

## Annexures

### India Water Digest: Scaling Investment for a Water-Secure India

**Authors:** Council on Energy, Environment and Water (CEEW) and Asian Infrastructure Investment Bank (AIIB)

#### Annexure 1: Mapping of central governance instruments to water-security challenges

Table 1 maps major central government policies, programmes, and missions against the six water-security challenges identified in this brief: (1) extreme variability in water availability across space and time; (2) climate-related water risks; (3) degradation of natural water infrastructure; (4) groundwater depletion and water quality deterioration; (5) irrigation inefficiency; and (6) coordinating water governance across sectors and levels, including used-water management. The mapping illustrates how different governance instruments respond to specific dimensions of water security and highlights the cross-sectoral nature of India's water policy landscape.

**Table 1: Mapping of central governance instruments to water-security challenges**

| Governance instrument                                          | Phase/ Launch                                        | Lead implementing agency                      | Challenges |    |    |    |    |    |
|----------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------|------------|----|----|----|----|----|
|                                                                |                                                      |                                               | C1         | C2 | C3 | C4 | C5 | C6 |
| National Water Policy (NWP)                                    | 2012                                                 | Ministry of Jal Shakti (MoJS)                 | ✓          | ✓  | ✓  | ✓  | ✓  | ✓  |
| National Water Mission (NWM)                                   | 2011 to present                                      | MoJS                                          | ✓          | ✓  | ✓  | ✓  | ✓  | ✓  |
| Jal Shakti Abhiyan: Catch the Rain (JSA: CTR)                  | JSA: 2019;<br>CTR: 2020;<br>JSA:CTR: 2021 to present | MoJS                                          | ✓          | ✓  | ✓  | ✓  | ✗  | ✗  |
| Atal Mission for Rejuvenation and Urban Transformation (AMRUT) | Phase I: 2015–21;<br>Phase 2: 2021–26                | Ministry of Housing and Urban Affairs (MoHUA) | ✓          | ✓  | ✓  | ✓  | ✗  | ✓  |

| Governance instrument                                               | Phase/ Launch                          | Lead implementing agency                                                                    | Challenges |    |    |    |    |    |
|---------------------------------------------------------------------|----------------------------------------|---------------------------------------------------------------------------------------------|------------|----|----|----|----|----|
|                                                                     |                                        |                                                                                             | C1         | C2 | C3 | C4 | C5 | C6 |
| <i>Jal Jeevan Mission (JJM)</i>                                     | Phase I: 2019–24;<br>Phase 2: 2026–28  | Department of Drinking Water and Sanitation (DoDW&S), MoJS                                  | ✓          | ✓  | ✗  | ✓  | ✗  | ✗  |
| <i>Namami Gange Programme (NGP)</i>                                 | Phase I: 2014–21;<br>Phase II: 2021–26 | National Mission for Clean Ganga (NMCG), MoJS                                               | ✗          | ✓  | ✓  | ✓  | ✗  | ✓  |
| <i>Swachh Bharat Mission–Rural (SBM-R)</i>                          | Phase I: 2014–19;<br>Phase II: 2020–25 | DoDW&S, MoJS                                                                                | ✗          | ✓  | ✗  | ✗  | ✗  | ✓  |
| <i>Swachh Bharat Mission–Urban (SBM-U)</i>                          | Phase I: 2014–19;<br>Phase II: 2021–26 | MoHUA                                                                                       | ✗          | ✓  | ✗  | ✗  | ✗  | ✓  |
| National Perspective Plan (NPP) on Interlinking of Rivers           | 1980–present                           | National Water Development Agency (NWDA), MoJS                                              | ✓          | ✓  | ✗  | ✗  | ✗  | ✗  |
| Ground Water Management & Regulation (GWMR) Scheme                  | 2007–08 to present                     | Central Ground Water Board (CGWB), MoJS                                                     | ✗          | ✓  | ✗  | ✓  | ✗  | ✓  |
| Flood Management and Border Areas Programme (FMBAP)                 | 2021–26                                | Department of Water Resources, River Development and Ganga Rejuvenation (DoWR, RD&GR), MoJS | ✗          | ✓  | ✗  | ✗  | ✗  | ✗  |
| <i>Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) – Accelerated</i> | 1996–97 to present<br>(integrated into | DoWR, RD&GR, MoJS                                                                           | ✓          | ✗  | ✗  | ✗  | ✓  | ✗  |

| Governance instrument                                                   | Phase/ Launch                                           | Lead implementing agency                                                                                              | Challenges |    |    |    |    |    |
|-------------------------------------------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|------------|----|----|----|----|----|
|                                                                         |                                                         |                                                                                                                       | C1         | C2 | C3 | C4 | C5 | C6 |
| Irrigation Benefits Programme (AIBP)                                    | PMKSY in 2015–16)                                       |                                                                                                                       |            |    |    |    |    |    |
| PMKSY – <i>Har Khet Ko Pani</i> (HKKP)                                  | 2015–present                                            | DoWR, RD&GR, MoJS                                                                                                     | ✓          | ✓  | ✗  | ✓  | ✓  | ✗  |
| <i>Rashtriya Krishi Vikas Yojana</i> (RKVY) - Per Drop More Crop (PDMC) | 2015–16 to present (delivered under RKVY since 2022-23) | MoA&FW – Department of Agriculture and Farmers Welfare (DoA&FW), Ministry of Agriculture and Farmers Welfare (MoA&FW) | ✗          | ✓  | ✗  | ✓  | ✓  | ✗  |
| PMKSY - Watershed Development Component (WDC-PMKSY)                     | Phase I: 2015–21; Phase II: 2021–26                     | MoRD – Department of Land Resources                                                                                   | ✓          | ✗  | ✓  | ✓  | ✗  | ✗  |
| PM-KUSUM Components B and C                                             | 2019–2026                                               | Ministry of New and Renewable Energy (MNRE)                                                                           | ✗          | ✓  | ✗  | ✓  | ✓  | ✗  |

Source: Authors' analysis

## Annexure 2: Key water governance instruments, targets and progress

Table 2. Key water governance instruments, targets and progress

| Governance instrument                                           | Target / commitment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Achievement to date                                                                                                                                                                                                                                                                                                                                                            | Source                                         |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|
| National Water Policy                                           | A document guiding the planning, conservation, and management of India's water resources. Calls for a <b>national water framework law</b> and an integrated river-basin approach; promotes <b>equitable and sustainable water use</b> , water-use efficiency and demand management; establish statutory <b>state water resources regulatory authorities</b> ; strengthen participatory water governance, especially for groundwater; conserve river corridors, water bodies and ecological flows; promote <b>recycling and reuse of water</b> ; integrate <b>climate-change adaptation</b> into water-resource planning; and strengthen water data, monitoring and planning systems. |                                                                                                                                                                                                                                                                                                                                                                                | (Ministry of Water Resources (erstwhile) 2012) |
| National Water Mission (NWM)                                    | Promote basin-level integrated water-resource management; climate-impact assessment of water resources; improvement in water-use efficiency (WUE) by <b>20 per cent</b> ; and promotion of citizen and state actions for water                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>24 states/ union-territories</b> submitted first-draft of state-specific action plan (SSAP) for the water sector covering irrigation, industry, domestic and used water and <b>3</b> submitted final plans; executing <b>Jal Shakti Abhiyan: Catch the Rain</b> since 2019 in all rural and urban blocks; and <b>Bureau of Water Use Efficiency (BWUE)</b> created in 2022. | (MoJS 2025b)                                   |
| <i>Jal Shakti Abhiyan: Catch the Rain</i> (JSA: CTR); under NWM | Water conservation and rainwater harvesting; renovation of traditional and other water bodies; reuse and recharge of bore wells; geo-tagging of water bodies; watershed development; intensive afforestation; and establishing <b>Jal Shakti Kendras in all districts</b>                                                                                                                                                                                                                                                                                                                                                                                                            | <b>1.9 million</b> water conservation and rainwater harvesting structures were constructed; <b>0.3 million</b> traditional water bodies renovated; <b>1 million</b> reuse and recharge structures created; <b>2 million</b> watershed development works completed; Jal Shakti Kendra                                                                                           | (PIB 2026a)                                    |

| Governance instrument                                          | Target / commitment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Achievement to date                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Source        |
|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
|                                                                | to disseminate information on water conservation techniques.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | established in <b>712 districts</b> as of January 2026.                                                                                                                                                                                                                                                                                                                                                                                                                           |               |
| Atal Mission for Rejuvenation and Urban Transformation (AMRUT) | Provide functional household tap connections to <b>13.9 million households</b> in <b>500 cities</b> (Phase 1) and <b>26.8 million</b> households in <b>4,800 statutory towns</b> (Phase 2); rejuvenation of water bodies and developing green spaces; <b>26.4 million</b> sewerage/septage coverage in <b>500 AMRUT cities</b> ; treated used water reuse to meet <b>20 per cent</b> of city water demand and <b>40 per cent</b> of state industrial water demand; reduce non-revenue water to <b>below 20 per cent</b> alongside <b>municipal governance reforms</b> on property tax, user charges and municipal bonds; and positive groundwater balance in <b>urban aquifer systems</b> | <b>23.8 million (70 per cent)</b> urban households provided tap connections, as of February 2026; <b>2,780 hectares</b> (ha) of area greened; <b>848</b> sewage treatment plants enrolled with <b>17,300 million litres per day (MLD) of total capacity</b> ; <b>870</b> groundwater sites mapped and <b>539 detailed project reports</b> (valued at over <b>INR 28 crores (USD 2.9 million)</b> for groundwater recharge structures prepared across the 75 participating cities. | (MoHUA 2026a) |
| Jal Jeevan Mission (JJM)                                       | Provide functional household tap connections to <b>193.6 million rural households (900 million people)</b> ; and ensure sustainable water sources and infrastructure.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>159 million (82.1 per cent)</b> rural households provided tap connections as of July 2026.                                                                                                                                                                                                                                                                                                                                                                                     | (MoJS 2026b)  |
| Namami Gange Programme (NGP)                                   | Effective abatement of pollution, conservation and rejuvenation of river Ganga and its tributaries.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>6,610 MLD</b> treatment capacity installed, of which <b>3,977 MLD (60 per cent)</b> made operational.                                                                                                                                                                                                                                                                                                                                                                          | (MoJS 2026d)  |

| Governance instrument                                     | Target / commitment                                                                                                                                                     | Achievement to date                                                                                                                                                                                                                                                                                                                                                        | Source                        |
|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| Swachh Bharat Mission–Rural (SBM-R)                       | Make and sustain open defecation-free (ODF) status of all villages, and ensure the safe management of solid and liquid waste in all villages of India (ODF +)           | <b>0.56 million villages (96 per cent)</b> declared ODF+ by March 2025.                                                                                                                                                                                                                                                                                                    | (MoJS 2025a)                  |
| Swachh Bharat Mission–Urban (SBM-U)                       | Make and sustain ODF status of all cities; make <b>all cities garbage-free</b> , ensure safe treatment /reuse of used water; and eliminate untreated discharge (ODF ++) | <b>1,973 urban local bodies (41.9 per cent of ODF declared ULBs)</b> achieved ODF++ as of June 2026; <b>82 per cent</b> of municipal solid waste getting processed, as of June 2026.                                                                                                                                                                                       | (MoHUA 2026b)<br>(MoHUA n.d.) |
| National Perspective Plan (NPP) on Interlinking of Rivers | Develop <b>30 identified links</b> to transfer water from surplus to deficit basins.                                                                                    | Feasibility reports completed for <b>26 links</b> ; <b>13</b> detailed project reports prepared; one link ( <b>Ken–Betwa</b> ) entered implementation.                                                                                                                                                                                                                     | (MoJS 2026a)                  |
| Ground Water Management & Regulation (GWMR) Scheme        | Aquifer mapping, groundwater quality and level monitoring, recharge/ rejuvenation and regulation of extraction.                                                         | <b>250 million hectares (Mha) (80 per cent of mappable area)</b> mapped under National Aquifer Mapping and Management Programme (NAQUIM) by 2023; high-resolution aquifer mapping via heliborne geophysical surveys completed over <b>9.7 Mha</b> under NAQUIM 2.0; all 14 principal and 42 major aquifers mapped; management plans prepared for 654 districts as of 2025. | (PIB 2026a)<br>(MoJS 2025c)   |

| Governance instrument                                                                                    | Target / commitment                                                                                                                                                                      | Achievement to date                                                                                                                                                                             | Source                                       |
|----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| Flood Management and Border Areas Programme (FMBAP)                                                      | Provide central assistance for flood-control and anti-erosion works; flood forecasting and border-river management on common border rivers with neighbouring countries.                  | <b>5 Mha</b> of land benefitted - protecting <b>53.6 million people</b> via 427 completed projects (82 per cent).                                                                               | (MoJS 2024)                                  |
| <i>Pradhan Mantri Krishi Sinchayee Yojana</i> (PMKSY) – Accelerated Irrigation Benefits Programme (AIBP) | Accelerate completion of ongoing major and medium irrigation projects to create additional irrigation potential, with priority to drought-prone and water-scarce regions.                | <b>3.07 Mha</b> of irrigation potential created since April 2016, with <b>71 of 125</b> projects taken up under AIBP completed as of May 2026.                                                  | (PIB 2026b)                                  |
| PMKSY – <i>Har Khet Ko Pani</i> (HKKP)                                                                   | Enhance the physical access of water on the farm and expand cultivable area under assured irrigation                                                                                     | <b>0.68 Mha</b> of irrigation potential added; <b>2,362</b> water bodies ( <b>71 per cent</b> of identified) repaired, renovated or restored, as of May 2026.                                   | (MoJS 2026c)<br><br>(DoWR, RD&GR n.d).       |
| Per Drop More Crop (PDMC)                                                                                | Expand micro-irrigation and improve farm-level water-use efficiency through drip and sprinkler systems.                                                                                  | <b>11.1 Mha (12.6 per cent</b> of potential) of area brought under micro-irrigation, as of June 2026.                                                                                           | (MoJS 2026c)<br><br>(Srivastava et al. 2024) |
| PMKSY - Watershed Development Component (WDC-PMKSY)                                                      | Treat <b>5 Mha</b> of degraded/rainfed land through integrated watershed management.                                                                                                     | <b>5 Mha</b> (100 per cent) of land treated                                                                                                                                                     | (MoRD 2025)                                  |
| PM-KUSUM Components B and C                                                                              | Install <b>1.4 million</b> standalone solar-powered agriculture pumps, replacing diesel pumps (component B); and solarise <b>3.5 million</b> grid-connected agriculture pumps, including | <b>1 million (75 per cent</b> of the sanctioned) standalone solar pumps installed (Component B); <b>1.3 million (37 per cent</b> of the sanctioned) grid-connected agriculture pumps solarised, | (MNRE 2026a)<br><br>(MNRE 2026b)             |

| Governance instrument | Target / commitment                                                                                                | Achievement to date                                                              | Source |
|-----------------------|--------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|--------|
|                       | through feeder-level solarisation, to reduce farmers' dependence on grid electricity for irrigation (Component C). | (Component C), as of 31 January 2026. Over <b>2.2 million</b> farmers benefited. |        |

Source: Authors' analysis

### Annexure 3: Financial instruments, mechanisms, and approaches

#### 3.1 Financial Instruments

##### - Municipal bonds

Municipal bonds (muni bonds) refer to debt instruments issued by municipal bodies or other authorised entities to raise capital for long-term infrastructure projects, such as water supply, sewerage, and road construction. These bonds generally come in two forms: general-obligation bonds, which are repaid using the municipality's overall revenues, and revenue-obligation bonds, where repayment is tied to the cash flows of a specific project (Bibhudatta and Rathee 2025; Gupta et al. 2025).

##### - Green bonds

A green bond is a fixed-income financial instrument for raising capital through the debt market like traditional corporate bonds. Its distinguishing feature is that the proceeds are dedicated to environmentally positive projects, such as renewable energy, water management, clean transport, and climate adaptation efforts (Ghosh et al. 2016).

##### - Blue bonds

Blue bonds are a sub-category of green bonds in which the proceeds are dedicated to funding marine projects that promote biodiversity and support economies reliant on sustainable fisheries (Habbel et al. 2021). These bonds work like conventional bonds with one distinguishing feature - proceeds are ring-fenced for eligible blue projects (European Commission n.d.)

##### - Water bonds

Water bonds are specialised debt instruments used by governments and corporations to raise medium- to long-term capital for essential freshwater projects. The funds generated are dedicated to improving water security by financing critical infrastructure, such as water supply systems, sustainable management, and wastewater treatment (OECD 2022).

##### - Resilience-linked loans

Loans whose economic terms, usually the interest margin, step up or down with the borrower's performance against pre-agreed, externally verified resilience targets, such as reductions in non-revenue water. Unlike green or blue bonds, proceeds are not ring-fenced, so credibility rests entirely on the quality of the chosen indicators (Resendiz, Ranger, and Mahul 2025).

- **On-lending**

On-lending is a financial practice in which a lender such as non-banking financial companies borrows funds from a larger financial entity such as a government, international organisation or bank, and then re-lends those funds to the ultimate beneficiaries. Some larger entities often avoid consumer credits due to risks associated with it (UNESCWA n.d.).

### **3.2 Financing mechanisms and approaches**

- **Watershed funds**

The watershed fund was set up with NABARD following the 1999-2000 Union Budget with an initial corpus of INR 200 crore contributed equally by the Ministry of Agriculture and NABARD. Its main goal is to promote people-driven watershed development, restore degraded land and water resources, and improve farming in dry rural areas. The fund is utilised to build local community capacity and fund watershed projects via grants and loans to state governments (NABARD 2006).

- **Blended finance structures**

Blended finance is an approach that combines public or philanthropic funds to catalyse private sector investment in projects that contribute to sustainable development that may not attract commercial funding due to high perceived risk or low returns. This is achieved by improving the risk-return profile of investments through various mechanisms such as insurance, concessional loans and guarantees (UNESCO n.d.).

- **Policy based financing**

Policy-based financing provides general finance support to the government rather than funding specific investment projects. The funds are disbursed only after the borrowing country successfully completes specific policy reforms agreed upon by the lender. It serves as an incentive for the government to enact meaningful improvements such as management of public resources or creating a more business friendly climate (ADB 2021).

- **Results-based financing (RBF) / performance-linked funding mechanisms**

RBF is a model that links financial returns directly to the achievement of specific, predetermined social or environmental outcomes. Unlike traditional activity-based grants, RBF relies on private investors to provide the upfront capital needed for service providers to implement interventions. An independent evaluator then measures the program's outcomes; if the targets are met, the government repays the investors with interest, but if they fall short, the investors absorb the financial risk (UNESCO n.d.)

- **Innovative public-private partnerships (PPPs)**

PPPs are collaborative agreements between government entities and private sector companies to finance, build, and operate projects that serve the public. Within this framework, a range of innovative financial mechanisms is now being leveraged to mobilise resources specifically for climate-resilient infrastructure development including blended finance structures, green municipal bonds and pooled investment funds (Bajpai et al. 2025).

- **Guarantee facilities**

Guarantee facilities are financial mechanisms where a third party (government or multilateral development bank (MDB)) acts as a guarantor by agreeing to bear the partial or total loss in the event of default or loss of value. These facilities are critical for de-risking projects, to attract the private capital at lower interest rates (IIMA, IFC, and CEEW 2023).

- **Payments for ecosystem services (PES)**

PES are conditional contracts under which downstream beneficiaries, such as utilities, industries and cities that gain cleaner raw water and lower treatment and desilting costs, pay upstream land managers to protect catchments, with payment tied to provision rather than intent. Evidence of effectiveness depends on four design conditions: motivated buyers and sellers, workable metrics and low-transaction-cost institutions, with tenure security and equitable benefit sharing determining whether payments reach those who actually change land use (Salzman et al. 2018; McElwee et al. 2014).

- **Nature credit markets**

A nature or biodiversity credit is a tradable unit representing a measured gain in ecosystem condition, bought as a positive contribution rather than to offset damage elsewhere, which for water could fund wetland, floodplain and catchment restoration that has no single obvious beneficiary. The market is still at pilot stage, with a review of 34 projects finding unresolved problems of additionality, permanence, leakage and commensurability, and a trade-off between metrics simple enough to trade and metrics that reflect ecological condition (Wunder et al. 2025).