo-tagging water-bodies** and creating water resource centres or ***Jal Shakti Kendras*** in each district.

FINANCIAL ALLOCATION

INR 2,00,000 (USD 0.2 million)

A one-time allocation by MoJS to every district for GIS-based mapping of water bodies and preparation of scientific plans.[56] This amount is disbursed in two instalments: half as advance, and the balance based on performance and quality of work done by every district.

JSA: CTR converses channelises funds from various Union and state government schemes such as MGNREGS, a rural job guarantee scheme, and Finance Commission grants.[57]

IMPLEMENTATION

National Water Mission, MoJS

The nodal implementation agency for JSA: CTR. The JSA: CTR was launched to nudge states to create rainwater harvesting structures suited to local climatic conditions and sub-soil strata, with the active participation of the local community and other stakeholders. *Jal Shakti Kendras* are to be formed in every district for facilitating formation of district-wise geo-tagged inventory of all water bodies, their ground-truthing, preparation of scientific water conservation plans, and institutionalising implementation at the grassroots.

The campaign focuses on multi-stakeholder participation where Union government officers and groundwater scientists and experts work with state and district officials for water conservation and water resource management. ULBs and *gram panchayats* are encouraged to participate actively in project planning.

JOBS

JSA has the potential to create jobs by synergising local infrastructure development with employment generation. Convergence with flagship employment guarantee schemes such as MGNREGS in rural areas and AMRUT in urban areas is organically generating employment opportunities for skilled, semi-skilled, and unskilled workers. Provision for training programmes and skill development in JSA also offers opportunities to improve the standard of living of the working class.

GROWTH

INR 2,40,000[59] (USD 0.2 million) Per ha per year worth of incremental benefits can be added to the local Indian economy because JSA's mandate to harvest rainwater provides immense potential for increasing area under irrigation and harnessing direct and indirect benefits from it.

SUSTAINABILITY

JSA supports several SDGs, including **SDG 6** (clean drinking water and sanitation) by implementing integrated water resource management, protecting and restoring water-related ecosystems, and supporting and strengthening of local communities, and **SDG 12** (responsible consumption and production) by ensuring sustainable management and efficient use of natural resources.

55 Press information Bureau. 2022. "Jal Shakti Abhiyaan." July 21, 2022. Accessed January 16, 2023. https://pib.gov.in/PressReleasePage.aspx?PRID=1843395.

56 Press Information Bureau. 2022. "Catch the Rain Campaign." August 08, 2022. Accessed January 16, 2023 https://pib.gov.in/PressReleasePage.aspx?PRID=1849940 (Conversion rate used in this section: 1 USD = INR 82.74).

57 Press Information Bureau. 2022. "Funds for Catch the Rain Programme." April 07, 2022. Accessed January 16, 2023. https://pib.gov.in/PressReleasePage.aspx?PRID=1814502.

58 Ministry of Jal Shakti, email message to CEEW, March 16, 2023.

59 Bhattarai, M., R. Barker, and A. Narayanamoorthy. 2007. "Who Benefits from Irrigation Development in India? Implication of Irrigation Multipliers for Irrigation Financing." Irrigation and Drainage 56 (2-3): 207–25. https://doi.org/10.1002/ird.309 (Price has been adjusted to year 2021 using CPI for 2015 as the base year).

60 Debashree, Mukherjee. 2022. "Concept Note Jal Shakti Abhiyan: Catch the Rain-2022 Campaign." New Delhi: Ministry of Jal Shakti, Government of India. https://jsactr.mowr.gov.in/website/help-documents/Concept-Note-JSA-2022.pdf.

ACHIEVEMENTS

JSA: CTR - 2022 has catalysed the development of resilient local infrastructure in mission mode, including:[58]

Construction of
1.2+ million water conservation and rainwater harvesting structures

Renovation of
2.67 lakh+ traditional water bodies

Creation of
8.74 lakh+ reuse and recharge bore wells

Building of
1.6+ million watershed development infrastructure

Planting of
783.83+ million saplings

Participation of
26.4 million people in JSA activities

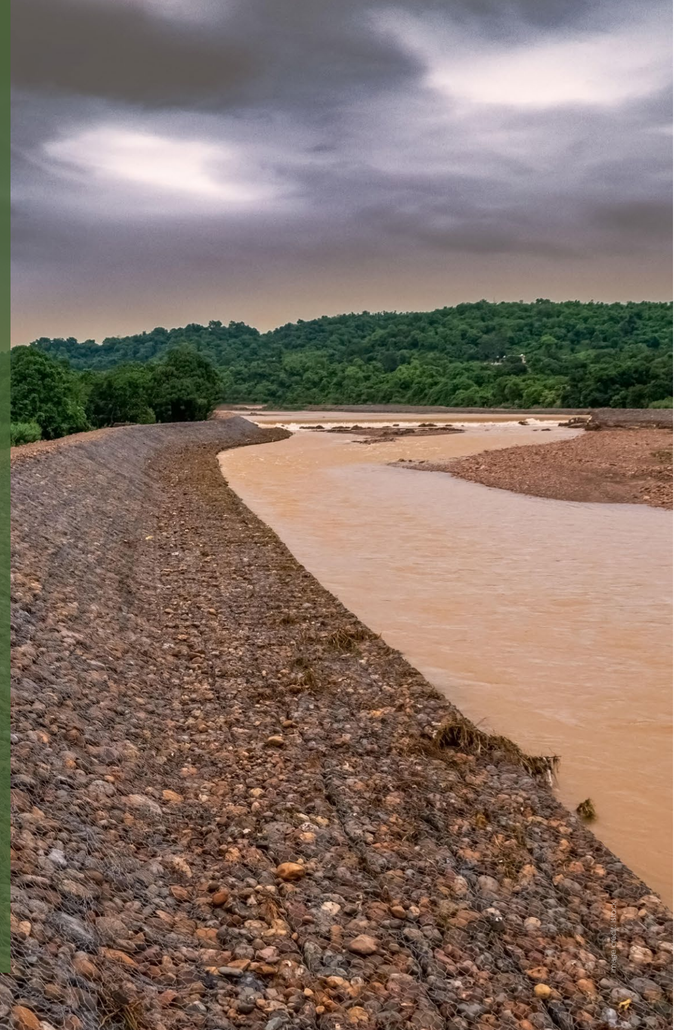
Establishment of
Jal Shakti Kendra in 632 districts

JSA: CTR addresses variations in Indian rainfall

by running each year in the months that India gets rainfall from both South-West monsoon and North-East monsoon.[60]

Water Harvesting Schemes

Watershed Development Component – Pradhan Mantri Krishi Sinchayee Yojana



OBJECTIVES

The Watershed Development Component – Pradhan Mantri Krishi Sinchayee Yojana (WDC-PMKSY) was launched in 2015 with three objectives– to improve the **productive potential of rainfed and degraded lands** through integrated watershed management, **strengthen community-based local institutions to promote livelihoods and watershed sustainability**, and **improve the efficiency of watershed projects** through cross learning and incentives. WDC-PMKSY takes up watershed development projects in the **most vulnerable rainfed districts** in India by prioritisation micro-watersheds. The programme was formed by merging the Integrated Watershed Management Programme (2009-15) with the umbrella scheme of PMKSY. The scheme was extended in 2021 for the next five years (ending in 2026) as WDC-PMKSY 2.0. Phase 2 marks a paradigm shift away from mechanical/engineering treatments to more agriculture engineering measures and integrated farming systems approaches (horticulture, fisheries, afforestation, etc.).[61]

FINANCIAL ALLOCATION

INR 8,134 crore[62] (USD 981.5 million)

The financial allocation for WDC-PMKSY 2.0. for the period 2021-22 to 2025-26 by the Union government. INR 13,590 crore was the financial outlay for phase 1 from 2015-16 to 2019-20[63]. The centre and states share the cost in a 60:40 ratio for all states, except hilly and Northeast states where the ratio is 90:10. [64]

IMPLEMENTATION

Department of Land Resources, Ministry of Rural Development (MoRD)
The nodal agency for implementing the scheme. It provides multi-tier institutional arrangements for its implementation. At the national level, a steering committee formulates policy guidelines and oversees implementation. At the state level, a nodal agency streamlines implementation through effective resource convergence. A Watershed Development Cell implements projects in each district, while the village-level Watershed Committee has the primary responsibility for project development. For 2021-26, the rejuvenation of spring shed has been incorporated as the new activity to the WDC-PMKSY 2.0.

JOBS
WDC-PMKSY 2.0 has the potential to create employment for manual labourers since strengthening the productive potential of land through watershed development is a labour-intensive work. As of January 2023, it has provided jobs to 78.5 million people[66].

GROWTH
2.14 - the benefit-to-cost ratio of investing in watershed development activities, as per a study on 311 treated watersheds of India by ICRISAT (The International Crops Research Institute for the Semi-Arid Tropics).[67] This study found that the interventions led to reduction in soil loss by 0.82 tonnes/ha/year, increase in area under irrigation by 34 per cent and cropping intensity by 64 per cent, and provided additional employment of 182 person-days/ha/year.

SUSTAINABILITY
WDC-PMKSY contributes to SDG 2 on zero hunger, **SDG 6.5** to implement integrated water resources management at all levels, **SDG 6.6** to protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes, **SDG 6b** to support and strengthen the participation of local communities in improving water management, and **SDG 15** that covers life on land. It also contributes to India's target to United Nations Convention to Combat Desertification of restoring **26 million hectares**[68] of degraded land to achieve land degradation neutrality.

ACHIEVEMENTS

As on January 2023, the project has:[65]

Brought
~1.4 million hectares
of additional area under protective irrigation

Created or renovated
~5,30,000
water harvesting structures

Brought
~3,26,000 hectares
under plantation

Treated
~5,05,000 hectares
of culturable wasteland

Benefited
~3.5 million farmers.

With a target of 29.57 million ha for watershed development from 2015-16 to 2020-21, and 4.95 million ha from 2021-22 to 2026-27,

WDC-PMKSY is the second-largest watershed programme in the world.[69]

61 Government of India. 2021. "Guidelines for New Generation Watershed Development Projects (WDC-PMKSY 2.0)." New Delhi: Department of Land Resources, Ministry of Rural Development. https://dolr.gov.in/sites/default/files/Guidelines_compressed.pdf.

62 Government of India. n.d. "Watershed Development Component-Pradhan Mantri Krishi Sinchayee Yojana (WDC-PMKSY 2.0)." Wdcpmksy.dolr.gov.in. Accessed January 11, 2023. https://wdcpmksy.dolr.gov.in/. (Conversion rate used in this section: 1 USD = INR 82.74).

63 Press Information Bureau. 2019. "Amalgamation of PMKSY to Schemes." February 04, 2019. Accessed January 20, 2023. https://pib.gov.in/Pressreleaseshare.aspx?PRID=1562545.

64 Government of India. 2021. "Guidelines for New Generation Watershed Development Projects (WDC-PMKSY 2.0)." New Delhi: Department of Land Resources, Ministry of Rural Development. https://dolr.gov.in/sites/default/files/Guidelines_compressed.pdf.

65 Government of India. 2023. "Watershed Development Component – Pradhaan Mantri Krishi Sinchayee Yojana Dashboard." iwmpmis.nic.in. Accessed January 20, 2023. https://iwmpmis.nic.in/fcDolr.do?method=dashboard.

66 ibid.

67 Joshi, P. K., A. K. Jha, S. P. Wani, Laxmi Joshi, and R. L. Shiyani. 2005. "Meta-Analysis to Assess Impact of Watershed Program and People's Participation: Comprehensive Assessment Research Report 8." Oar.icrisat.org. Sri Lanka: International Water Management Institute. http://oar.icrisat.org/2371/.

68 United Nations Convention to Combat Desertification. 2022. "India mobilizes its social security scheme to fund land restoration." October 07, 2022. Accessed February 23, 2023. https://www.unccd.int/news-stories/stories/india-mobilizes-its-social-security-scheme-fund-land-restoration.

69 Press Information Bureau, 2022. "Shri Giriraj Singh inaugurates National Watershed Conference." July 14, 2022. Accessed February 23,2023. https://pib.gov.in/PressReleasePage.aspx?PRID=1841555 and The World Bank Press Release. 2014. "World Bank Approves Neeranchal National Watershed Project, India." July 17, 2014. Accessed February 23, 2023. https://www.worldbank.org/en/news/press-release/2014/07/17/world-bank-approves-neeranchal-national-watershed-project-india.

WATER CONSERVATION AND RIVER REJUVENATION

National Plan for Conservation of Aquatic Ecosystems

Namami Gange Programme

River Rejuvenation Plan

Image credit: istock

Water Conservation and River Rejuvenation

National Plan for Conservation of Aquatic Ecosystems

OBJECTIVES

India has about **16 million hectares**[70] of wetlands. The National Plan for Conservation of Aquatic Ecosystems (NPCA) was launched in 2015 by merging 2001's National Lake Conservation Programme (NLCP) and 1985 National Wetland Conservation Programme (NWCP) for **holistic conservation and restoration of wetlands** to achieve the desired enhancement in water quality, and improvement in biodiversity and ecosystems.

NPCA has adopted an **integrated management** approach by including the interception, diversion, and treatment of wastewater; shoreline protection; lakefront development; in-situ cleaning; stormwater management; bioremediation; catchment area treatment; lake beautification; survey and demarcation; bio-fencing; fisheries development; weed control; and, biodiversity conservation education and awareness creation and community participation.

FINANCIAL ALLOCATION

INR 1,066 crore[71] (USD 128.9 million)

The funds released by the Union government from 2015 to 2022. NPCA is a centrally sponsored scheme and funds are released to state governments on the basis of proposals received from them for wetland conservation.

IMPLEMENTATION

Wetland Authorities
Of state and Union Territories are the nodal agencies for the conservation and sustainable management of wetlands. The Union Ministry of Environment, Forest and Climate Change (MoEF&CC) is responsible for the overall coordination of the NPCA, and its Wetlands Division manages the implementation at the national level. The National Wetlands Committee, constituted under the provisions of the Wetlands (Conservation and Management) Rules, 2017, is the nodal advisory body for the NPCA.[72] The key functions of the wetlands division include providing:

- A national policy framework for conservation and sustainable management of wetlands
- Financial assistance for the implementation of activities identified in the integrated management plans for wetlands
- Need-based advice to the states/Union Territories to leverage funds from the Union government
- Detailed guidelines and technical know-how for wetlands restoration and management
- Funds for conducting research, capacity building, and training programmes

The Wetlands Division also conducts periodic evaluations, suggests course corrections, facilitates the development of a national inventory and an informed decision support system, and outreach communications.

JOBS
Wetlands offer direct employment opportunities through centres of tourism, crop production, and aquaculture, to name a few. In 2016, the livelihoods of about 12,000 households[75] were dependent on services received from Rann of Kutch (an extensive salt marsh in western India).

GROWTH
INR 57,525 (USD 696) per hectare[76] is the average value of benefits from wetlands that India can continue deriving by protecting their range and health.

SUSTAINABILITY
NPCA contributes to several SDG targets, including **SDG 1** (no poverty) by securing wetland-dependent livelihoods, **SDG 2** (zero hunger) by ensuring food production, and **SDG 6** (clean water and sanitation) and **SDG 15** (life on land) through the protection, conservation, restoration, and sustainable use of wetlands **(SDG 6.6)**.

70 Gupta, P K, J G Patel, R P Singh, and I M Bahuguna. 2021. "Space Based Observation of Indian Wetlands." Ahmedabad: Space Applications Centre, ISRO. https://indianwetlands.in/uploads/wetland_atlas_LISS3_final-SAC.pdf.

71 Press Information Bureau. 2022. "Wetlands in India." August 8, 2023. Accessed February 23, 2023. https://pib.gov.in/PressReleasePage.aspx?PRID=1849868.

72 Government of India. 2019. "National Plan for Conservation of Aquatic Ecosystems (NPCA): Guidelines." New Delhi: Ministry of Environment, Forest and Climate Change.https://indianwetlands.in/uploads/NPCA-MOEFCC-guidelines-April-2019.pdf.

73 Press Information Bureau. 2022. "Protection and Preservation of Wetlands." July 18,2022. Accessed January 17, 2023. https://pib.gov.in/PressReleasePage.aspx?PRID=1842626.

74 ibid.

75 Dixit, Arun, Somnath Bandyopadhyaya, Lalit Kumar, and Satyasiba Bedamatta. 2016. "Economic Valuation of Landscape Level Wetland Ecosystem and Its Services in Little Rann of Kachchh, Gujarat." New Delhi: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.

76 World Bank. 2013. "Diagnostic Assessment of Select Environmental Challenges Valuation of Biodiversity and Ecosystem Services in India: Volume III." (https://www.cbd.int/financial/hlp/doc/literature/World%20Bank%20India%20Environmental%20Report3.pdf(Price has been adjusted to year 2021 using CPI for 2015 as the base year).

77 Press Information Bureau. 2022. "Year End Review: Ministry of Environment Forest and Climate Change 2022." December 22, 2022. Accessed January 18,2023.

ACHIEVEMENTS

Adoption of the
Wetlands (Conservation and Management) Rules, 2017
to provide legal protection to wetlands; these were revised in 2020.[73]

Launch of the
National Wetland Decadal Change Atlas
(1:50,000 scale) in 2021.[74]

India has 75 Ramsar sites (wetlands of international importance),
the most in Asia, covering 1.33 million hectares.[77]

Water Conservation and River Rejuvenation

Namami Gange Programme

OBJECTIVES

Namami Gange Programme (NGP) was initially implemented as a flagship programme from 2014 to 2021 for the effective **abatement of pollution, conservation and rejuvenation** of river Ganga and all of its tributaries.[78] In 2022, Namami Gange Phase II was launched till 2026.[79] The programme's main objectives are cleaning river surfaces, creating sewerage treatment infrastructure, monitoring industrial effluents, developing riverfronts, achieving biodiversity conservation, afforestation, and raising public awareness.

FINANCIAL ALLOCATION

INR 22,500 crore[80] (USD 2.72 billion)

Is the financial outlay for Namami Gange Phase II from 2021 to 2026 and will be borne entirely by the Union government. A **clean ganga fund (CGF)** was established under the Union Finance Ministry in 2015 for raising contribution from resident Indians, domestic and overseas corporates/trusts, and Non-Residential Indians towards the conservation of River Ganga. As of February, 2023, the corpus amount stands at INR 665.64 crore (USD 80.42 million).

IMPLEMENTATION

Department of Water Resources, River Development and Ganga Rejuvenation, Ministry of Jal Shakti (MoJS)
The nodal department for the implementation of both phases of the mission. The National Mission for Clean Ganga (NMCG) and state program management group (SPMGs) have been created at the Union and state levels respectively.

The programme is being implemented in three phases:

- Entry-level activities for immediate visible impact, including cleaning the river's surface to deal with floating solid wastes, improving rural sanitation to stop pollution (solid and liquid) from entering rural sewage drains, and building toilets. Efforts also include renovating, modernising, and building new crematoria to halt the disposal of unburnt or partially burnt bodies in the Ganga, and repairing, updating and building *ghats* (banks) to improve the human-river connection.
- Medium-term activities to be implemented within five years to stop industrial and municipal pollutants from entering the Ganga.
- Long-term activities to be implemented within 10 years to determine e-flow, raise water use efficiency, and improve surface irrigation efficiency to provide the Ganga with a proper flow.[82]

The programme also includes **biodiversity protection, afforestation, and water quality monitoring[83].**

JOBS
The *Namami Gange* programme provides several jobs opportunity in states sharing the Ganga basin. Sanitation workers and operators of sewage treatment plants are being hired, trained, and deployed, and capacity-building activities are undertaken for workers engaged in faecal sludge and septage management.[87] Further employment opportunities exist in the rejuvenation of small rivers in the Ganga basin. Further, employment opportunities exist in the rejuvenation of small rivers in the Ganga basin, afforestation in the catchment, and protection of water bodies.

GROWTH
3 per cent[88] of GDP is envisaged to come from the river basin through the *Arth Ganga* economic model being deployed under *Namami Gange*. The model focuses on zero-budget natural farming, cultural heritage and tourism, and monetising reuse of sludge and wastewater.

SUSTAINABILITY
Namami Gange contributes to SDG 6, (clean water and sanitation), with special emphasis on **target 6.3** for improving water quality by reducing pollution. It also supports **target 6.6** to protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers, and lakes by 2030.

78 Government of India. 2020. "Namami Gange Programme – At a Glance." New Delhi: Ministry of Jal Shakti. https://nmcg.nic.in/pdf/NGP-At%20a%20Glance%20(Final%20Version%20Printed).pdf.

79 Press Information Bureau. 2022. "Status Report on Cleaning of River Ganga." August 8, 2022. Accessed February 28, 2023. https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1849945.

80 ibid. (Conversion rate used in this section: 1 USD = INR 82.74).

81 Ministry of Jal Shakti, email message to CEEW, March 16, 2023.

82 Government of India. n.d. "Namami Gange." Pmindia.gov.in. Accessed on February 7, 2023. https://www.pmindia.gov.in/en/government_tr_rec/namami-gange/.

83 Government of India. 2020. "Namami Gange Programme – At a Glance." New Delhi: Ministry of Jal Shakti. https://nmcg.nic.in/pdf/NGP-At%20a%20Glance%20(Final%20Version%20Printed).pdf.

84 Ministry of Jal Shakti, email message to CEEW, March 16, 2023.

85 Press Information Bureau. 2018. "GIS Technology on Ganga Cleaning Projects." August 6, 2018. Accessed February 7, 2023. https://pib.gov.in/Pressreleaseshare.aspx?PRID=1541737.

86 Government of India. n.d. "National Mission for Clean Ganga." Nmcg.nic.in. Accessed on February 7, 2023. https://nmcg.nic.in/NamamiGanga.aspx.

87 Press Information Bureau. 2021. "NMCG & WASH Institute Signs MoU For Capacity Building In Faecal Sludge & Septage Management." October 8, 2021. Accessed February 7, 2023. https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1762216.

88 Government of India. 2022. "Namami Gange Annual Report 2021-22" New Delhi: National Mission for Clean Ganga, Minsitry of Jal Shakti. https://nmcg.nic.in/writereaddata/fileupload/5_Annual%20Report%20Eng2021-22%20.pdf.

89 Press Information Bureau. 2022. "United Nations Recognizes Namami Gange Initiative As One Of The Top 10 World Restoration Flagships To Revive The Natural World." December 15, 2022. Accessed February 28, 2023. https://pib.gov.in/PressReleasePage.aspx?PRID=1883661.

ACHIEVEMENTS

Milestones achieved as of March 2023:[84]

Completed 99 out of 182 sanctioned sewerage infrastructure projects

Completed 74 out of 102 banks and crematoria-related projects (new construction and renovations)

Achieved 1,022 MLD of the targeted 5,628 MLD sewerage treatment capacity

River surface cleaning initiated at 11 locations in 4 states[85] and completed 9 of them

Awarded projects to develop science-based aquatic species restoration plans for Ganga by involving multiple stakeholders

Conducted regular annual inspection of grossly polluting industries (GPIs) in the Ganga River basin for compliance verification against stipulated environmental norms

Established online continuous effluent monitoring stations (OCEMS) in 885 of 1,072 GPIs[86] and piloting a landmark pollution inventorisation, assessment and surveillance on river Ganga basin system

Launched a Ganga River theme song to raise public awareness about the initiative

Launched a national framework on Safe Reuse of Treated Water

Preparation of 'Guidelines on Constructed Wetland System'

In 2022, United Nations recognised the Namami Gange Programme as one of the top 10 flagship restoration initiatives in the world[89].

Water Conservation and River Rejuvenation

River Rejuvenation Plan

OBJECTIVES

Launched in 2022, the River Rejuvenation Plan (RRP) aims to **rejuvenate 13 major rivers** and their **202 tributaries** in India through forestry interventions. The objectives are to increase green cover, contain soil erosion, recharge groundwater table, sequester carbon dioxide, treat catchment areas, restore ecology, conserve soil moisture, improve livelihoods, promote ecotourism by developing river fronts and eco-parks, and create public awareness to improve water quality and flow in rivers.

Of the 13 rivers, seven are Himalayan (Jhelum, Chenab, Ravi, Beas, Sutlej, Yamuna, and Brahmaputra), five are peninsular (Narmada, Godavari, Mahanadi, Krishna, and Cauvery), and one is an inland drainage basin (Luni). They together cover 24 states and two Union Territories, and have a combined basin area of 190 million hectares, covering about **57 per cent** of India's geographical area.[90]

FINANCIAL ALLOCATION

INR 19,342 crore[91]
(USD 2.35 billion)

The financial outlay of the plan. The RRP is funded by the National Afforestation and Eco-development Board of the Union Ministry of Environment, Forest and Climate Change. The overall proposed budget is divided into four major components: Implementation of forestry intervention; strengthening knowledge management and national capacity development; maintenance including replicating and scaling up successful models; national coordination for forestry interventions and river conservation.

IMPLEMENTATION

State Forest Departments
will serve as the nodal departments for the implementation of RRP. Ministry of Jal Shakti and the Ministry of Environment, Forest and Climate Change have released detailed project reports prepared by the Indian Council of Forestry Research and Education. The RRP will adopt a multi-scale, multi-stakeholder, multidisciplinary, and holistic approach to accomplish the objectives of uninterrupted flow (*Aviral Dhara*), clean water (*Nirmal Dhara*), and ecological rejuvenation.

JOBS
RRP is expected to generate nearly 344 million person-days of work[93].

GROWTH
INR 440 crore[94] (USD 53.18 million)
Value from non-timber and other forest produce that will be accrued due to proposed forestry interventions.

SUSTAINABILITY
The RRP contributes to SDG 6.6, which aims to protect and restore water-related ecosystems, **SDG 13**, which calls for urgent action to combat climate change and its impacts, and **SDG 15**, to protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt land degradation and biodiversity loss.

ACHIEVEMENTS

The RRP is in the preparatory phase. Once fully implemented, it will:[92]

Increase
0.74 million hectares
of forest cover

Achieve
50 million tonnes
of carbon sequestration through plantations after 10 years and **75 million tonnes** after 20 years

Recharge
1,889 million
cubic metres of groundwater per year

Reduce
6.5 million
cubic metres of sedimentation per year

90 Press Information Bureau of India. 2022. "Union Environment Minister, Sh. Bhupender Yadav & Union Jal Shakti Minister, Sh. Gajendra Singh Shekhawat Jointly Release Detailed Project Reports On Rejuvenation Of 13 Major Rivers Through Forestry Interventions." March 14, 2022. Accessed February 28, 2023. https://www.pib.gov.in/PressReleasePage.aspx?PRID=1805945.

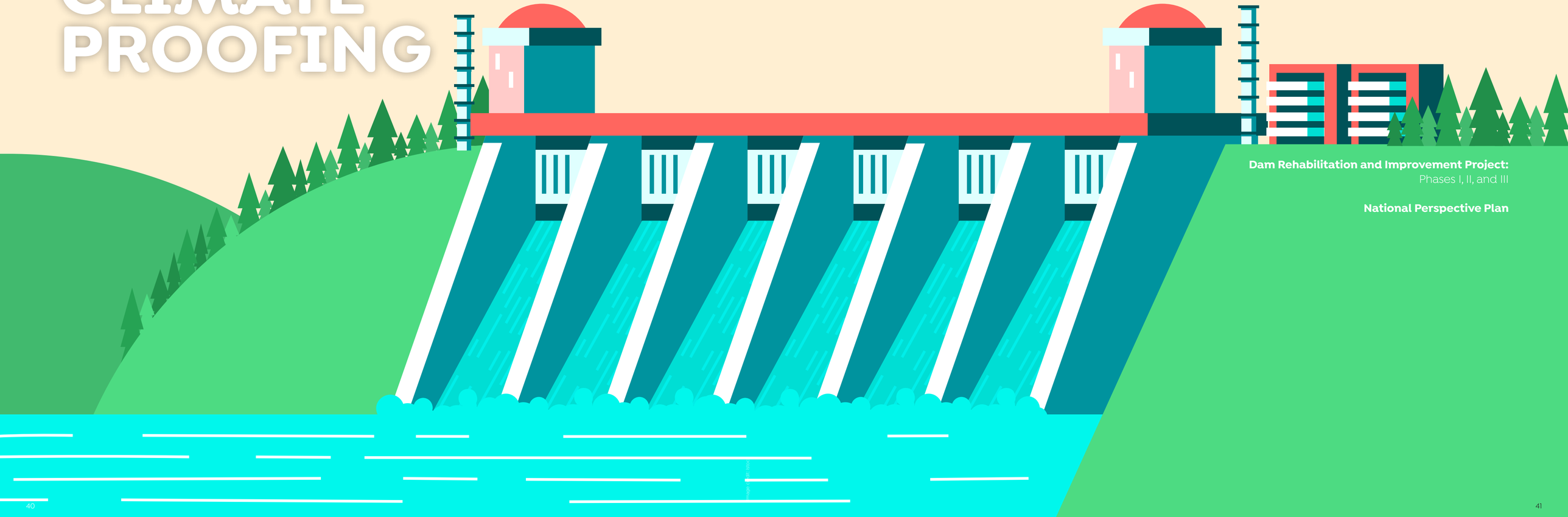
91 ibid.

92 ibid.

93 ibid.

94 ibid.

CLIMATE PROOFING



Dam Rehabilitation and Improvement Project:
Phases I, II, and III

National Perspective Plan

Climate Proofing

Dam Rehabilitation and Improvement Project: Phases I, II, and III

OBJECTIVES

Dam Rehabilitation and Improvement Project (DRIP) phase I was launched in 2012 to **improve the safety and operational performance of select dams**. It provided for the rehabilitation of 223 dams in seven Indian states. DRIP phases II and III were announced in 2021 for a period of six years each, i.e. 2021-26 and 2026-31. They have a rehabilitation provision of **736 additional dams in 19 states**[95] and two additional components: incidental revenue generation for sustainable operation and maintenance of dams and project management.

FINANCIAL ALLOCATION

INR 10,211 crore (USD 1.46 billion)[96]

Is the financial outlay for phase II and III. DRIP is a state sector scheme with a central component as well as external funding. The external funding is INR 7,000 crore (USD 1 billion) for both the phases, with the Union government share of INR 1,309 crore (USD 186.7 million) in the form of liability against loan and direct contribution, and state governments contributing INR 2,926 crore (USD 418 million).[97] The external funding for Phase II is being equally provided by the World Bank and Asian Development Bank (USD 250 million each), and the same will be finalised for phase III as well.[98]

IMPLEMENTATION

Central Water Commission (CWC), Ministry of Jal Shakti (MoJS)
Is the nodal agency for overall coordination and supervision of the project. Two other central agencies – Bhakra Beas Management Board and Damodar Valley Corporation – support the implementation of the project.

Further, state project monitoring units (SPMUs) have been established within the State Water Resources Departments to coordinate project activities, including monitoring the physical and financial progress, and environmental and social issues.

JOBS

DRIP is likely to generate employment opportunities of 1 million person-days for unskilled workers and 0.25 million person-days for skilled working professionals.[104]

GROWTH

INR 47,457 crore[105] (USD 7.4 billion)
The annual cost of floods estimated by the United Nations (UN) in India, part of which can be abated by ensuring climate proofing of dams. Further, the UN estimated that returns on investment for disaster reduction are six times[106] the initial investment value globally.

SUSTAINABILITY

DRIP seeks to develop climate-resilient infrastructure by strengthening adaptive capacity to climate-related hazards and natural disasters, which aligns with the commitments of **SDG 13.1**. Further, its focus on building capacity aligns with **SDG 13.2** on improving education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.

95 Central Water Commission. 2019. "Welcome | DRIP - Dam Rehabilitation and Improvement Project." cwc.gov.in. Accessed March 1, 2023. https://damsafety.cwc.gov.in/.

96 ibid. (Exchange rate not adjusted for current year value).

97 Central Water Commission. 2019. "DRIP - Dam Rehabilitation and Improvement Project Dashboard." cwc.gov.in. 2019. https://damsafety.cwc.gov.in/index.php?lang=en&page=Dashboard_On_DRIP_II&origin=front-end&tp=1 (Not adjusted for current year value) (exchange rate conversion not adjusted for current year prices).

98 ibid.

99 Central Water Commission. 2019. "Dashboard | DRIP - Dam Rehabilitation and Improvement Project." cwc.gov.in. 2019. https://damsafety.cwc.gov.in/index.php?lang=en&page=Dashboard&origin=front-end&tp=1.

100 ibid.

101 Central Water Commission (CWC). 2019. "Welcome | DRIP - Dam Rehabilitation and Improvement Project." cwc.gov.in. 2019. https://damsafety.cwc.gov.in/.

102 Central Water Commission. 2019. "Dashboard | DRIP - Dam Rehabilitation and Improvement Project." cwc.gov.in. 2019. https://damsafety.cwc.gov.in/index.php?lang=en&page=Dashboard&origin=front-end&tp=1.

103 ibid.

104 Press Information Bureau. 2021. "Government Signs US $ 250 Million Loan Agreement For Second Phase of Dam Rehabilitation & Improvement Project (DRIP)." August 4, 2021. Accessed January 18,2023 Press Information Bureau (pib.gov.in).

105 United Nations Office for Disaster Risk Reduction. 2015. "Global Assessment Report on Disaster Reduction 2015. Making Development Sustainable: The Future of Disaster Risk Management." Geneva: United Nations. https://www.undrr.org/publication/global-assessment-report-disaster-risk-reduction-2015 (Not adjusted for current year value).

106 ibid.

107 Dam Safety Organization. 2019. "National Register of Large Dams – 2019." New Delhi: Central Water Commission, Government of India. https://cwc.gov.in/sites/default/files/nrld06042019.pdf.

ACHIEVEMENTS

DRIP I

Had a completion rate of **99 per cent** and rehabilitated **221** out of 223 dams[99]

Developed two key dam-specific technical documents, i.e., emergency action plan (EAP), and Operation and Maintenance (O&M) manual

Conducted **191** customised national and international trainings, benefitting about 5,500 officials[100]

Developed a **web-based tool**, 'Dam Health and Rehabilitation Monitoring Application (DHARMA)', to capture important data for all dams and appropriate monitoring and development of rehabilitation protocols[101]

DRIP II and III

Completed the flood design review for 326 dams, and dam safety inspection for 301 dams[102]

Approved project screening template for 87 dams[103]

India has
5,745 large dams
(5,334 constructed and 411 under construction as of 2019).[107] The Dam Safety Act of 2021 governs their surveillance, inspection, operation, and maintenance.

Climate Proofing

National Perspective Plan

OBJECTIVES

The National Perspective Plan (NPP) on Inter-Linking of Rivers is a project of **national importance** and was first proposed in 1980 by the Central Water Commission of the erstwhile Ministry of Irrigation (now Ministry of Jal Shakti). The objectives of NPP are to ensure greater equity in water distribution by enhancing its availability in drought-prone and rainfed areas by transferring it from **water-surplus basins** to **water-deficit basins**. NPP will help in mitigating the likely adverse impact of climate change and promote integrated development and management of water resources.

NPP with its 30 river links identified, has two components: the Himalayan rivers' development component that envisages the construction of storage reservoirs on the principal tributaries of Ganga and Brahmaputra to transfer surplus flows, and the peninsular rivers' development component to build storage at potential peninsular basins to transfer surplus flows down to southern India's deficit basins.

FINANCIAL ALLOCATION

INR 8.44 lakh crore[108]
(USD 102.31 billion)

Is the estimated cost of the 30 identified river links in the NPP project. In 2021, the Ken-Betwa River link in the Ganga basin became the first inter basin water transfer (IBWT) project approved by the Union government, with a budgetary allocation of INR 44,600 crore[109] (USD 5.41 billion). It includes central assistance of about 90 per cent with the balance contributed by the states.

IMPLEMENTATION

National Water Development Agency (NWDA), Ministry of Jal Shakti (MoJS)
Entrusted to prepare the detailed project reports (DPRs) of the NPP river-link proposals. In September 2014, a special committee was constituted to implement the IBWT, with four specific sub-committees for:

- Comprehensive evaluation of various studies and reports
- System studies to identify the most appropriate alternate plans
- Restructuring of NWDA
- Consensus building through negotiations to arrive at agreements between involved states

In April 2015, a **Task Force** was constituted by the MoJS to expedite the activities of the IBWT project.

JOBS
NPP possesses immense employment opportunities for unskilled workers and skilled workers based on the scale of water infrastructure required to complete all the identified links.

GROWTH
34,000 MW[113]
Hydropower that will be added to India once IBWT is implemented. The project is estimated to increase India's irrigation potential by 35 million hectares[114], and provide likely incidental benefits such as navigational facilities, flood control, mitigation of droughts, domestic & industrial water supply augmentation, fisheries, recreation facilities, infrastructural development and socio economic development.

SUSTAINABILITY
IBWT mandates equitable distribution of water resources to build adaptive capacity against climate variability and change. This will lead to improvements in water, food, and energy security. Thus, it contributes to **SDG 2** (zero hunger), **SDG 6** (ensure access to water and sanitation for all), and **SDG 13** (take urgent action to combat climate change and its impacts).

108 Press Information Bureau. 2022. "Inter-Linking of Rivers." March 24, 2022. Accessed January 15, 2023. https://pib.gov.in/PressReleasePage.aspx?PRID=1809267#:~:text=Under%20the%20National%20Perspective%20Plan,eight%20links%20have%20been%20completed. (Conversion rate used in this section: 1USD = INR 82.49).

109 ibid.

110 ibid.

111 Government of India. 2018. "Inter Linking of Rivers." New Delhi: Department of Water Resources, River Development and Ganga Rejuvenation, Ministry of Jal Shakti (MoJS). https://jalshakti-dowr.gov.in/sites/default/files/INTERLINKING_OF_RIVERS.pdf.

112 Ministry of Jal Shakti, email message to CEEW, March 16, 2023.

113 ibid.

114 ibid.

115 Shah, Tushaar, Upali Amarasinghe, and Peter Mccornick. 2007. "India's River Linking Project: The State of the Debate." Sri Lanka: International Water Management Institute. https://publications.iwmi.org/pdf/H041797.pdf.

ACHIEVEMENTS

Identified
14 links
within the Himalayan rivers component and **16 links** within the peninsular rivers component[110]

Prepared feasibility reports of
seven links
under the Himalayan rivers component (plus three draft feasibility reports) and 14 links within the peninsular rivers component[111], and prioritised seven link projects

Initiated the implementation of the
Ken-Betwa Link Project.
The Project will irrigate 1.6 million hectares annually in Bundelkhand and its surrounding areas. It will provide 194 million cubic meters of drinking water to 6.2 million people, and will also generate 103 megawatts (MW) of hydropower and 27 MW of solar power[112]

About
178 trillion litres[115]
of water will be transferred from surplus to deficit basins per year, upon completion of 30 links proposed under IBWT.

WATER-USE EFFICIENCY

National Water Mission

Per Drop More Crop - Rashtriya Krishi Vikas Yojana

Pradhan Mantri Kisan Urja Suraksha Evam Utthaan Mahabhiyan

Water-Use Efficiency

National Water Mission

OBJECTIVES

The National Water Mission (NWM) was launched in **2011** as one of eight national missions under the National Action Plan on Climate Change. The NWM aims to **conserve water, minimise wastage, and ensure equitable distribution of water** through integrated water resource development and management. One of its most important goals is to **improve the efficiency of water use** by **20 per cent** by targeting both demand and supply side interventions in the domestic, agricultural, and industrial sectors.

FINANCIAL ALLOCATION

INR 14,314 crore[116]
(USD 1.75 billion)

To achieve water-use efficiency targets was envisaged by the Indian government in 2008, but eventually, it was decided that water-use efficiency interventions could be undertaken through **convergence with several ongoing schemes[117]** and separate financial provisions were not made.

IMPLEMENTATION

Ministry of Jal Shakti (MoJS)
The nodal ministry for implementation of NWM, which has 11 strategies to achieve water-use efficiency[118]:

- Undertaking research to increase water-use efficiency and maintain its quality in agriculture, industry, and domestic sectors
- Incentivising water recycling, including wastewater and water efficient techniques and technologies
- Promoting the efficiency of the urban water supply system
- Efficiency labelling of water appliances and fixtures in collaboration with Bureau of Indian Standards
- Undertaking pilot projects with states to improve water-use efficiency
- Promoting water regulatory authorities to ensure equitable water distribution and nominal charges for water facilities
- Promoting mandatory water audits, including those for drinking water purposes
- Providing enough operations and maintenance of water resources projects
- Incentivising water conservation and efficient use of water through awards
- Promoting the use of efficient irrigation practices, and fully utilising the created facilities through participatory campaigns
- Setting up a National Bureau of Water Use Efficiency.

JOBS
NWM is helping create employment opportunities in the manufacturing and installation of water-efficient devices, and the operations and maintenance of wastewater treatment plants.

GROWTH
16.4 per cent[120]
Is the compound annual growth rate projected for the smart water management market in India, from 2019-25.

SUSTAINABILITY
NWM contributes to SDG 6.4 on substantially increasing water-use efficiency across all sectors by 2030.

116 Author's calculation based on - Government of India. 2008. "National Water Mission under National Action Plan on Climate Change: Comprehensive Mission Document Volume 2." New Delhi. Ministry of Jal Shakti. http://nwm.gov.in/sites/default/files/nwm2875944786.pdf(Price has been adjusted to year 2021 using CPI for 2015 as the base year).

117 Government of India. 2011. "National Water Mission under National Action Plan on Climate Change: Comprehensive Mission Document Volume 1." New Delhi. Ministry of Jal Shakti.http://nwm.gov.in/sites/default/files/nwm16606419934.pdf.

118 Government of India. n.d. "Goal 4 | National Water Mission, Ministry of Jal Shakti, Department of Water Resources, RD & GR, Government of India." Nwm.gov.in. Ministry of Jal Shakti. Accessed January 20, 2023. https://nwm.gov.in/goal-4#:~:text=One%20of%20the%20most%20important.

119 Government of India. 2022. "Office Order No. 738/2022." New Delhi. Department of Water Resources, River Development, and Ganga Rejuvenation, Ministry of Jal Shakti. http://nwm.gov.in/sites/default/files/Notification_BWUE-20.10.2022.pdf.

120 Orion Market Research Private Limited. 2020. "Indian Smart Water Management Market Size, Share & Trends Analysis Report by Product (Hardware, Software and Services), By Application (Residential, Commercial and Industrial) Forecast 2019-2025." Omrglobal.com. Accessed March 6, 2023. https://www.omrglobal.com/industry-reports/indian-smart-water-management-market.

ACHIEVEMENTS

The Bureau of Water Use Efficiency was established in 2022[119]
under the administrative control of the Department of Water Resources, River Development and Ganga Rejuvenation, MoJS, to facilitate the promotion of efficient water use in irrigation, drinking water, power generation, and industry.

Running of awareness campaign and demonstration project called Sahi Fasal (Adequate Crop) that aims to nudge farmers to grow less water- intensive crops and increase their awareness about suitable environment and markets for these crops.

"Modernisation of India is dependent on the modernisation of its water management...
Better and more efficient use of water is a challenge for Indian agriculture and industry alike. It requires us to set new benchmarks in both our villages and in the cities we build."

Shri Ram Nath Kovind,
Former President of India

Excerpt from inaugural speech given at India Water Week - 2017, October 2017, India.

Water-Use Efficiency

Per Drop More Crop – Rashtriya Krishi Vikas Yojana

OBJECTIVES

Per Drop More Crop (PDMC), launched in 2015, is one of the components of the Rashtriya Krishi Vikas Yojana, and aims to enhance water-use efficiency at the farm level by promoting **micro irrigation systems** (drip and sprinkler technologies). It also supports **on-farm water management** practices and the creation of **micro-level water storage** to supplement source creation for micro irrigation. Micro irrigation has high water-use efficiency (85-90 per cent) compared to flood irrigation (60-75 per cent)[121]. Earlier, PDMC was implemented as the 'On Farm Water Management' scheme.

FINANCIAL ALLOCATION

INR 13,200 crore[122]
(USD 1.6 billion)

Has been released by the Union government till 2022. PDMC is a **centrally sponsored scheme**, and the total financial assistance available to the beneficiary under the micro irrigation component is **55 per cent for small and marginal farmers**, and **45 per cent for other farmers**.[123] The subsidy amount payable to the beneficiary is shared 60:40 between the Union and state governments, except in the north-eastern and Himalayan states where it is 90:10.[124] In the case of Union Territories, the entire amount is funded by the Union government, and for states, the central assistance is provided based on their approved annual action plans.

In 2017-18, the Union government set up a **dedicated micro-irrigation fund** to help states mobilise resources to expand micro irrigation coverage by taking up special and innovative projects, and to also incentivise farmers to install micro irrigation systems beyond the provisions of the PMKSY. The fund had an initial corpus of **INR 5,000 crore** (USD 600 million), which was further raised to **INR 10,000 crore** (USD 1,200 million)[125] in 2021.

IMPLEMENTATION

Ministry of Agriculture and Farmers Welfare (MoAFW)
Is the nodal agency to implement PDMC. The supplementary water management activities are done in convergence with the **Union Ministry of Rural Development**. A **three-tier** implementation structure exist:

- At the national-level, two bodies exist – a **National Steering Committee** under the chairmanship of the **Prime Minister** gives general policy strategic directions, and a **National Executive Committee** under the Chairmanship of Vice Chairman, NITI Aayog (apex public policy think tank of the Indian government) over sees programme implementation, allocation of resources, inter-ministerial coordination, monitoring and performance assessment, and address administrative issues.
- At the state level, **State-Level Sanctioning Committees** chaired by the Chief Secretaries of respective states sanction projects and oversee their implementation, based on the recommendations of the Inter-Departmental Working Group in each state.
- At the district level, **District-Level Implementation Committees**, which have representatives from the village-level government head, industry, and civil society organisations, oversee the implementation and inter-departmental coordination.

JOBS
Micro irrigation has been identified as an important strategy to boost green growth in India. Such practices have been found to **boost farmers' incomes** by up to **48.5 per cent[128]** by increasing crop yields and reducing input costs.

GROWTH
10.9 per cent per annum[129]
Is the compound annual growth rate of the micro irrigation market in India, from 2018-28. India has more than **200 big and small manufacturers** of **micro irrigation devices[130]**, hence boosting the availability of green jobs

SUSTAINABILITY
By promotion of micro irrigation and other practices in the production of crops and fruits, *PDMC* is helping the attainment of **SDG 1** on ending poverty in all its forms, **SDG 2** on promoting food security and sustainable agriculture, and **SDG 6.4** on increasing water-use efficiency by 2030.

121 Niti Aayog. 2020. "Evaluation of Centrally Sponsored Schemes in Water Resources, Environment and Forest Sector - Volume 2: Water Resources." https://pmksy.gov.in/microirrigation/Archive/FinalEvaluationReport.pdf.

122 Government of India. 2022. "Unstarred Question No.2275 in Lok Sabha." New Delhi: Ministry of Agriculture & Farmers Welfare. https://loksabha.nic.in/Questions/QResult15.aspx?qref=45241&lsno=17#:~:text=From%20the%20year%20202 2%2D23,country%20through%20the%20PDMC%20scheme (Conversion rate used in this section: 1 USD = INR 82.74).

123 Government of India. 2021. "Operational Guidelines of Per Drop More Crop Component of Pradhan Mantri Krishi Sinchayee Yojana - 2021." New Delhi: Ministry of Agriculture and Farmers Welfare. https://pmksy.gov.in/microirrigation/Archive/Revised%20PDMC%20GL%202021.pdf.

124 ibid.

125 Press Information Bureau. 2021. "Coverage of PMKSY-PDMC, Ministry of Agriculture & Farmers Welfare." December 1, 2021. Accessed on January 25, 2023. https://pib.gov.in/Pressreleaseshare.aspx?PRID=1776900.

126 Government of India. 2022. "Unstarred Question No.2275 in Lok Sabha." New Delhi: Ministry of Agriculture & Farmers Welfare. https://loksabha.nic.in/Questions/QResult15.aspx?qref=45241&lsno=17#:~:text=From%20the%20year%20202 2%2D23,country%20through%20the%20PDMC%20scheme.

127 Grant Thornton, Irrigation Association of India, and FICCI. 2016. "Accelerating growth of Indian agriculture: Micro irrigation an efficient solution. Strategy paper - Future prospects of micro irrigation in India." https://www.grantthornton.in/globalassets/1.-member-firms/india/assets/pdfs/micro-irrigation-report.pdf.

128 Niti Aayog. 2020. "Evaluation of Centrally Sponsored Schemes in Water Resources, Environment and Forest Sector - Volume 2: Water Resources." https://pmksy.gov.in/microirrigation/Archive/FinalEvaluationReport.pdf.

129 Mordor Intelligence. 2022. "India Micro Irrigation Systems Market – Growth, Trends, and Forecasts (2023-2028)." https://www.mordorintelligence.com/industry-reports/india-micro-irrigation-systems-market.

130 Future Market Insights. 2021. "Micro Irrigation Systems Market." https://www.futuremarketinsights.com/reports/micro-irrigation-systems-market.

ACHIEVEMENTS

By the end of 2022,
7.2 million hectares[126]
had been brought under micro irrigation, which is **10.3 per cent** of India's **estimated potential of micro irrigation** of 690 million hectares.[127]

"Adoption of water saving technologies such as sprinkler and drip irrigation system have proven extremely effective...

Emphasis should be given on water resources conservations through watershed development in suitable areas and development of micro-water structures for rainwater harvesting."

Shri Radha Mohan Singh,
former Union Minister of Agriculture and Famers Welfare

Excerpt from address given to expert panel meeting on International Green Week 2017, January 2017, Berlin.

Water-Use Efficiency

Pradhan Mantri Kisan Urja Suraksha Evam Utthaan Mahabhiyan

OBJECTIVES

Pradhan Mantri Kisan Urja Suraksha Evam Utthaan Mahabhiyan (PM-KUSUM) Scheme was launched in **2019**, with a target of adding **30.8 gigawatts (GW)** solar capacity by **2026**. It aims to provide clean energy to more than **3.5 million farmers** by solarising their agriculture pumps, thereby helping decarbonise the agriculture sector. It has **three components: Component A**, to install **10,000 megawatts** (MW)[131] of decentralised, grid-connected small power plants (capacity up to 2 MW) on barren land through individual farmers, panchayats, and cooperative groups; **Component B**, to add **2 million**[132] solar agricultural pumps [capacity up to 7.5 horsepower (HP) each] to replace diesel pumps in off-grid areas; **Component C**, to solarise **1.5 million**[133] existing grid-connected agricultural pumps (capacity up to 7.5 HP each) for irrigation and to help farmers sell the excess power to utilities, thereby enhancing their incomes. Solarisation of agriculture feeders was also included as one of the models under Component C. Preference for installation of standalone solar pumps and solarisation of existing agriculture pumps is given to the farmers using micro-irrigation systems or covered under micro irrigation schemes or those who opt for micro irrigation systems.

FINANCIAL ALLOCATION

INR 34,000 crore[134] (USD 4.1 billion)

Has been provided as central assistance till March 2022. PM-KUSUM provides central financial assistance of up to 30 per cent (50 per cent for north-eastern and hill states, and Union Territories) of the benchmark cost of the standalone solar pump, as fixed annually by the Union Ministry of New and Renewable Energy. The state government provides a subsidy of 30 per cent, and the remaining 40 per cent is the farmer's contribution. Farmers can avail loans of up to 30 per cent of the cost.

Image credit: istock.

IMPLEMENTATION

Ministry of New and Renewable Energy (MNRE)
Is the nodal ministry for PM-KUSUM. An MNRE **screening committee** determines the state-wise annual allocation of solar pumps based on the overall annual target and proposals received from the implementing agencies[125], which could include power distribution companies, agricultural departments, minor irrigation departments, or any other department designated by the state governments. Implementing agencies oversee the entire installation process and monitor the progress of the scheme. The Union government facilitates the tendering process for solar pumps.

JOBS

An estimated 24.50 job-years are created per MW of small-capacity solar installation[138]. Extrapolating, PM-KUSUM is likely to generate employment opportunities equivalent to **7.55 lakh job-years**[139] for skilled and unskilled workers, especially in the manufacturing of indigenous solar panels and solar cells.

GROWTH

1.38 million metric tonne (MMT)[140]
Diesel consumption in India can be reduced by fully implementing PM-KUSUM. The import bill on account of crude oil, which was 211.98 MMT[141] in 2021-22, can be reduced. Further, enhanced domestic solar manufacturing will also lead to a reduction in imports.

SUSTAINABILITY

The PM-KUSUM scheme is leveraging its multi-pronged approach to contribute to SDG 1 on no poverty, **SDG 6.4** on substantially increasing water-use efficiency across all sectors, **SDG 7** on affordable and clean energy, and **SDG** 13 on climate action.

131 Government of India. n.d. "PM-KUSUM." Pmkusum.mnre.gov.in. Ministry of New and Renewable Energy. Accessed January 20, 2023. https://pmkusum.mnre.gov.in/landing-about.html.

132 ibid.

133 ibid.

134 Government of India. 2021. "PM KUSUM Reforms English." New Delhi. Ministry of New and Renewable Energy. https://mnre.gov.in/img/documents/uploads/file_f-1632204688401.pdf (Conversion rate used in this section: 1 USD = INR 82.74).

135 Government of India. 2019. "Guidelines for Implementation of Pradhan Mantri Kisan Urja Suraksha evam Utthan Mahabhiyan Scheme." 22 July 2019. New Delhi. Ministry of New and Renewable Energy. https://mnre.gov.in/img/documents/uploads/8065c8f7b9614c5ab2e8a7e30dfc29d5.pdf.

136 Government of India. n.d. "PM-KUSUM." Pmkusum.mnre.gov.in. Ministry of New and Renewable Energy. Accessed January 20, 2023. https://pmkusum.mnre.gov.in/landing-about.html.

137 ibid.

138 Government of India. 2021. "PM KUSUM Reforms English." New Delhi. Ministry of New and Renewable Energy. https://mnre.gov.in/img/documents/uploads/file_f-1632204688401.pdf.

139 ibid.

140 Government of India. 2022. "PM-KUSUM: A New Green Revolution." New Delhi: Ministry of Information and Broadcasting.https://static.pib.gov.in/WriteReadData/specificdocs/documents/2022/apr/doc202242548601.pdf.

141 Government of India. 2022. "Indian Petroleum & Natural Gas Statistics, 2021-22." New Delhi: Economic and Statistics Division, Ministry of Petroleum and Natural Gas. https://mopng.gov.in/files/TableManagements/IPNG-2021-22_L.pdf.

142 Government of India. 2022. "PM-KUSUM: A New Green Revolution." New Delhi: Ministry of Information and Broadcasting.https://static.pib.gov.in/WriteReadData/specificdocs/documents/2022/apr/doc202242548601.pdf.

ACHIEVEMENTS

As of December 2022, the following have been achieved:[136]

Addition of 88 MW
of small solar power plants under Component A

Installation of about 1,82,000
standalone solar-powered agriculture pumps under Component B

Installation of about 1,175
grid-connected agriculture pumps under Component C

Sanction of more than 43,00,000
pump demands under feeder level solarisation[137]

PM-KUSUM is one of the largest initiatives in the world
to provide clean energy to more than 3.5 million farmers.[142]

GROUNDWATER MANAGEMENT

image credit: istock

Groundwater Management

National Aquifer Mapping and Management Programme

OBJECTIVES

National Aquifer Mapping and Management (NAQUIM) Programme, the **world's largest aquifer management programme**, was launched in **2012 and was extended for another five years in 2017**. The objectives of NAQUIM are to **delineate and characterise aquifers in three dimensions** (1:50,000 scale in general and 1:10,000 scale in identified priority areas), **identify and quantify issues**, and **develop management plans** to ensure the sustainability of groundwater resources. Major activities include geophysical investigations, exploratory drilling, water-level monitoring, water quality analysis, and preparation of management plans. The completed aquifer maps and management plans are shared **with the respective state agencies,** including the district administrations, for implementation.

FINANCIAL ALLOCATION

INR 1,600 crore[143]
(USD 193 million)

The progressive expenditure incurred during 2012-23 under the relevant components (aquifer mapping, ground water regime monitoring etc.) of the Ground Water Management and Regulation Scheme[144].

IMPLEMENTATION

Central Ground Water Board, Ministry of Jal Shakti (MoJS)
Is the nodal department for implementation. The National Interdepartmental Steering Committee constituted by the Ministry oversees the implementation.[145] Activities related to data generation and groundwater modelling and monitoring are undertaken with state governments, academic and research institutions.

JOBS
NAQUIM is creating opportunities for individuals and enterprises in the field of **developing and using technologies** for aquifer mapping.

GROWTH
9 per cent
Gross value added to the Indian economy in 2018-19 that can be accrued to the use of groundwater for irrigation.[147] Aquifer mapping has the potential of sustaining this economic growth by ensuring the sustainable development of groundwater resources.

SUSTAINABILITY
NAQUIM is contributing significantly to SDG 6.4, which envisions a substantial increase in water-use efficiency across all sectors and ensuring sustainable withdrawals and supply of freshwater to address water scarcity, and reducing, by 2030, the number of people facing water scarcity. It also contributes to **SDG 12.2** to achieve sustainable management and efficient use of natural resources.

143 Ministry of Jal Shakti, email message to CEEW, March 16, 2023.

144 ibid.

145 Government of India. 2012. "Manual on Aquifer Mapping." New Delhi. Government of India. http://cgwb.gov.in/AQM/documents/Manual%20on%20Aquifer%20Mapping.pdf.

146 Ministry of Jal Shakti, email message to CEEW, March 16, 2023.

147 Government of India, 2021 "Agricultural Statistics at a Glance 2021." Ministry of Agriculture and Farmer Welfare, New Delhi. https://eands.dacnet.nic.in/PDF/Agricultural%20Statistics%20at%20a%20Glance%20-%202021%20(English%20version).pdf.

ACHIEVEMENTS

By March 2023[146]:
Aquifers have been mapped in
80 per cent
(250 million hectares)
of the mappable area

Aquifer management plans have been shared with district authorities across
500 districts

"India is in the process of upgrading its water resource information and management system for scientific development, conservation, and conjoint use of our ground and surface water resources. India has launched an ambitious NAQUIM to completely map 2 million sq. km. of the mappable area of the country. The mapping is followed by proper aquifer management plan."

Shri Nitin Gadkari,
Former Union Minister for Water Resources,
River Development and Ganga Rejuvenation

Excerpt from speech given at Conference on International Decade for Action: Water for Sustainable Development 2018-28, June 2018, Tajikistan.

Image credit: istock

Groundwater Management

Atal Bhujal Yojana

OBJECTIVES

Atal Bhujal Yojana (Atal Jal) was launched in **2019** and is being implemented since April 2020 to **improve the management of groundwater resources in the water-stressed areas** of **seven selected** Indian states. This is being achieved through implementing appropriate community-led management actions and investments by converging various ongoing and new central and state schemes. The seven states together account for **229 water-stressed blocks**[148], which are about **37 per cent of total such blocks** in India. The scheme will be implemented over a period of **five years up to 2025**.

FINANCIAL ALLOCATION

INR 6,000 crore[149]
(USD 734.3 million)

The financial outlay. It is a central sector scheme where half of this amount is a loan from the World Bank and the other half is a matching contribution from the Union government. The funds are provided to the states as grants-in-aid under two components: the institutional strengthening and capacity-building component to improve groundwater governance, and the incentive component aimed at incentivising states to ensure the long-term sustainability of groundwater resources. The disbursement under the latter is linked with the **performance of states** against **five disbursement linked indicators**[150]:

- Public disclosure of groundwater data/information and reports
- Preparation of community-led water security plans
- Public financing of approved water security plans through the convergence of ongoing/new schemes
- Adoption of practices for efficient water use
- Improvement in the rate of decline in groundwater levels

IMPLEMENTATION

Department of Water Resources, River Development and Ganga Rejuvenation, Ministry of Jal Shakti (MoJS) Is the nodal implementing agency at the national level. **A three-tier**[151] **institutional mechanism** at national, state and district levels has been set up. National Level Steering Committee (NLSC) is in-charge to review overall progress of ABY:

- State interdepartmental steering committee, formed under Atal Jal, oversees the state-level administration, management, and coordination. The state groundwater resource department is the nodal agency responsible for implementing the scheme
- District Programme Management Units support their respective states with implementing activities

JOBS
One major responsibility of the Atal Jal state implementing agency is to train the village community to prepare water security plans. This is creating employment opportunities for domain experts in hydrology, geo-hydrology, water planning, and community mobilisation. More than 8,000 village-level water security plans have to be prepared, which would generate sizable person-days of employment for such experts. Moreover, skilled and unskilled workers will be required to implement the plan's water supply and water demand management.

GROWTH
INR 80,000- 91,000 crore[153]
(USD 9.8-11.1 billion)
Is estimated as the range of annual power subsidies to agriculture in India. Atal Jal can save parts of these subsidy costs since aquifer management can prevent the digging of deeper tube wells and borewells to extract water.

SUSTAINABILITY
Atal Jal will contribute significantly to SDG 6.4, which envisions a substantial increase in water-use efficiency across all sectors and ensuring sustainable withdrawals and supply of freshwater to address water scarcity, and reducing, by 2030, the number of people facing water scarcity. It also contributes to **SDG 6b** by supporting and strengthening the participation of local communities in improving water management. It supports in attainment of **SDG 2** by arresting water decline and hence ensuring its availability for crop growth leading to zero hunger, and **SDG 5** by providing for mandatory participation of women in the scheme implementation.

148 Ministry of Jal Shakti, email message to CEEW, March 16, 2023.

149 Government of India. 2019. "Atal Bhujal Yojana (Atal Jal) – Program Guidelines (Version 1.1)." New Delhi: Ministry of Jal Shakti. https://ataljal.mowr.gov.in/Ataljalimages/Atal_Bhujal_Yojana_Program_Guidelines_Ver_1.pdf (Conversion rate used in this section: 1 USD = INR 82.74)

150 ibid.

151 ibid.

152 Ministry of Jal Shakti, email message to CEEW, March 16, 2023.

153 Ramaswami, Bharat. 2019. "Agricultural Subsidies - Study Prepared for XV Finance Commission." New Delhi: Indian Statistical Institute. https://fincomindia.nic.in/writereaddata/html_en_files/fincom15/StudyReports/Agricultural%20subsidies.pdf.

ACHIEVEMENTS

As of January 2023,[152]**:**

Conducted
~19,900 training
on various aspects of village-level groundwater management

Installed
3,547 piezometers, 1,972 digital water level recorders and 2,458 water flow metres to strengthen groundwater monitoring in villages

Groundwater data has been placed in the public domain by
8,000+ village panchayats

Initiated or completed community-led water security plan preparation in
8,116 village panchayats.

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Organisation
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