



# CONVERGENCE

AND CO-FINANCING OPPORTUNITIES FOR  
CLIMATE-RESILIENT WATER MANAGEMENT

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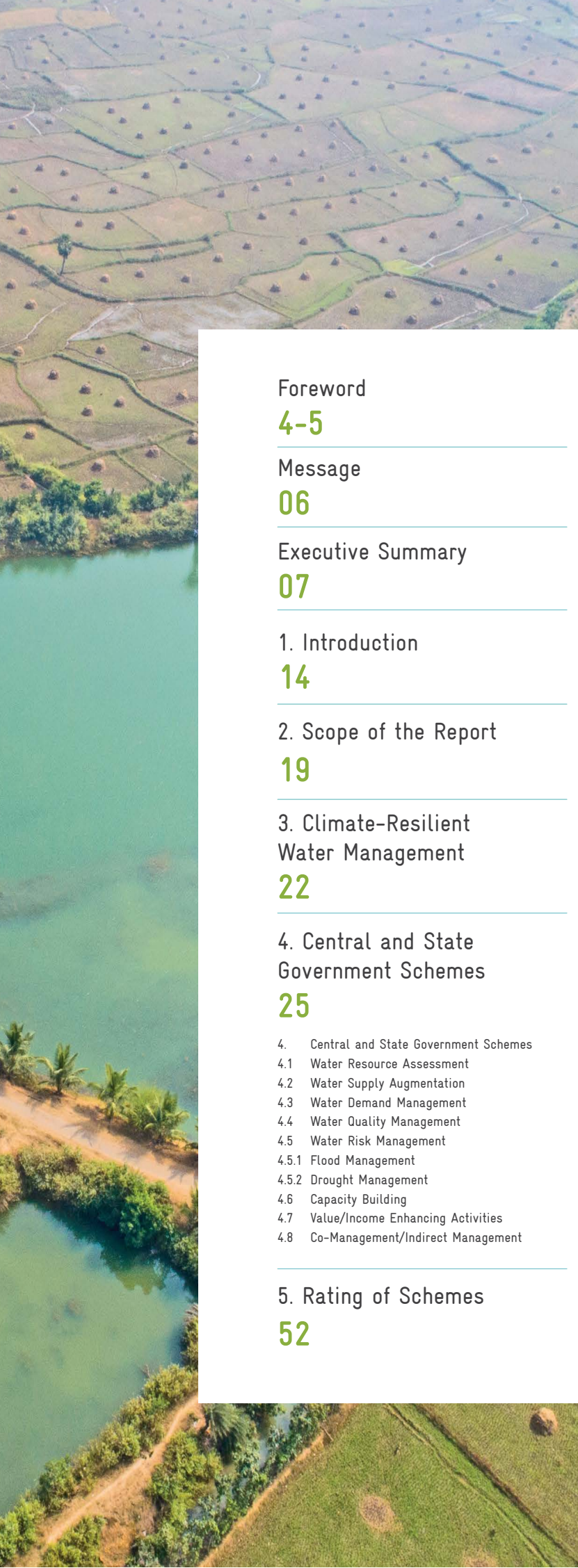
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# FOREWORD

Greetings from National Water Mission!

National Water Mission (NWM) was set up in 2011 with the objective of “conservation of water, minimising wastage & ensuring its more equitable distribution both across and within the states through integrated water resource development and management.”

Keeping with the overarching objectives of its 5 main goals, NWM has initiated two separate campaigns-

‘Sahi-Fasal’ to nudge farmers in the water stressed areas to grow crops which are not water intensive, but use water very efficiently; and are economically remunerative; are healthy and nutritious; suited to the agro-climatic-hydro characteristics of the area; and are environmentally friendly. Under this, a series of workshops are being organised in the water stressed areas of the country.

‘Catch the rain’ with an aim to nudge all stakeholders to create Rain Water Harvesting Structures (RWHS) suitable to the climatic conditions and sub-soil strata, before the onset of monsoon, to ensure storage of rain water; while utilising Mahatma Gandhi NREGA funds for water conservation works, drives, for rooftop RWHS, maintenance of catchment areas and to put water back into aquifers.

With the use of Composite Water Resource Management (CWRM) framework, the Indo-German project on Water Security and Climate Adaptation in Rural India (WASCA) in partnership with Ministry of Rural Development and Ministry of Jal Shakti through the NWM, tangibly contributes to the targets under the 3rd, 4th and 5th Goals of NWM, while also making use of Mahatma Gandhi NREGA works in social programmes; and in their publications, they highlight the importance of demand side management in water use planning, becoming a knowledge product that aims to identify financing and convergence opportunities.

With regards,

**G. Asok Kumar**

Additional Secretary & Mission Director  
National Water Mission





# FOREWORD

Mahatma Gandhi National Rural Employment Guarantee Act (Mahatma Gandhi NREGA) has been providing guaranteed wage employment of up to 100 days in a financial year to every rural Indian household whose adult members are willing to do unskilled manual labour. The programme has contributed towards creation of durable assets and strengthening the livelihood resource base across rural India, since 2006. As of July 2020, 8.52 crore households of the 14.26 crore households registered under the programme, are active workers. The programme received the highest ever budget allocation of INR 1,05,000 crore in FY 2020-21, including an additional allocation of INR 40,000 crore to support infrastructure development and livelihood augmentation during the Covid-19 situation.

Mahatma Gandhi NREGA has immense focus on improving natural resource management and water conservation and management in rural areas. In this regard, the Mission Water Conservation was launched in 2016 as a convergent initiative with the Ministry of Water Resources and the Ministry of Agriculture and Farmer's Welfare, for allocating 65% programme expenditure on NRM and water-related works in the 2,129 water-stressed blocks across the country. In subsequent years, the programme supported the Jal Shakti Abhiyan and Jal Jeevan Mission initiatives of the Ministry of Jal Shakti.

The Indo-German project on Water Security and Climate Adaptation in Rural India (WASCA) is in partnership with the Ministry of Rural Development and the Ministry of Jal Shakti. The project has a key focus on climate-resilient water resource management and is being implemented in selected districts of four states namely, Rajasthan, Madhya Pradesh, Uttar Pradesh and Tamil Nadu. Composite Water Resources Management (CWRM) planning framework is a key contribution of the project that is now being piloted in the project areas. This publication on 'Convergence and Co-financing opportunities for Climate-Resilient Water Management' highlights the need and scope of convergent financing for implementing the action plan that will be developed through the CWRM framework.

We hope these key elements will prove to further the knowledge of readers and support the rural development and other departments at a district level in convergent financing and implementation of CWRM.

Best wishes,

**Rohit Kumar**

Joint Secretary (Mahatma Gandhi NREGA)  
Ministry of Rural Development

# MESSAGE

The German Development Cooperation (GIZ) is the implementing agency of the Technical Cooperation for the German Government and is currently present in over 120 countries worldwide. The Indo-German cooperation is 62 years young and works with the Governments and other organisations on issues of environment, climate change, sustainable agriculture, energy, social security among others.

GIZ India has been implementing the Indo-German project on 'Water Security and Climate Adaptation in Rural India' (WASCA) with the Ministry of Rural Development (MoRD) and the Ministry of Jal Shakti (MoJS) since 2019. Commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ), the project aims to improve water security and rural climate adaptation through better management of rural water resources.

The project's intended outputs include:

1. Improved convergence of existing planning and financing approaches to strengthen water security.
2. Demonstration of convergent planning, financing and implementation at local level.
3. Cooperation with the private sector.

Water resource management is a significant issue in India today, and as alerted by the Intergovernmental Panel on Climate Change, water is one of the key resources impacted by climate change. The BMZ notes that all the existing problems surrounding water, such as too much water causing floods, too little water causing droughts, or water pollution, will all be further exacerbated by climate change. It is in this context that WASCA has developed a Composite Water Resource Management (CWRM) framework synthesising learnings from various Indo-German projects and rural development programmes in India, to provide a sustainable and holistic district level water plan suitable for a convergent financing and implementation of water security and climate adaptation measures.

Given WASCA's and CWRM's focus on enhancing climate-related water action, this report will prove crucial in recognising convergence and co-financing opportunities while providing a blueprint for effective execution of climate-resilient water management strategies. The findings will act as relevant sources for the development of interventions within our existing institutions. These strategies with an overlap of adaptation and mitigation aspects will help cope with impending climate-induced uncertainties as we move ahead.

We hope that this report will be a useful input for the implementation of CWRM measures in the WASCA project locations. Further, we look forward to sharing the results and evidence from the piloting process in WASCA project locations and supporting our Ministerial and state government partners in further upscaling and mainstreaming the approach countrywide. We hope that this way of mapping financial opportunities could also be useful at a global level.

Best regards,

**Rajeev Ahal**

Director, Natural Resource Management and Agroecology  
GIZ India

# EXECUTIVE SUMMARY

In 2019, NITI Aayog estimated that India's GDP by 2050 could be lost by 6% due to water scarcity. Given growing climate-induced uncertainties and the centrality of water in India's largely agrarian and rural livelihoods, the adoption of climate-resilient water management (CRWM) is crucial for India's 'water future'. CRWM can be summed up as water management interventions that enhance the system's ability to maintain hydrological processes and build flexibility and adaptability to deal with climate-induced uncertainties at different geographical and temporal scales. The core components of CRWM may be categorised as water resource assessment, water supply augmentation, water demand management, water quality management, water risk management, capacity building/awareness, value/income enhancing activities and indirect or co-management. With this in mind, this report focuses on identifying CRWM avenues by mapping convergence and co-financing opportunities for executing them within existing institutional regimes.

The report carefully and meticulously maps several central and state level government initiatives, policies and schemes with the potential for building and enhancing climate resilience through improved water management and governance. The Ministry of Jal Shakti (MoJS), Government of India is the nodal agency for water resources planning, management and development in the country. It underlines its water vision through the National Water Mission and National Water Policy; providing broad objectives, goals and framework for water

resource development along with numerous flagship programmes such as *Pradhan Mantri Krishi Sinchayee Yojana* (PMKSY) for delivering '*har khet ko pani*'; *Atal Bhujal Yojana* (ABhY) for reducing groundwater over-exploitation; *Jal Jeevan Mission* (for delivering safe drinking water to all households); *Namami Gange* (for rejuvenation of Ganges river); National Hydrology Project (for improved water information, planning and management); *Swachh Bharat Abhiyan-Gramin*, for rural sanitation; and so on.

Apart from MoJS, there are number of complementary schemes that contribute to CRWM components, for example: *Mahatma Gandhi National Rural Employment Guarantee Act* (Mahatma Gandhi NREGA) of the Ministry of Rural Development; *Pradhan Mantri Kisan Urja Suraksha evam Utthan Mahabhiyan* (PM-KUSUM) of the Ministry of New and Renewable Energy (MNRE); National Mission for Sustainable Agriculture (NMSA) and *Rashtriya Krishi Vikas Yojana* (RKVY) of the Ministry of Agriculture and Farmers' Welfare. All of these, and some more, are mapped and different CRWM components identified. In addition, we also review and map several relevant programmes, schemes and policies in the four WASCA project states- Madhya Pradesh (E.g. *Mukhyamantri Krishak Samraddhi Yojana*); Rajasthan (E.g. *Mukhyamantri Jal Swavlamban Abhiyan*); Tamilnadu (E.g. *Kudimaramath*; Irrigated Agriculture Modernisation Project); and Uttar Pradesh (E.g. *State Groundwater Conservation Mission*) - that contribute to CRWM.

To address funding and knowledge gaps in developing CRWM, we also explore opportunities presented through private players, CSR initiatives, international and national donors and civil society organizations. Some of the largest industry-led initiatives in water conservation, restoration and quality management financed by Reliance Foundation, Hindustan Unilever Foundation, Johnson & Johnson, Tata Motors Ltd, Hindalco, etc. exhibit immense potential for co-financing CRWM activities. Apart from that, role of Confederation of Indian Industry-Triveni Water Institute (CII-TWI), Federation of Indian Chambers of Commerce and Industry (FICCI) and ASSOCHAM Foundation for Corporate Social Responsibility (AFCSR) as organisations involved in private CSR activities is also important. Additionally, international and national donor agencies working closely on water and related sectors such as green climate funds, international climate initiative, adaptation funds, international fund for agriculture development, NABARD's Watershed Development Funds (WDF) and WDF-Climate proofing offer significant co-financing opportunities. Civil society organisations have a large pool of personnel with field and community organisation skills that can be leveraged for implementing CRWM plans.

With a specific focus on WASCA project states, the report offers some potential convergence models for CRWM execution.

The institutional framework for executing convergence is critical in CRWM planning and implementation. Most of

the central and state schemes have their respective convergence guidelines with tasks identified and it is suggested that for planning and implementation of CRWM, village/gram panchayat is the most appropriate unit to bring about meaningful impact of convergence and co-financing with Mahatma Gandhi NREGA as the central scheme for water adaptation to climate change.

Finally, the concept of convergence is not new; it has been the suggested 'mantra' for inter-sectoral collaboration for co-financing for a while, especially for implementing development schemes and programmes. It is not without challenges and despite the best of intentions, it often suffers in execution due to sectoral/silo-thinking; lack of flexibility and imagination; absence of conducive policy framework; and a general aversion for risks associated with institutional innovations. The convergence and co-financing mechanisms and models we propose can hopefully overcome some of these issues by offering attractive win-win opportunities and by clearly demonstrating that the combined effort will bring results that are substantially more than the sum of individual results. The report also suggests that capacity building of implementing agencies and their programme staff; field testing and fine-tuning of co-financed CRWM models before execution of large scale; development of a common planning and reporting format; and making these accessible through a common portal can also go a long way in improving convergence.

# ABBREVIATIONS AND ACRONYMS

## A-D

<b>ABhY</b> Atal Bhujal Yojana
<b>AED</b> Agriculture Engineering Department
<b>APC</b> Agriculture Production Commissioner
<b>BRC</b> Block Resource Centre
<b>BWSC</b> Block Water and Sanitation Committee
<b>C-DAPs</b> Comprehensive District Agriculture Plans
<b>CEGC</b> Central Employment Guarantee Council
<b>CSR</b> Corporate Social Responsibility
<b>CRWM</b> Climate-Resilient Water Management
<b>CS</b> Chief Secretary of the State
<b>CWC</b> Central Water Commission
<b>DAC&amp;FW</b> Department of Agriculture, Cooperation and Farmers' Welfare
<b>DAPs</b> District Action Plans
<b>DAPU</b> District Agriculture Planning Unit
<b>BAPU/TAPU</b> Block or Taluka Agriculture Planning Unit
<b>DAY</b> Deendayal Antyodaya Yojana
<b>DC</b> District Collector
<b>DDWS</b> Department of Drinking Water and Sanitation

## D-G

<b>DIP</b> District Irrigation Plan
<b>DLIC</b> District Level Implementation Committee
<b>DoA</b> Department of Agriculture
<b>DoF</b> Department of Fisheries
<b>DoGW</b> Department of Groundwater
<b>DoIWR</b> Department of Irrigation and Water Resource
<b>DoLR</b> Department of Land Resources
<b>DoMA&amp;WS</b> Department of Municipal Administration and Water Supply
<b>DoRD&amp;PR</b> Department of Rural Development and Panchayati Raj
<b>DoWR</b> Department of Water Resources
<b>DoWR, RD&amp;GR</b> Department of Water Resources, River Development and Ganga Rejuvenation
<b>DPC</b> District Programme Coordinator
<b>DWSM</b> District Water and Sanitation Committee
<b>FMBAP</b> Flood Management and Border Areas Programme
<b>GGJVV</b> Guru Golwalkar Janbhagidari Vikas Yojana
<b>GMRS</b> Groundwater Management and Regulation Scheme

## G-M

<b>GoTN</b> Government of Tamil Nadu
<b>GP</b> Gram Panchayat
<b>ICAR</b> Indian Council of Agricultural Research
<b>IDWG</b> Inter Departmental Working Group
<b>INR</b> Indian Rupee
<b>ISAM</b> Integrated Scheme on Agricultural Marketing
<b>ISRO</b> Indian Space Research Organisation
<b>IWMP</b> Integrated Watershed Management Programme
<b>JJM</b> Jal Jeevan Mission
<b>KBS</b> Krishi Bhagya Scheme
<b>KTY</b> Khet Tirtha Yojana
<b>KVK</b> Krishi Vigyan Kendra
<b>LTIF</b> Long Term Irrigation Fund
<b>Mahatma Gandhi NREGA</b> Mahatma Gandhi National Rural Employment Guarantee Act
<b>MKSP</b> Mahila Kisan Sashaktikaran Pariyojana
<b>MJSA</b> Mukhyamantri Jal Swavlamban Abhiyan
<b>MLIS</b> Micro Lift Irrigation Scheme

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**M-N**

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**MNRE**  
Ministry of New and Renewable Energy

**MoAFW**  
Ministry of Agriculture and  
Farmers' Welfare

**MoFPI**  
Ministry of Food Processing Industries

**MoJS**  
Ministry of Jal Shakti

**MoPR**  
Ministry of Panchayati Raj

**MoRD**  
Ministry of Rural Development

**MoSDE**  
Ministry of Skill Development and  
Entrepreneurship

**MoSJE**  
Ministry of Social Justice and  
Empowerment

**MoSPI**  
Ministry of Statistics and Programme  
Implementation

**MoTA**  
Ministry of Tribal Affairs

**MPLADS**  
Member of Parliament Local Area  
Development Scheme

**MSDA**  
Mission on Sustainable Dryland  
Agriculture

**MSP**  
Minimum Support Price

**NABARD**  
National Bank for Agriculture and  
Rural Development

**NEC**  
National Executive Committee

**NFSM**  
National Food Security Mission

**NHM**  
National Horticulture Mission

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**N-P**

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**NHP**  
National Hydrology Project

**NICRA**  
National Initiative on Climate  
Resilient Agriculture

**NJJM**  
National Jal Jeevan Mission

**NMAET**  
National Mission on Agricultural  
Extension and Technology

**NMSA**  
National Mission on Sustainable  
Agriculture

**NMT**  
National Management Team

**NPSHF**  
National Project on Soil Health  
and Fertility

**NRLM**  
National Rural Livelihood Mission

**NSC**  
National Steering Committee

**NWM**  
National Water Mission

**NWP**  
National Water Policy

**PAPU/VAPU**  
Panchayat or Village Agriculture  
Planning Unit

**PKVY**  
Paramparagat Krishi Vikas Yojana

**PM-KUSUM**  
Pradhan Mantri- Kisan Urja Suraksha  
evam Utthan Mahabhiyan

**PMAGY**  
Pradhan Mantri Adarsh Gram Yojana

**PMFBY**  
Pradhan Mantri Fasal Bima Yojana

**PMGSY**  
Pradhan Mantri Gram Sadak Yojana

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**P-S**

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**PMKsaY**  
Pradhan Mantri  
Sampada Yojana

**PMKSY-AIBP**  
Pradhan Mantri Krishi Sinchayee  
Yojana- Accelerated Irrigation Benefit  
Programme

**PMKSY-HKKP**  
Pradhan Mantri Krishi Sinchayee  
Yojana- Har Khet Ko Pani

**PMKSY-PDMC**  
Pradhan Mantri Krishi Sinchayee  
Yojana- Per Drop More Crop

**PMKVY**  
Pradhan Mantri Kaushal Vikas Yojana

**PO**  
Programme Officer

**PRIs**  
Panchayati Raj Institutions

**PWD**  
Public Works Department

**RADP**  
Rainfed Area Development Programme

**RBM**  
River Basin Management

**RGSA**  
Rashtriya Gram Swaraj Abhiyan

**RHRMP**  
Rainwater Harvesting and Runoff  
Management Programme

**RKVY-RAFTAAR**  
Rashtriya Krishi Vikas  
Yojana- Remunerative Approaches  
for Agriculture and Allied Sector  
Rejuvenation

**SAPs**  
State Agriculture Plans

**SAPs\***  
State Action Plans

**SBA-G**  
Swachh Bharat Abhiyan- Gramin



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**S-S**

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**SDGs**  
Sustainable Development Goals

**SEGC**  
State Employment Guarantee Council

**SGCM**  
State Groundwater Conservation Mission

**SGY**  
Suvarna Gramodaya Yojana

**SIP**  
State Irrigation Plan

**SLPSC**  
State Level Project Steering Committee

**SLSC**  
State Level Steering Committee

**SMAE**  
Sub-Mission on Agriculture Extension

**SMAM**  
Sub-Mission on Agricultural  
Mechanisation

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**S-U**

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**SMC**  
State Mahatma Gandhi NREGA  
Mission/Cell

**SMPP**  
Sub-Mission on Plant Protection and  
plant quarantine

**SMSP**  
Sub-Mission on Seed and Planting  
material

**SWSM**  
State Water and Sanitation Mission

**TM**  
Technical Team

**TN-IAM**  
Tamil Nadu- Irrigated Agriculture  
Modernisation

**UPWSRP**  
Uttar Pradesh Water Sector  
Restructuring Project

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**U-W**

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**UTFI**  
Underground Transfer of Floods for  
Irrigation

**VAPs**  
Village Action Plans

**VWSC**  
Village Water and Sanitation Committee

**WDC-PMKSY**  
Watershed Development Component-  
PM Krishi Sinchayee Yojana

**WRD**  
Water Resources Department

**WRO**  
Water Resources Organisation

**WUAs**  
Water User Associations

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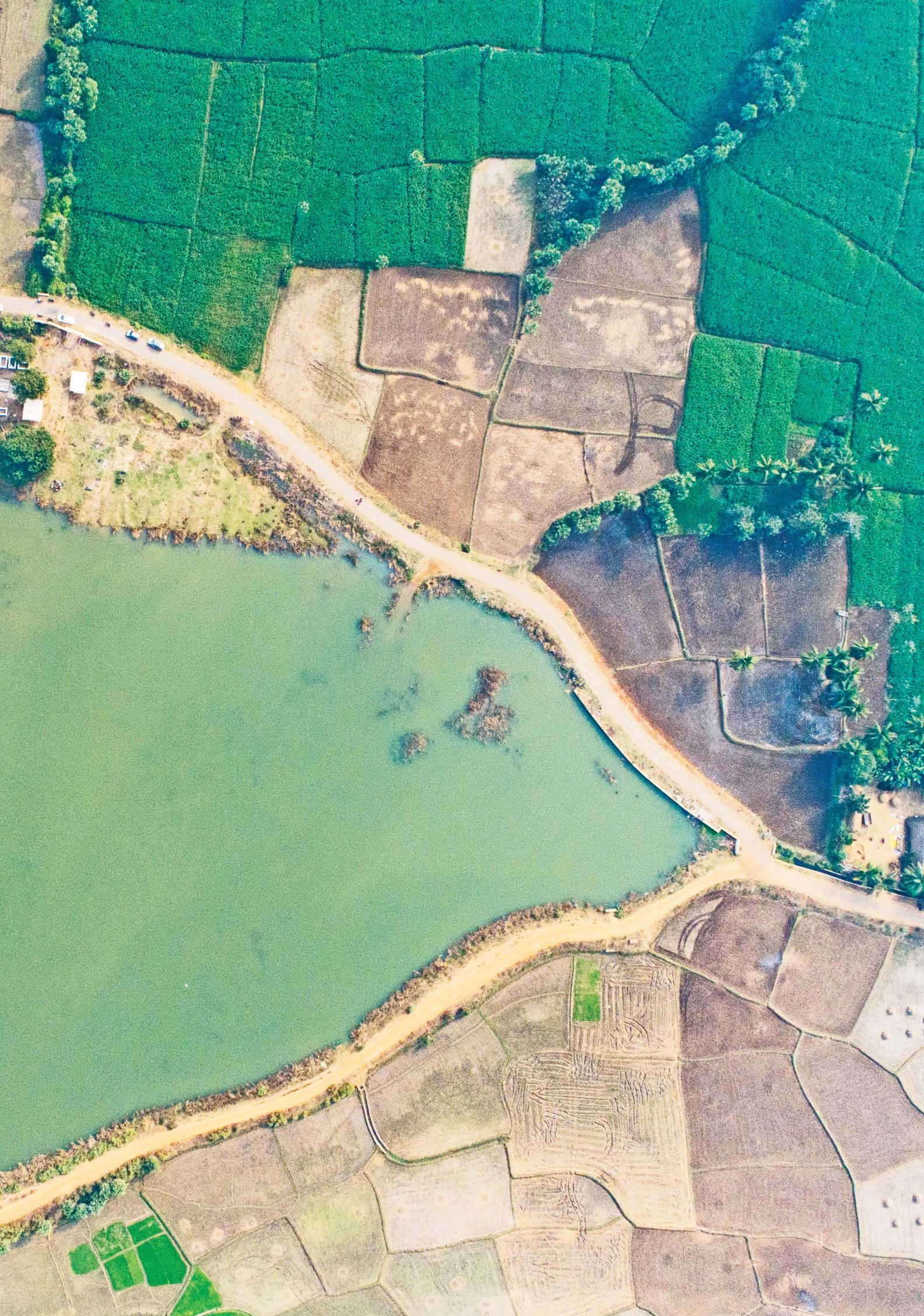
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# INTRODUCTION

Climate change will manifest itself most prominently through changes in the water cycle and its impacts are likely to get amplified in agrarian economies like India. Investing in improved water management is therefore critical for helping communities deal with climate-induced uncertainties.

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It has been argued that one of the most prominent ways in which climate change will manifest itself will be through its impact on the water cycle. Climate change is increasing the variability in the water cycle, reducing the predictability of water availability, inducing extreme weather and decreasing water quality threatening the water security of all sectors (United Nations, 2019). These impacts are likely to get amplified in agriculture-dependent developing economies like India and is widely expected to stress the country's water management and governance systems and institutions.

*Figure 1* illustrates how climate change is likely to impact each of the key

hydrological processes in the water cycle across different regions of India.

The impacts highlight the importance of focusing on water and investing in improved 'water management' for helping communities deal with climate-induced uncertainties. Investing in improved water management is thus critical to the three pillars of the response to global warming: Adaptation, Mitigation and Resilience<sup>1</sup>.

Specifically, in the context of climate change, the Intergovernmental Panel on Climate Change (IPCC) has offered the following definitions:



# Adaptation

...the process of adjustment to actual or expected climate and its effects



# Mitigation

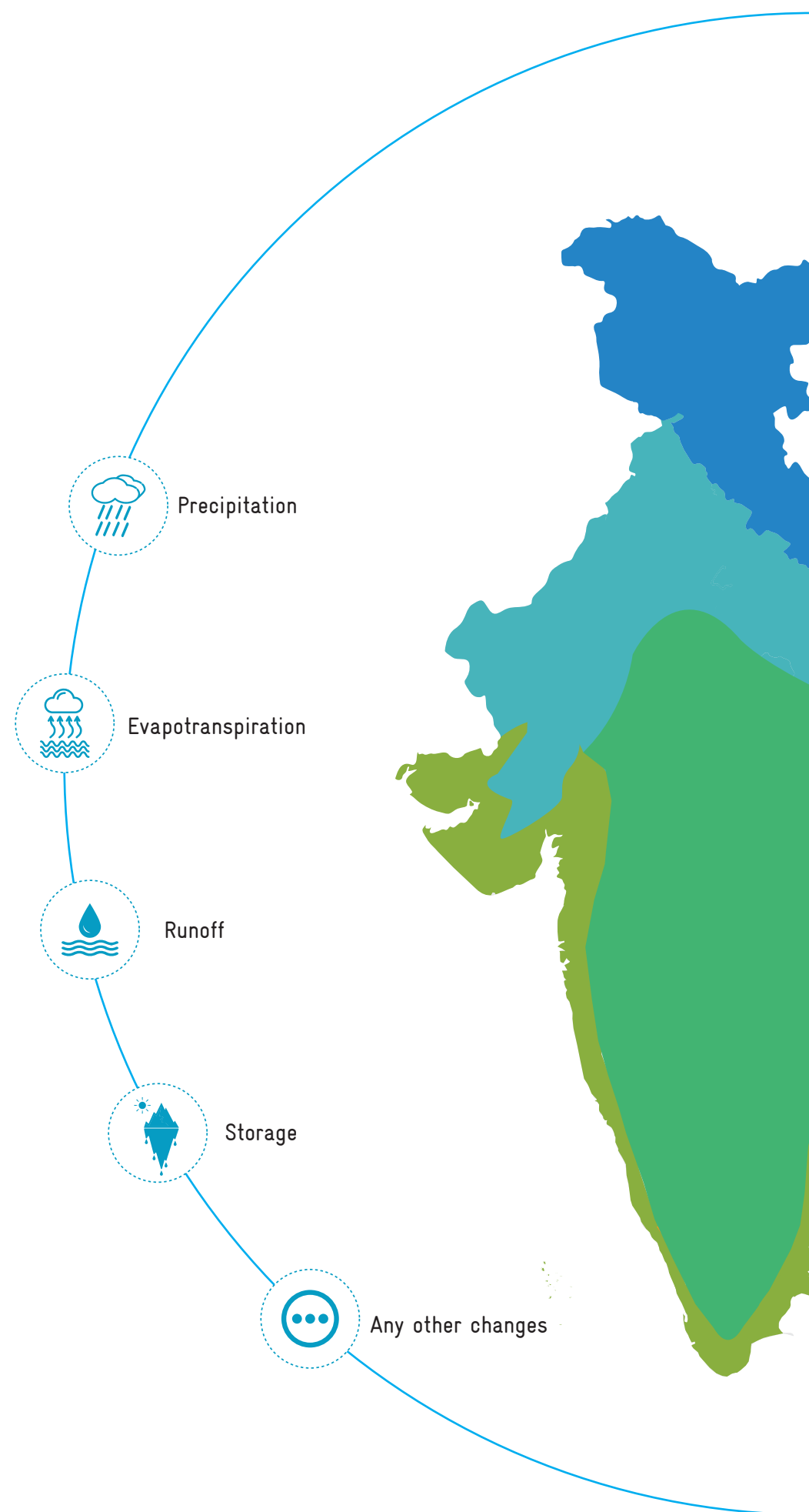
...a human intervention to reduce emissions or enhance the sinks of greenhouse gases



# Resilience

...the capacity of social, economic and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganising in ways that maintain their essential function, identity and structure while also maintaining the capacity for adaptation, learning and transformation

<sup>1</sup><https://cop23.com.fj/mitigation-adaptation-resilience/>



Source: James et al. (2018) c.f. Shah (2009)

## Northern Mountain Ranges

- Higher snowmelt and precipitation  
Greater temporal variability
- Little or no change
- Declining glacial storage over time
- Increased stream flows up to 2030  
gradual decline thereafter
- No other significant changes

## Indus-Ganges-Brahmaputra plains

- Marginal decline in precipitation  
Reduction in number of rainy days  
Increased incidence of extreme precipitation events
- Higher evaporation and transpiration  
Lower productivity of rain-fed agriculture
- More siltation of surface reservoirs  
Growing reliance on sub-surface (groundwater) storage
- More runoff (5–20%)  
Less natural groundwater recharge
- No other significant changes

## Peninsular Plateau

- Marginally higher (5–10%) precipitation  
Greater temporal variability
- Higher evaporation and transpiration  
Lower productivity of rain-fed agriculture
- More siltation of surface reservoirs  
Little multi-year storage capacity  
More frequent and more severe drought events
- More runoff  
Less natural groundwater recharge
- No other significant changes

## Coastal, delta and island ecosystems

- Marginally higher (5–10%) precipitation
- Little or no change
- Risk of seawater intrusion in groundwater storage
- Little or no change
- Rising sea level a key challenge for coastal and island ecosystems  
Increase in incidence and severity of arsenic contamination  
Higher frequency of coastal floods and cyclones

Figure 1: Projected impacts of climate change on water cycle processes across different regions of India



The 2019 Climate Change and UN Water Policy Brief succinctly highlights the central role of water management in climate adaptation – “water is to adaptation what energy is to mitigation”. The Global Commission on Adaptation in its 2019 report underlined the importance of investments in adaptation; highlighting making water resources management more resilient as one of the five key areas of action for adaptation. Given the centrality of water in India’s largely agrarian and rural livelihoods, this adaptation and its contribution to resilience becomes even more critical. NITI Aayog (2019) estimated that by 2050, under the business as usual scenario, as much as 6% of India’s GDP could be lost due to the water crisis.

Adaptation activities in water management include a range of possibilities at different scales varying from fields/farms to river basins and national level (FAO, 2017). Soil moisture security in the form of improved in-situ soil moisture conservation and enhanced

surface and ground water storage through water harvesting including farm ponds, tanks, and recharge measures at field/farm/village/watershed level are some proven examples of adaptation and building resilience to climate change at the farm/watershed level (Sikka et al. 2018). Water and energy efficient irrigation methods such as drip irrigation not only help increase adaptation to climate change through water savings but also help in mitigation through reduced carbon emissions (Sikka et al. 2018). Similarly, afforestation and soil conservation measures sequester carbon and reduce greenhouse gas emissions contributing to national and global efforts to address climate change (UNDP, 2012).

Many of these activities and interventions are important components of government schemes including Mahatma Gandhi National Rural Employment Guarantee Act (Mahatma Gandhi NREGA) and have implicit alignment to adaptation and mitigation. For example, total mean carbon (biomass and soil organic carbon)



Hamish John Appleby / IWMI



sequestered at the national level, considering all the Agro-Ecological Regions and Natural Resource Management (NRM) works of Mahatma Gandhi NREGA, for the year 2017, is estimated at 62 MtCO<sub>2</sub> (metric tons of carbon dioxide equivalent) with 'Drought Proofing' intervention providing about 40% of the total carbon sequestration, considering all NRM works at the national level (Ravindranath and Murthy, 2018).

India's heavy reliance on groundwater – for agricultural, industrial and domestic uses – adds another crucial dimension to management and governance of water resources. No country in the world pumps even half the amount of groundwater that India does each year. Much of this pumping is for irrigation and nearly a fifth of the country's annual energy demand is attributable to subsidised or free farm power offered to

farmers by various state governments – at an aggregate annual subsidy bill in excess of US\$ 12 billion - often critically hampering the viability of electricity utilities. All this means that the fates of India's water and energy economies are intricately intertwined and that for effective and sustainable results, water and energy will need to be co-managed – combining aspects of adaptation and resilience with overlapping mitigation strategies.

To overcome these challenges, there is a need for an integrated approach to climate change and water management (United Nations, 2019) at the national and state climate policy and planning. In addition, to meet the investments required for improved and integrated water management, there is a critical need for bringing convergence and co-financing which is still beset with silo thinking and processes.



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# 2

## SCOPE OF THE REPORT

Mapping, identifying and synthesising convergence and co-financing opportunities across governmental and non-governmental programmes for climate-resilient water management to support 'Water Security and Climate Adaptation in Rural India (WASCA)'.

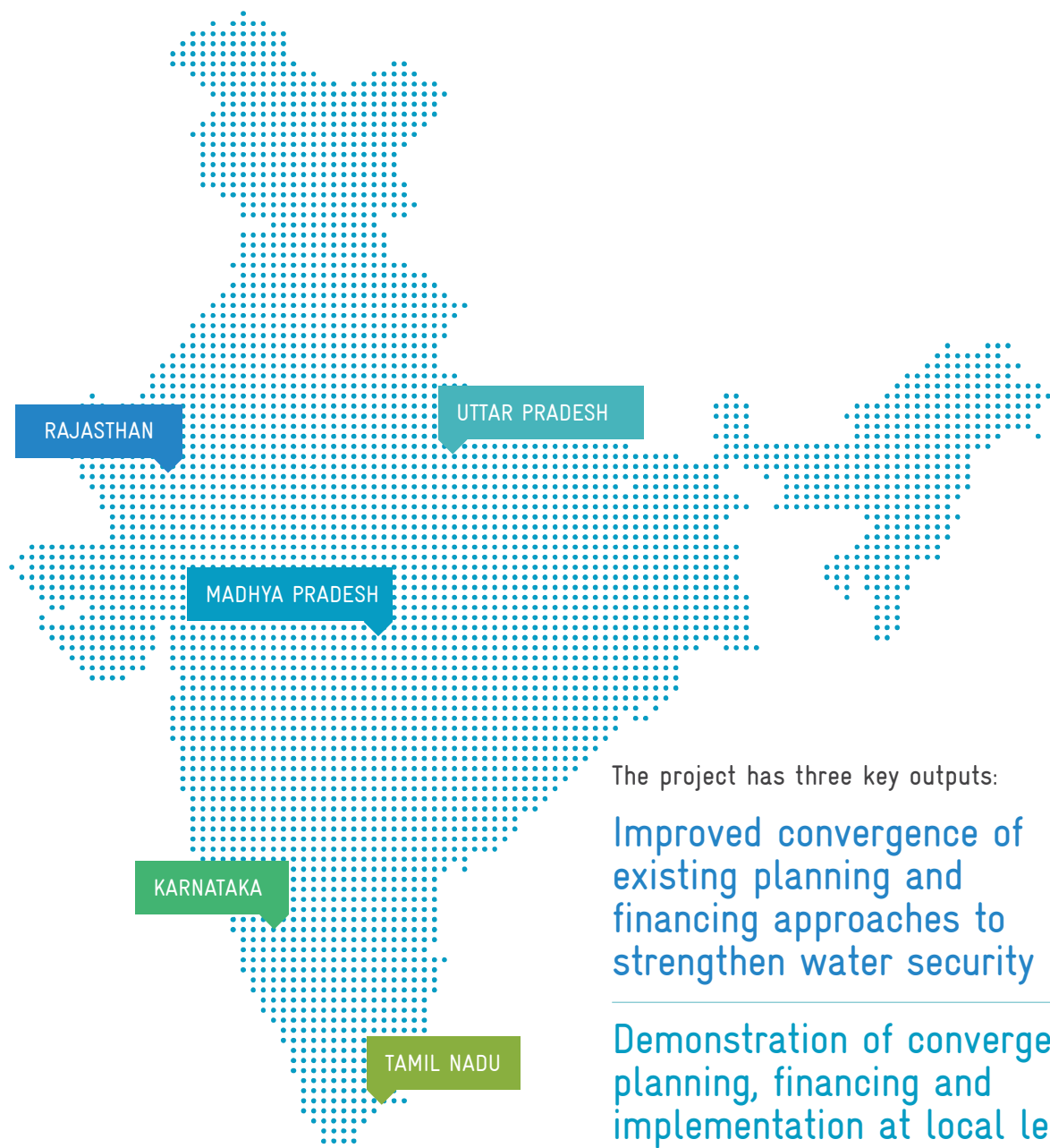


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‘Water Security and Climate Adaptation in Rural India’ (WASCA) is a three-year Indo-German project launched in April 2019 with the key objective of enhancing water resources management with regards to water security and climate adaptation in rural areas through an integrated approach at national, state and local level. The project is commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ) in partnership with the

Ministry of Rural Development (MoRD) and Ministry of Jal Shakti (MoJS) in India and implemented by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. The project is operational at the national level and in select areas of five states: Madhya Pradesh, Rajasthan, Tamil Nadu, Uttar Pradesh and Karnataka (Supported by WASCA through a special project 'Technical support to Jalamrutha scheme and Government of Karnataka for water security').



The project has three key outputs:

Improved convergence of existing planning and financing approaches to strengthen water security

Demonstration of convergent planning, financing and implementation at local level

Cooperation with the private sector

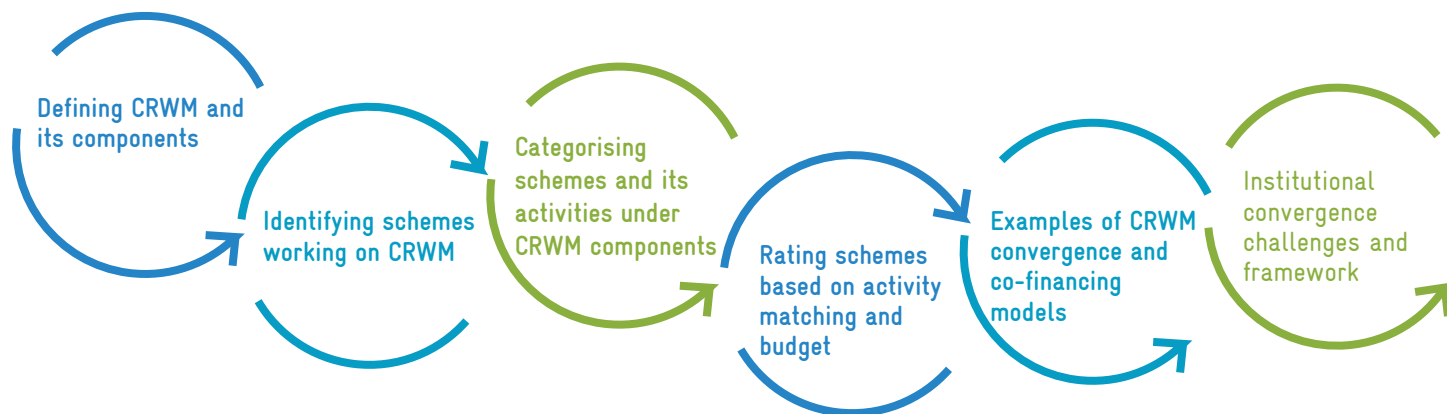


Figure 2: Flow chart showing major steps in data collection and synthesis

## The report introduces and defines the concept of Climate Resilient Water Management (CRWM) and its components.

Within this larger context, this report focuses on identifying CRWM interventions and mapping convergence and co-financing opportunities for executing them with existing institutional regimes. The report identifies and maps existing national and state level government programmes and schemes; and civil-society led initiatives and programmes that exhibit the potential for building and enhancing climate resilience through improved water management and/or improved co-management of energy and water resources for delivering CRWM outcomes. The report also presents a generic institutional framework for facilitating convergence and cofinancing of CRWM initiatives that is intended for planners, policy makers and programme designers.

Existing and potential convergence and co-financing opportunities have been synthesised across a broad spectrum that includes state and national schemes/programmes and funds (*e.g.* Mahatma Gandhi NREGA, Skill India scheme, NABARD fund), international funds (*e.g.* World Bank, Asian Development

Bank, Green Climate Fund) and private sector (*e.g.* CSR activities). *Figure 2* shows the major steps employed for the report to identify and map various convergence and co-financing opportunities and develop an institutional framework for effectively executing CRWM.

The report starts with introducing and defining the concept of CRWM and its components. We then identify and map the most important government schemes and programmes at the national level and in the WASCA project states. The schemes are then classified based on recommended activities provided in the schemes' guidelines and their synergy with CRWM components. Thereafter, a simple rating is done based on the schemes activities' synergy with CRWM and their total budget. Identification of potential private companies (under CSR activities), NGOs, national and international funds working in alignment with CRWM is also carried out. Based on identified opportunities, few innovative CRWM convergence and co-financing examples are highlighted. Finally, an illustrative institutional convergence framework is provided for convergence and co-financing across schemes.

# 3

## CLIMATE-RESILIENT WATER MANAGEMENT

Climate-Resilient Water Management is the integrated portfolio of water management interventions aimed at enhancing the system's ability to maintain hydrological processes and build flexibility and adaptability to deal with climate-induced water uncertainties at different geographical and time scales.



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CRWM interventions include those that help maintain the system's ability to absorb short-term shocks and sustain livelihoods

As part of an overall 'climate adaptation' strategy, improved management and governance of water resources can contribute significantly to improving the resilience of communities – especially poor and underprivileged communities – to cope with climate-induced uncertainties. James et al. (2018) define CRWM as any set of improved management practices that aim to, “*reduce the vulnerability of at-risk populations to the adverse impacts of climate change*”. Thus, CRWM interventions include those that help maintain the system's ability to absorb short-term shocks and sustain livelihoods as well as those that help communities adapt to medium and longer-term climate uncertainties and variability. In other words, CRWM may be seen as a portfolio of interventions that enhances the system's ability to maintain hydrological processes and build flexibility and adaptability to deal with climate-induced long and short-term water uncertainties.

What sets CRWM apart from the business as usual approach is that the interventions are implemented considering key elements of CRWM *i.e.* adaptability and flexibility towards long and short-term water uncertainties and they holistically focus on all aspects of water management, starting from resource assessment and projections to building capacity of people and institutions for long-term sustainability. Based on a review of interventions for

water management, we classify the CRWM core areas and interventions into broad categories (*Table 1*). These core areas and broad activities are analysed further when schemes are identified in terms of their synergy with CRWM.

Water resource assessment is the first step in CRWM which aims to assess current and future water availability under different scenarios. This requires considering best available socio-economic and climate data and projections. Based on this, suitable water supply/demand management and water quality management interventions need to be prioritised and decided. The above may also become part of larger water risk management strategies to build and enhance resilience against droughts and floods. Further, there may be cross-cutting interventions or strategies that focus on livelihood support or income enhancement and co-management of inter-related sectors such as the water-energy-food-climate nexus; these often involve policies and interventions *outside the water sector* but can have significant impact on water governance and climate resilience. Finally, there are a set of interventions and strategies that address the need for building capacity of individuals and institutions (*e.g.* building capacity of gram panchayats to optimally utilise opportunities presented by Mahatma Gandhi NREGA).

## Core Areas

## Focal Points

## Examples of interventions

Water resource assessment	Assessing current and future water availability and demand under different scenarios Requires use of modelling and latest data	Hydrological modelling; climate datasets Meteorological data assessment Digital technologies for planning, implementation and monitoring
Water supply augmentation	All options to increase availability of surface and groundwater including creation of large and small, surface and sub-surface storages	Reservoirs, tanks, ponds, check dams; centralised and decentralised storage Soil moisture conservation Water harvesting; water transfers
Water demand management	Options and strategies to reduce water demand and optimise its use Increase resilience to droughts/dry periods	Efficient irrigation technologies and practices including drip, land levelling Soil moisture-based irrigation scheduling Participatory mechanisms Shift to less water intensive crops and livelihood options
Water quality management	Wastewater treatment, management of point and non-point source of pollution Promotion of reuse for municipal and recycling for industrial/commercial wastewater to reduce pressure on freshwater resources Strategies to mitigate coastal and secondary salinisation and seawater intrusion Treatment of fluoride and arsenic contamination Management of deltas and island ecosystems	Treatment technologies and practices Safe practices for using primary-treated municipal wastewater for irrigation Awareness about direct and indirect health risks and mitigation measures Mitigating sea level rise Maintaining drainage in coastal aquifers
Water risk management (floods and droughts)	Enhanced drought and flood resilience Mitigating and minimising adverse impacts	Field visits; exposure trips; farmer schools Trainings, workshops Awareness campaigns, etc.
Awareness/Capacity building/training	Enhancing awareness and capacity at all levels	Effective embankments; Forecast and early warning/monitoring; Submergence/drought-tolerant crops and varieties Advisories/contingency measures
Income/Value enhancing Interventions	Better agronomy practices Fertiliser and pesticide management, nutrient management Linkages with markets, processing units, storage infrastructure	Integrated nutrient and pesticide management Dairy, horticulture, fisheries; poultry High value agriculture Mechanised, market-driven agricultural enterprises
Co-Management/ Indirect Management	Co-management of interlinked sectors like energy and water; water and food Actions outside the water sector that have a direct and significant impact on water security	Farm power tariff regimes; Solar pump promotion programmes; Minimum support price (MSP) and Food procurement policies Import tariffs and export restrictions

Table 1: Components of CRWM and examples of CRWM interventions

# 4

## CENTRAL AND STATE GOVERNMENT SCHEMES

With water having inter-sectoral impact, number of schemes<sup>2</sup> at the central and state level are operational under different ministries; directly or indirectly contributing to CRWM, albeit with lack of integrated planning and inter-sectoral convergence. Schemes are classified into eight thematic focus areas of CRWM.



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<sup>2</sup>The term "schemes" here is defined very broadly to indicate all government initiatives *i.e.* all schemes, programmes, missions and projects (including time-bound funded large projects).

National Water Mission (NWM) and National Water Policy (NWP) under MoJS provides broad objective, goals and framework for water resource development in the country.

Ministry of Jal Shakti (MoJS) is the nodal agency for water resources planning, management and development in the country with the vision of “*Optimal sustainable development, maintenance of quality and efficient use of water resources to match with the growing demands on this precious natural resource of the country*”.

MoJS was formed in May 2019 by merging two ministries: Ministry of Water Resources, River Development & Ganga Rejuvenation and Ministry of Drinking Water and Sanitation bringing together all the national water schemes, programmes, missions and agencies (such as Central Water Commission, Central Ground Water Board, River Boards, Department of Drinking Water and Sanitation etc.) under one umbrella. This was done to bring in the much needed convergence and integrated management of the water sector which needs to be broadened with convergence with other ministries’ programmes for CRWM.

National Water Mission (NWM) and National Water Policy (NWP) under MoJS provides broad objective, goals and framework for water resource development in the country. NWM, one among the eight missions of National Action Plan on Climate Change, was developed to ensure integrated water resources management to conserve water, minimise wastage and ensure more equitable distribution both across and within states. There are five goals of India’s NWM: (1) developing a comprehensive water data base in the public domain and assessment of the impact of climate change on water resources; (2) promotion of citizen and state action for water conservation, augmentation and preservation; (3) Focused attention to vulnerable areas including overexploited areas; (4) Increasing water use efficiency by 20%

and (5) Promotion of basin level integrated water resources management.

NWP’s objective is to propose a framework for creation of a system of laws and set of high-level objectives for water management nationally. With the first national policy coming in 1987, it was updated in 2002 and then in 2012. A revision of the NWP is under planning. NWP of 2012 emphasised on an integrated perspective of water resources planning taking river/sub-basin as a unit with a focus on planning projects with multipurpose aims, bringing integration into data information systems and increasing water use efficiency.

These goals and objectives of NWM and NWP reflect the vision of moving towards comprehensive and holistic water management which encompasses directly or indirectly all the components of CRWM. As water is a cross-cutting theme impacting all sectors, there are a number of schemes both at the central and state level operational under different ministries, other than MoJS, which directly or indirectly contribute to CRWM. For instance, there is a strong complementarity between Mahatma Gandhi NREGA under Ministry of Rural Development (MoRD) and various other central and state government schemes specially related to natural resources management and agriculture. Great co-benefits can be derived by seeking convergence of these schemes by pooling their resources, finance and institutions for building CRWM plans. However, as they are planned and implemented by different ministries focusing on specific goals, a lack of integrated planning and convergence is apparent. However, convergence has now become a necessity and *mantra* for providing a critical mass and avoiding



duplication of works as well as the thin distribution of limited resources for impactful development, and CRWM is no exception. However, convergence is not without challenges of diverse visions and sectoral thinking, a lack of flexibility and incentives, along with social and political dynamics. A lack of information on

possible avenues and opportunities for convergence to plan CRWM is a key gap that this report aims to reduce. The mapping carried out in this report is intended to highlight schemes in different government departments and identify the opportunities for convergence and co-financing for CRWM.

## Mapping of government schemes

There are a number of schemes operating at the national as well as the state level focusing on water security and climate adaptation. To map and identify schemes with scope, objectives and provisioned activities covering all or part of CRWM components, the following steps were taken:

- 1. Identify:** The government departments web portals and latest union budget statements were reviewed to identify schemes having direct relevance to components of CRWM. These were

departments which cater directly or indirectly to water management and development in rural areas: (MoJS), Ministry of Agriculture and Farmers' Welfare (MoAFW), Ministry of Rural Development (MoRD), and departments with a focus on capacity building and value-enhancing activities of CRWM: Ministry of Panchayati Raj (MoPR), Ministry of Food Processing Industries (MoFPI), Ministry of Skill Development and



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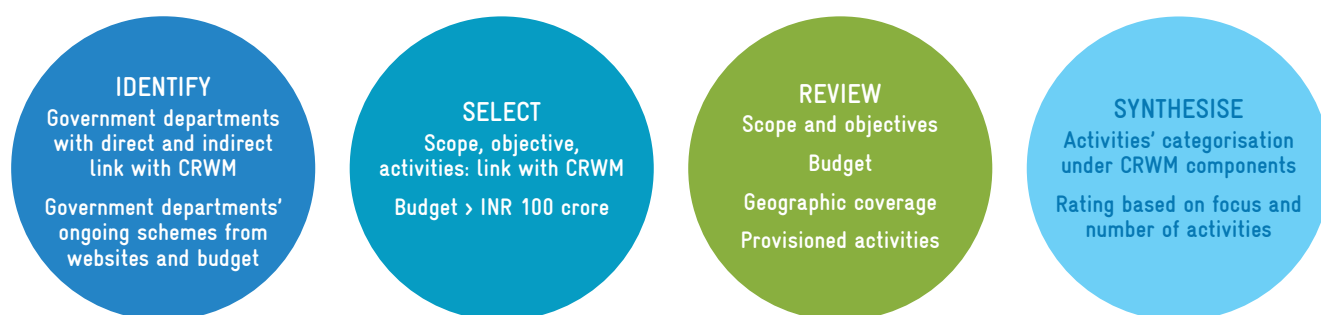


Figure 3: Process of mapping schemes/programmes directly or indirectly contributing to CRWM

Entrepreneurship (MoSDE). In addition, an online review with key words<sup>3</sup> was carried out. Best efforts to assess and review major schemes across a number of ministries were taken, however this may not be considered exhaustive.

2. **Select:** From the identified schemes, the first screening was done based on the schemes' scope, objectives and provisioned activities after which only those schemes with a clear link to CRWM (subjective assignment) and budget of more than INR 100 crore (in case of central schemes) were selected.
3. **Review:** For the selected schemes, a detailed review and analysis was carried out. This included examining aspects of the scheme budget, objectives, provisioned activities and coverage (areas or population specific, if any).
4. **Synthesise:** Provisioned activities of schemes were categorised under different CRWM components and

based on the number of activities under each component, ratings were assigned to each scheme.

5. For the private sector, civil society organisations, national and international funding agencies, the same four-step process was carried out through literature and web review followed by reviews on scope, objectives, budget and area-specific coverage (with a special focus on WASCA project states).

The upcoming sections give details of the identified schemes under each CRWM component. With WASCA's focus on rural areas and more than 90% of water in rural areas being used for agriculture, the schemes selected are naturally inclined towards agriculture. For a quick look, *Annexure A* gives a snapshot of schemes indicating alignment with CRWM components, their budget, nodal ministry and the scheme's area/state-specific applicability. Wherever available, budget component is taken from 2020-21

<sup>3</sup>Scheme/mission/programme/project + Water/Hydrology/Hydrogeology/Agriculture/Groundwater + India/WASCA states



expenditure budget of different ministries. Budget is for the total scheme and may have different outlays for each CRWM component, however that was not available for all and is not given. The budget for the different schemes noted here are as of, at the time of publication. As many of the schemes are not applicable

pan India and focus on specific district or geographical area, *Annexure B* gives the scheme's geographic focus details, if any. Also, a detailed list of activities provisioned under schemes supporting various CRWM components is given in *Annexure C*.

**Disclaimer:** In the sections that follow, the schemes' total budget allocation is mapped. Total budget of schemes doesn't represent allocation for individual components of CRWM and should therefore be interpreted accordingly. Mapping of schemes and their total budget allocation under different components only gives an indication – at the national/state level – which is needed to be disaggregated at implementation scale (district or block) as their budget distribution is not uniform across different CRWM components and at sub-national scale.



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## 4.1 Water Resource Assessment

Water resource assessment is the foremost and critical step towards making CRWM plans. This incorporates present and future assessment of available resources, water risks and continuous monitoring along with effective dissemination of information. Only with assessment and monitoring, further CRWM interventions can be planned which are resilient and sustainable. The importance of water resource assessment is underscored by the National

Water Mission which, among its five goals, has its first goal focusing on a “Comprehensive water data base in public domain and assessment of impact of climate change on water resources”.

### Central Level Schemes

Figure 4 shows the schemes at the central level which either focus on water resource assessment or have components which add to this.

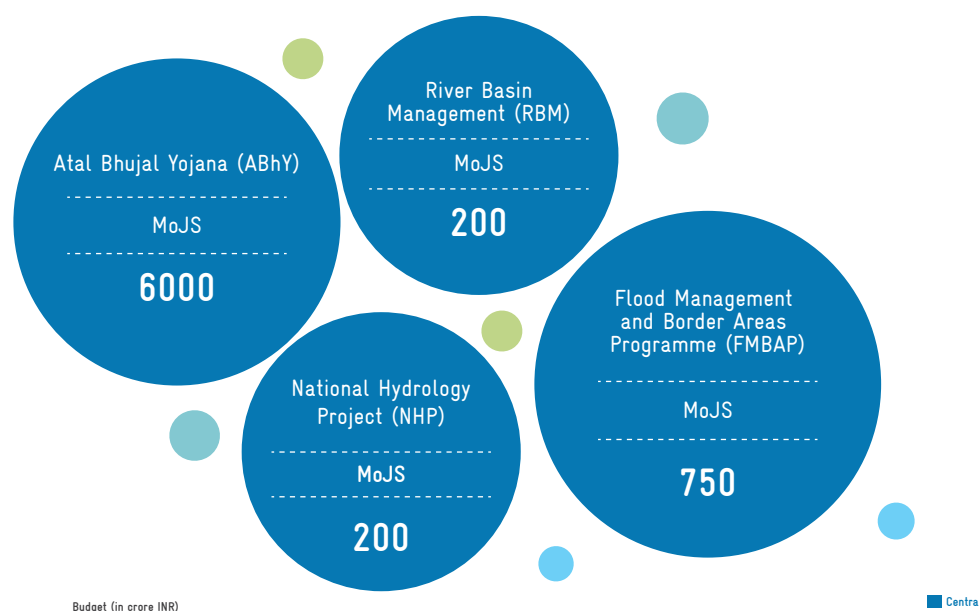


Figure 4: Key Central Level Schemes under Water Resource Assessment

National Hydrology Project (NHP), a World Bank funded project, at the national level is one key project that focuses specifically on water resource assessment. NHP works with both central and state agencies responsible for surface and/or groundwater planning and management, including river basin organisations with the objective of improving the extent, quality and accessibility of water resources information, and to strengthen the capacity of water resources management institutions in India. Of its four main components, three exclusively focus on water resource assessment: water resources

monitoring systems, water resources information systems and water resources operation and planning systems. The activities (detailed in *Annexure C1*) focus on setting up monitoring systems, national and sub-national water information centres with web-enabled water resources information systems for information dissemination and development of tools and decision support systems for improved water resources planning and management. Monitoring stations, datasets, web systems and tools developed under NHP provide a lot of useful data that can be tapped at the initial planning stage of CRWM.

Other than NHP, there are some other national schemes which do have one or more components of water resource assessment but do not exclusively focus on this. For example, Atal Bhujal Yojana (ABhY) has provisions for monitoring groundwater data and making aquifer maps which may be useful for groundwater planning. Schemes such as Flood Management and Border Areas Programme (FMBAP) and River Basin Management (RBM), provide data, maps and capability on flood forecasting, hydrological modelling, flood zone mapping and climate change vulnerability assessment studies that can be used.

In addition, under the assessment component, there are specific central level departments (*Annexure D*) that carry the main tasks of water resource assessment continuously and are mostly responsible for implementing these schemes. Though these are not projects or schemes as such,

they warrant an inclusion here as they play the core role in water resource assessment. Some of the key central agencies that focus on water resource assessment are Central Water Commission (surface water), Central Ground Water Board (groundwater), India Meteorological Department (climate monitoring and forecasts), Indian Space Research Organisation (for satellite monitoring and mapping) and National Institute of Hydrology (hydrology modelling etc.). Other than the repositories of vast data, they all have very strong technical and institutional capabilities which can significantly support convergence of programmes while planning CRWM.

No state-specific schemes with a clear focus on components adding to water resource assessment were identified. However, similar to central, there are state-specific organisations and institutions that carry out these assessments.



Prasanth Vishwanathan / IWMI

## 4.2 Water Supply Augmentation

Water supply augmentation is at the centre of CRWM and is essential for improving options of water availability to meet the unpredictability arising from climate change which threatens water security of all sectors. Impact of climate change is evident in increased frequency of droughts impacting agriculture yields and income, threatening domestic water supply in both rural and urban areas (*e.g.* Cape Town, Chennai) and impacting industrial activities (*e.g.* power generation). Water supply augmentation, of both surface and sub-surface storage, can play an important and critical role in making water resources resilient to the spatial and temporal imbalance and uncertainty in water resources. Water supply augmentation consists of a range of practices focusing both on surface and sub-surface (groundwater and soil) storage (*Table 1*).

### Central Level Schemes

The importance of water supply augmentation is clear from the large number of schemes which incorporate this as a part of their activities (*Figure 5*) and represents the large scope that exists of convergence and co-financing. The main schemes at the central level, in terms of activity focus on water supply and provisioned budget, are Mahatma Gandhi NREGA, RKVY-RAFTAAR, WDC-PMKSY, ABhY and JJM.

Mahatma Gandhi National Rural Employment Guarantee Act (Mahatma Gandhi NREGA) which aims to enhance livelihood security by providing at least 100 days of wage employment in rural areas to voluntary households, has a specific focus on natural resource management. For example, out of 260

combinations of works which are permissible under Mahatma Gandhi NREGA, 181 works are related to natural resource management of which 84 are water related works (Mahatma Gandhi NREGA guidelines). A big thrust of Mahatma Gandhi NREGA is on water conservation and water harvesting structures with provisions for water supply augmentation of both surface and sub-surface storage through activities such as constructing earthen dams, check dams, stop dams, contour trenches, bunds, renovation of traditional water bodies including desilting, afforestation, tree plantation of irrigation tanks etc. With its large budget and pan India coverage, Mahatma Gandhi NREGA can be considered as a central scheme for convergence and co-financing water supply augmentation.

Similarly, other schemes such as *Rashtriya Krishi Vikas Yojana* –RAFTAAR (RKVY-RAFTAAR) and Watershed Development Component- *PM Krishi Sinchayee Yojana* (PMKSY-WDC) also have provisions for a complete range of surface and sub-surface water supply augmentation activities similar to Mahatma Gandhi NREGA, however with a much lower budget. Thus, while planning water supply augmentation plans, these schemes can be considered for converging and co-financing interventions. For example, as Mahatma Gandhi NREGA works are labour intensive, construction of material intensive works can be taken under other schemes with labour contribution coming from Mahatma Gandhi NREGA. There could also be specific convergence opportunities such as construction of farm

Jal Jeevan Mission (JJM) differs from the above schemes with a specific focus on rural household water supply with the aim to “provide Functional Household Tap Connection to every rural household by 2024.”

ponds via Mahatma Gandhi NREGA and provision of plastic/RCC lining through RKVY-RAFTAAR.

*Atal Bhujal Yojana* (ABhY) is a recently launched scheme, building and expanding on previous Groundwater Management and Regulation schemes, specifically focusing on groundwater management and will be operational in about 8300 gram panchayat and 78 districts in seven water distressed states of Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan, and Uttar Pradesh. ABhY’s main focus is on participatory groundwater management leading to community water security plans and has provisions for a range of water supply augmentation activities such as check dams, percolation tanks & desilting tanks, recharge shafts/wells/trenches/bunds, rooftop surface water harvesting, storm water harvesting structures, farm ponds/farm ditches, etc.

*Jal Jeevan Mission* (JJM) differs from the above schemes with a specific focus on rural household water supply with the aim to “provide Functional Household Tap

*Connection to every rural household by 2024.”* Thus, development of sustainable storages, supply source and infrastructure (supply pipelines, bulk transfer etc.) is one of its key activities. For sustainable supply sources, convergence of JJM with other supply augmentation schemes to protect and sustain supply sources is critical. As also mentioned in JJM guidelines, for source recharging and protection, watershed and spring shed principles need to be adopted in convergence with other schemes such as Mahatma Gandhi NREGA, PMKSY-WDC, MPLADS etc.

Other than this, there are a number of other central schemes such as National Food Security Mission (NFSM), National Horticulture Mission (NHM) and PMKSY-Har Khet Ko Pani (PMKSY-HKKP) where, along with the focus on agriculture and horticulture, provisions for constructing and maintaining farm ponds, dug wells, reservoirs and tanks exist to ensure sustainable water supply for agriculture. PMKSY-AIBP focuses on faster completion of ongoing Major and Medium Irrigation including National Projects.



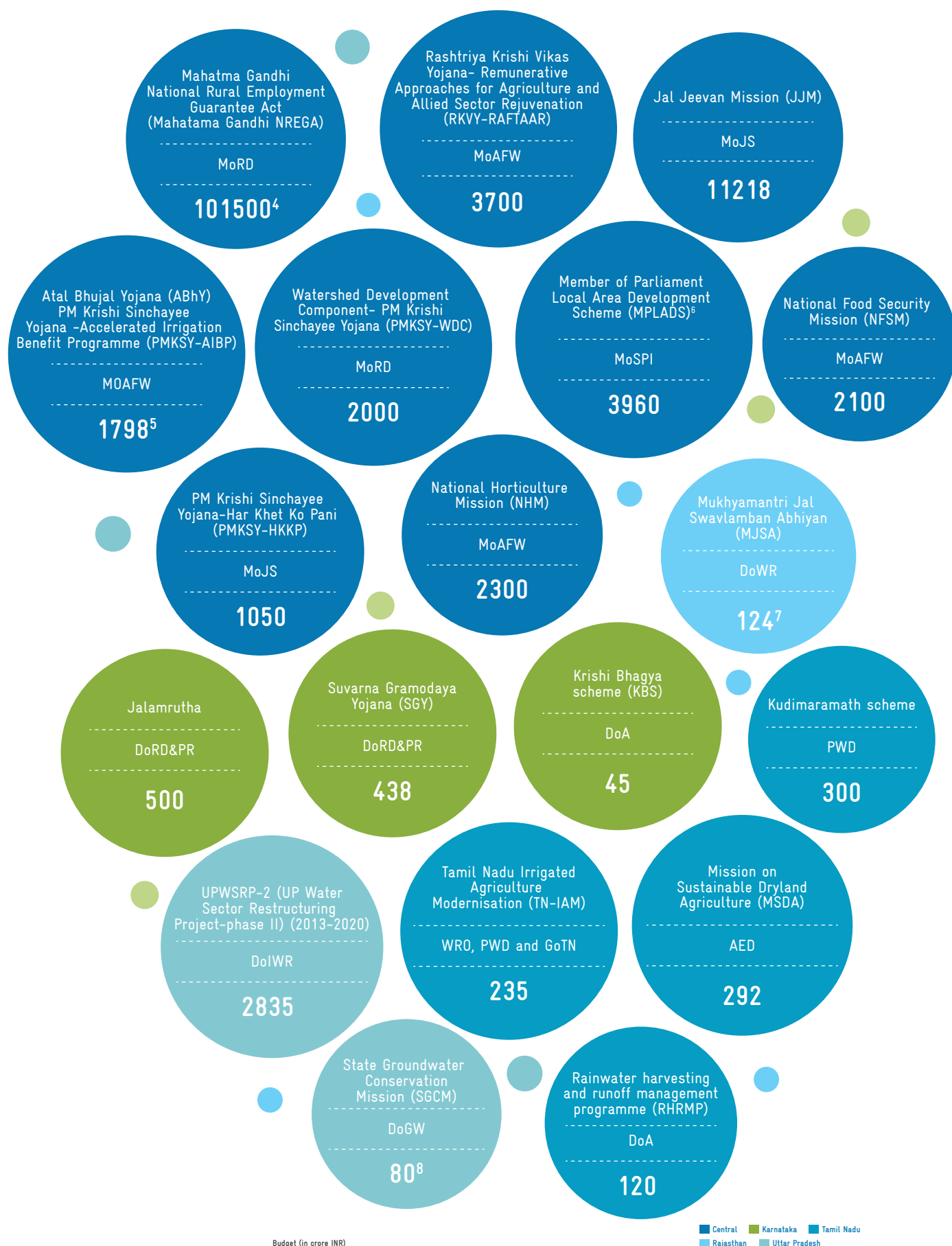


Figure 5: Key Central and State Level Schemes under Water Supply Augmentation

<sup>4</sup>This budget includes additional INR 40,000 crore received as part of the Covid-19 response through Atmanirbhar Abhiyan.

<sup>5</sup>Funded through Long Term Irrigation Fund (LTIF) in NABARD. Budget number represents amount released in 2019. <http://pmksy-mowr.nic.in/aibp/AIBPDashBoard.aspx>

<sup>6</sup>MPLADS funds is suspended during 2020-21 and 2021-22 with funds going to Consolidated Fund of India for COVID-19 response.

<sup>7</sup>Total cost of work completed under MJSA phase-IV. <http://mjsa.water.rajasthan.gov.in/>

<sup>8</sup>SGCM is envisioned to be carried out through convergence of scheme. Budget number represents of total allocation to minor irrigation and groundwater department, the main department responsible to carry out SGCM, for the 2018-19 financial year. <http://upgwd.gov.in/MediaGallery/Digdarshika2018-2019.pdf>

## State Level Schemes

### Rajasthan

At the state level, Rajasthan initiated a campaign named *Mukhyamantri Jal Swavlamban Abhiyan* (MJSA) in the year 2016 which converges all the existing schemes of various departments working on water conservation and water harvesting in rural areas. Holistic participatory approach is adopted under the programme with financial assistance from multiple stakeholders such as government, corporate social responsibility (CSR), non-government organisations and people's participation. The main objective of the programme is to efficiently utilise water from rainfall, runoff, groundwater and in-situ soil moisture in a watershed approach. Provisions for activities such as water harvesting structures, groundwater recharge structures, drain widening etc. are part of the scheme to strengthen water supply. MJSA is one of the flagship initiatives of Government of Rajasthan which would not only provide meaningful lessons/learnings for convergence but can also be considered for converging and co-financing interventions.

### Tamil Nadu

In 2019, Government of Tamil Nadu in keeping with the objectives of Jal Shakti Abhiyan, launched *Kudimaramath*: Tamil Nadu Water Resource Conservation and Augmentation Mission. The objective of *Kudimaramath* is the rejuvenation of minor irrigation tanks, ponds and *ooranies* in rural areas through convergence with Mahatma Gandhi NREGA. It intends to desilt and deepen 5,000 minor irrigation tanks through Panchayat unions and 25,000 traditional ponds and *ooranis* through machineries. Convergence with Mahatma Gandhi NREGA is set for activities including inlet, outlet, surplus weir, bathing ghat, etc.

Another project is Tamil Nadu Irrigated Agriculture Modernisation (TN-IAM) with support from the World Bank. TN-IAM is a follow up of the Irrigated Agriculture Modernisation and Water-Bodies Restoration and Management project. The project aims to enhance climate resilience of irrigated agriculture, improve water management and increase market opportunities for farmers and agro-entrepreneurs. The project will cover 66 sub-basins, which was not covered under the earlier phase of project. Under the supply component, the project will modernise irrigation infrastructures, including tanks, anicuts and irrigation canals through rehabilitation and modernisation of about 4,800 tanks and 477 anicuts.

Besides these, there are two other state schemes focusing on rainwater harvesting for groundwater recharge and soil moisture retention. These are the Rainwater Harvesting and Runoff Management Programme (RHRMP) and the Mission on Sustainable Dryland Agriculture (MSDA). The works under RHRMP are carried out in watershed approach with 100% grant on works in community lands whereas MSDA aims to achieve sustainable production in dryland agriculture through the development of 1000 dryland clusters @ 1000 ha of cluster dryland per cluster under which setting up water harvesting structures is a main activity.

### Karnataka

In Karnataka, 2019 was celebrated as the Year of Water with the launch of the water conservation scheme '*Jalamrutha*'. The scheme was launched as a response to prevailing drought conditions in the state. It primarily focuses on drought proofing measures including protection and restoration of water bodies. Key supply augmentation interventions provisioned



include check dams, reservoir, small irrigation ponds, bunds, barrage dams, farm ponds, rejuvenation of water bodies and rainwater harvesting structures.

*Krishi Bhagya Scheme*, launched in 2014 to supplement rainfed agriculture is another significant initiative of Government of Karnataka. The scheme covers areas with rainfed dominated agriculture, districts of coastal and Malnad areas. The scheme focuses on promoting farm level rainwater conservation particularly through *Krishi Honda* (farm ponds) to support irrigation practices during dry spells. The scheme also encourages farmers to upscale modern irrigation systems including micro-irrigation for water efficiency.

*Suvarna Gramodaya Yojana*, is an integrated village development scheme focusing on upgrading the physical

environment, generating land-based livelihood activities, providing human resources development infrastructure, developing non-agricultural youth employment avenues and community development through self-help groups, cultural associations, etc. Activities provisioned under water supply augmentation include irrigation tanks and canals developed/restored, water supply for drinking purposes and check dams.

### **Uttar Pradesh**

In Uttar Pradesh, the UP Water Sector Restructuring Project (UPWSRP) was initiated in a four-phased manner with the financial assistance of the World Bank and Government of Uttar Pradesh in the year 2002. UPWSRP under its second phase emphasises on renovating/modernising canal systems for improved irrigation and



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agricultural productivity in the Lower Ganga Canal system, Haidargarh branch and the Rohini, Jamni and Sajnam Dam canal system. Water supply augmentation works in the project include canal renovation, water drainage network for irrigation, restoration work for canal system, barrage modernisation and lake restoration for rainwater harvesting and check dams.

Uttar Pradesh has a designated State Groundwater Conservation Mission (SGCM) which focuses on improving groundwater resources through monitoring, mapping and demand side interventions. It aims to cover areas with

scarce groundwater resources including Bundelkhand, Vindhayan and over-exploited, critical and semi-critical areas. Activities provisioned under the mission include construction of check dams, ponds, peripheral bunds, groundwater recharge structures, farm ponds, contour bunds, trenching, gabion and renovation of water bodies. These activities are to be implemented through convergence of ongoing schemes and programmes.

No state-specific scheme in Madhya Pradesh with a clear focus on components adding to water supply augmentation were identified.

## 4.3 Water Demand Management

Water demand management is essential for efficient water use and to enhance the benefits of water supply augmentation. There is a clear need and scope for converging water supply augmentation interventions with water demand management interventions. In India, with more than 80% of water used in agriculture, improved demand management in agriculture sector via irrigation efficiency improvement and planning can free water resources for other sectors while increasing resilience to water deficits. Improved irrigation efficiency can enable more effective use of water supply created to increase crop water productivity and extend larger coverage from the same source. The NWM goal on “Increasing water use efficiency by 20%” underscores the importance of water demand management.

There are a range of activities that are considered for demand management which include technological and agronomic practices to increase irrigation efficiency such as micro-irrigation, land levelling, canal lining along with planning interventions such as water budgeting, participatory groundwater management, etc. Ideally, a combination of planning with technological and agronomic practices yield the best results.

### Central Level Schemes

Considering the importance and need of demand management, a number of schemes similar to water supply augmentation have a water demand component under them, as listed in *Figure 6*.

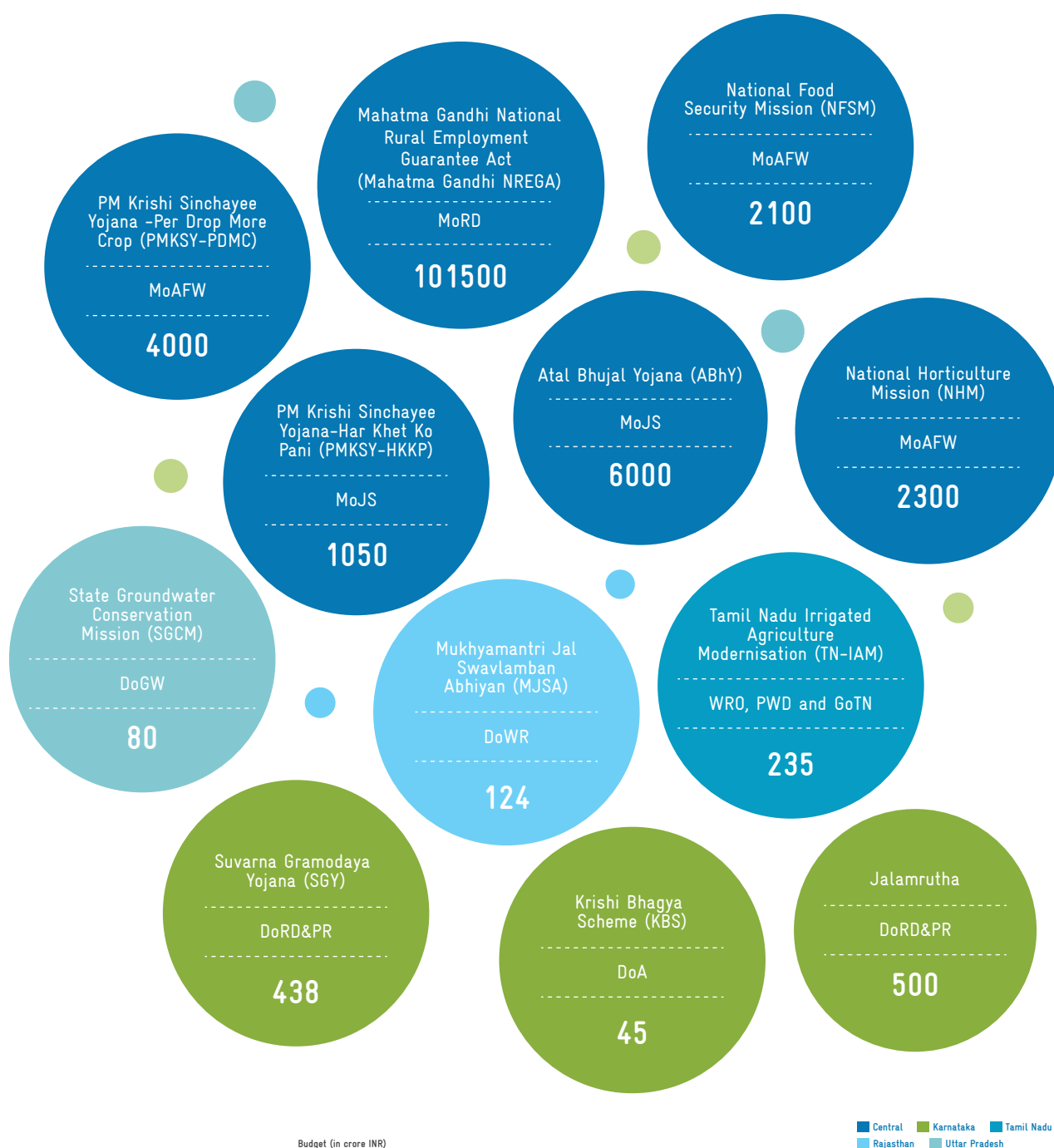


Figure 6: Key Central and State Level Schemes under Water Demand Management

The main schemes at the national scale, in terms of activity focus on water demand and provisioned budget, are PMKSY-PDMC and ABhY which can be supported by a number of other schemes such as Mahatma Gandhi NREGA, NFSM, NHM and PMKSY-HKKP.

PMKSY-PDMC aims to enhance farmers' irrigation water use efficiency by promoting technological interventions like

drip and sprinkler irrigation and encouraging the farmers to use water saving and conservation technologies. Under this scheme, the government provides financial assistance of 45-55% to farmers and the state can provide further subsidy incentive to farmers to adopt drip and sprinkler.

ABhY focuses on bottom-up participatory groundwater management to build and implement community-led water security



Schemes such as Mahatma Gandhi NREGA, NFSM, NHM and PMKSY-HKPP while not focusing specifically on water demand management have provisions for demand management activities providing scope for both convergence and co-financing.

plans which would include a wide range of demand management interventions such as improved irrigation technologies, managing groundwater through energy-irrigation nexus, groundwater metering, water-efficient technologies at community level, crop management and diversification, etc.

Other schemes such as Mahatma Gandhi NREGA, NFSM, NHM and PMKSY-HKPP while not focusing specifically on water demand management have provisions for demand management activities providing scope for both convergence and co-financing. For example, Mahatma Gandhi NREGA have provision for activities such as construction of canals, distributaries and minors, lining of canals, correction of water conveyance system and system deficiencies which could be used in command areas to fill the gap between irrigation potential created (through water supply augmentation) and being utilised. Similarly, there are convergence opportunities with schemes such as PMKSY-HKPP if the district lies under command area, which aims to cover at least 10% of the command area under micro/precision irrigation.

There are also other schemes with a specific focus on agriculture such as NFSM and NHM. NFSM with the objective of increasing production of crops and pulses (rice, wheat, pulses, coarse cereals and Nutri-Cereals) and NHM with the objective of enhancing horticulture

production includes micro-irrigation (drip and sprinkler) as one of their main activities. NFSM also includes demonstration of interventions such as direct seeded rice, system of rice intensification and land levelling for increasing water use efficiency.

### State Level Schemes

At the state level, Rajasthan's *Mukhyamantri Jal Swavlamban Abhiyan* also have provision for works such as micro-irrigation tanks, drip irrigation, solar pumps, and water budgeting for demand side water management. In Karnataka, water demand management at farm level through micro-irrigation systems such as drip and sprinkler is promoted by *Jalamrutha, Krishi Bhagya scheme and Suvarna Gramodaya Yojana*. These schemes could be supplemented by central sponsored schemes working on demand management.

In Tamil Nadu, TN-IAM project focus on improving irrigation water delivery to farmers, to the tail end of the distribution system through on-farm development work by empowering Water User Associations (WUAs). The activities includes concrete lining of irrigation channels and desilting irrigation channels. Uttar Pradesh's State Groundwater Conservation Mission also focuses on demand side interventions such as drip/sprinkler systems and field bunding to improve of water productivity in critical groundwater zones.

## 4.4 Water Quality Management

Water quality management is critical for ensuring safe and sustainable domestic water supply as envisioned under the Jal Jeevan Mission. Water quality is likely to be affected by changes in land use in the form of urbanisation, industrialisation and changes in forest cover. As per NWM, climate change could have an effect on groundwater quality in alluvial aquifers due to increased flood and drought events and can lead to increased salt intrusion of coastal and island aquifers due to rising sea levels. This can severely undermine domestic, agricultural and industrial water security by making available water not good for use. Thus, water quality management is as integral to CRWM as water supply

augmentation and water demand management. Water quality management requires a range of interventions such as protection of source, focusing on water treatment, safe sanitation, recycle and reuse, and water quality testing and monitoring.

### Central Level Schemes

At the central level, the schemes that focus on quality are (Figure 7): Jal Jeevan Mission, *Swachh Bharat Abhiyan*, *Namami Gange* and National River Conservation Plan (NRCP). JJM and SBA-G have their focus on domestic water supply and sanitation whereas *Namami Gange* and NRCP focus on river water quality.

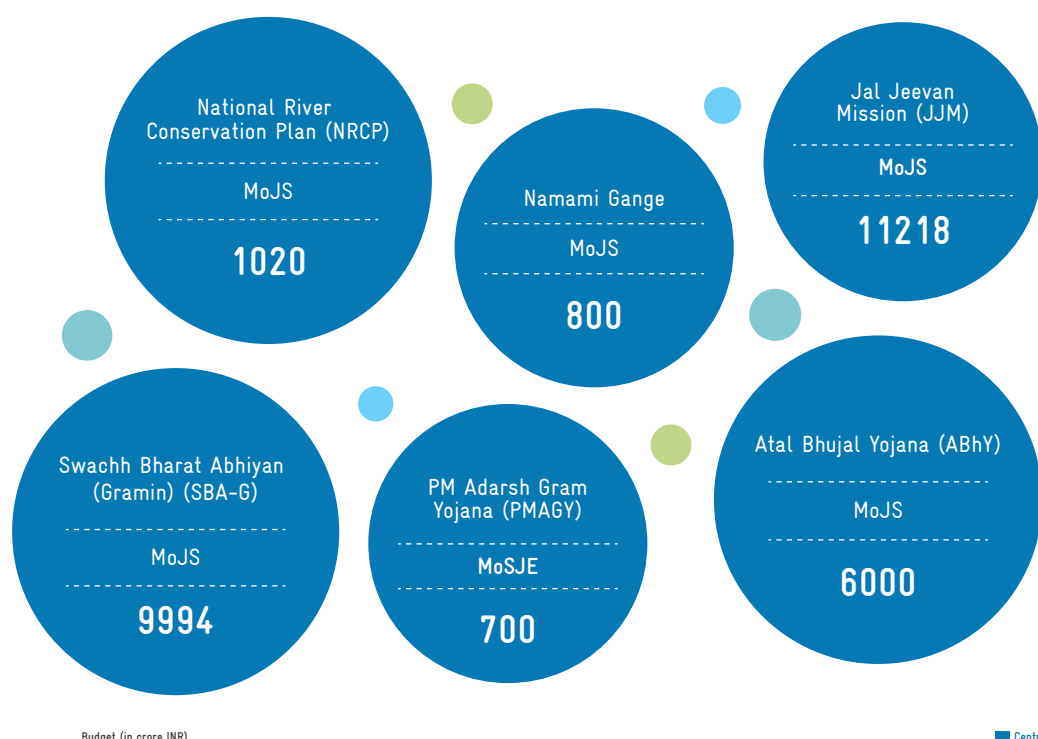


Figure 7: Key Central Level Schemes under Water Quality Management

JJM has a specific focus on water quality through water quality management, testing and monitoring. JJM subsumed missions and programmes from previous National Rural Drinking Water Programmes which focused on water quality such as National Water Quality Sub-Mission (focus on

providing safe drinking water to identified 27,544 arsenic/ fluoride-affected rural habitations), Water Quality Monitoring and Surveillance and *Swajal* Programme (implemented in aspirational districts through community designed, implemented, maintained and safely

## Namami Gange provides a good avenue for convergence to ensure water quality management.

managed single village water supply scheme). Under JJM, a range of activities on water quality management have been provisioned such as water treatment plants (in case the water source is contaminated), grey water management, water quality testing, and monitoring. JJM guidelines have assigned state level public health engineering departments and rural water supply departments, which already have infrastructure and data, being the responsible institutions for carrying water quality testing and monitoring.

SBA-G focuses on promoting cleanliness, hygiene and eliminating open defecation and accelerating sanitation coverage in rural areas. It complements JJM with a focus on household sanitation with a provision for construction of individual household latrines and community sanitary complexes. Also, SBA-G has a provision for solid and liquid waste management under which the treatment of wastewater is done through recommended technologies (e.g. Waste Stabilization Pond technology, duckweed-based wastewater treatment).

PMAGY and ABhY don't have a specific focus on water quality but have provisions for activities that can be converged with above schemes. PMAY-G with the objective of integrated development of selected villages with more than 50% scheduled caste (SC) population, has provisions for gap-filling funding (INR 21 lakh for a village) with an expectation of convergence of at least three to four gap-filling funds from existing Central/State level schemes or with matching grants from state governments. Gap-filling component can be utilised for the development of drinking water and sanitation infrastructure, setting up of solid and liquid waste disposal facilities and, construction and major repairs of toilets in schools and *Anganwadis*. ABhY primarily

focuses on water quantity but has provisions for groundwater quality improvement in terms of planning and monitoring for understanding dynamics of groundwater pollution pathways and potential actions to halt the deterioration of groundwater quality.

Two central programmes that have their focus on water quality of rivers are: *Namami Gange* and NRCP. *Namami Gange* is an integrated conservation mission which was started in 2014 with the objective to reduce pollution and rejuvenate river Ganga by adopting a river basin. Thus, the states falling under Ganges basin (Uttarakhand, Uttar Pradesh, Bihar) can take up a number of water quality management interventions (sewage treatment plants for domestic and industrial effluents, river surface cleaning, etc.). For districts falling under the programme, *Namami Gange* provides a good avenue for convergence to ensure water quality management. Another scheme, NRCP has a pan India coverage with the aim to improve the water quality of major rivers through the implementation of pollution abatement measures such as sewage treatment plants, low cost sanitation works to prevent open defecation on riverbanks, riverfront development works such as the improvement of bathing ghats, etc.

With these schemes, there is a wide range of interventions that can be incorporated in CRWM for water quality management and source protection. As such, no national scheme could be found for stopping salinity ingress or focusing on groundwater pollution alone.

No state-specific schemes focusing on water quality management could be identified.



## 4.5 Water Risk Management

### 4.5.1 Flood Management

Extreme weather events leading to floods due to the changing climate are increasing and expected to increase more in the future. In India, where more than 80% of rainfall is concentrated in 3-4 months of monsoon, and with 40 million hectares (12% of land) prone to floods, flood management becomes more critical. To mitigate and manage flooding, both structural and non-structural interventions along with monitoring and forecasting is critical. Structural interventions include flood control and protection works such as building dams and reservoirs, embankments, retention basins, etc. However, structural interventions will not completely mitigate the flood risk and can

yield more benefits when combined with non-structural interventions such as land use management (for example afforestation), nature based solutions (such as recharge basins for groundwater), flood forecasting and monitoring, interventions for making agriculture more resilient with flood-tolerant seeds and crop insurance.

There are a number of schemes that can be converged for integrated flood management (Figure 8). Flood monitoring, forecasting and flood zone mapping requires water resource assessment for which there are specific departments and schemes already discussed in section 4.1. They are a critical part of any CRWM plan.

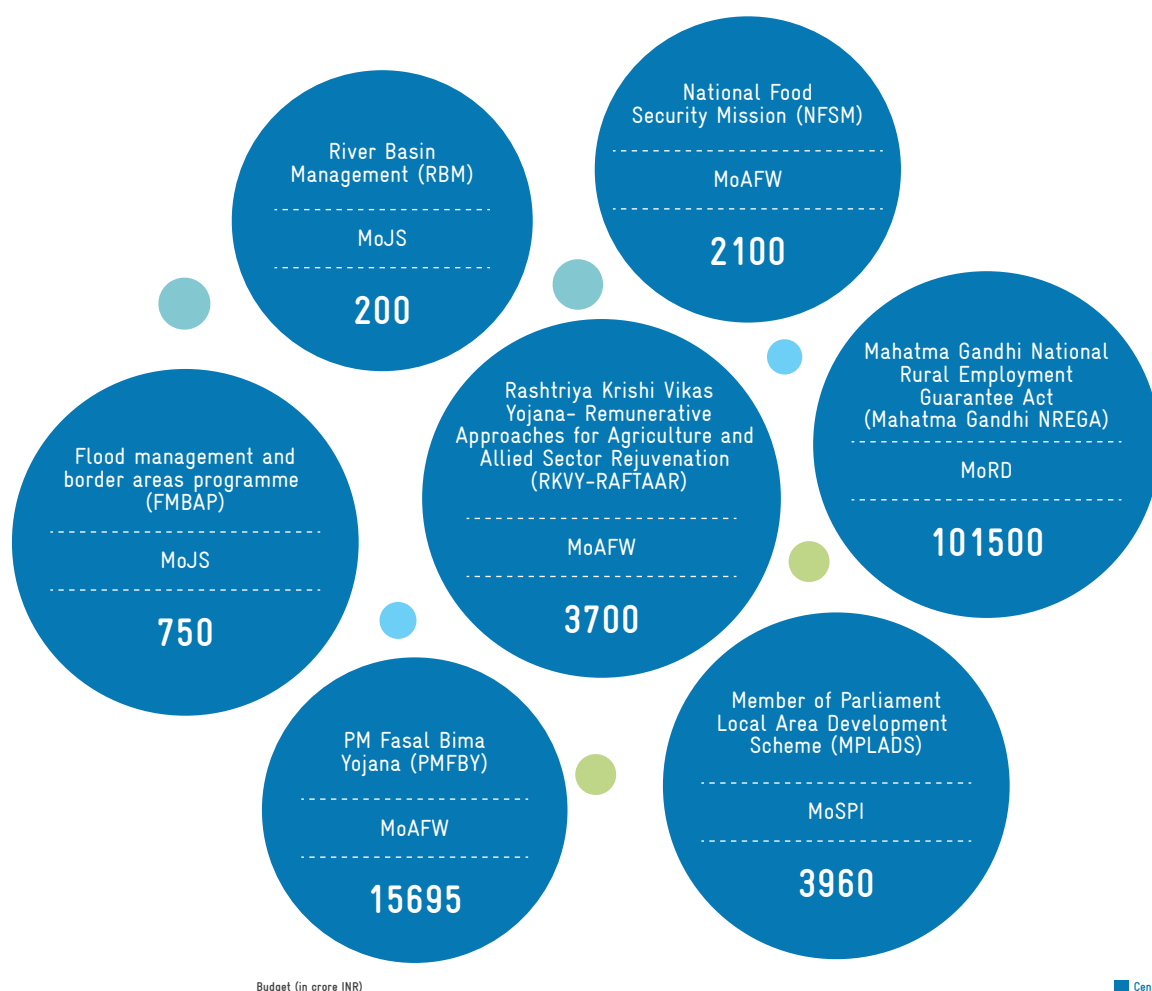


Figure 8: Key Central Schemes under Flood Management

At the central level, the programme solely dedicated to flood management is Flood Management and Border Areas Programme. FMBAP was framed by merging the two schemes of Flood Management Programme (FMP) and River Management Activities and Works related to Border Areas (RMBA). The scheme is aimed to assist state governments to create flood protection in critical areas by adopting optimum combination of structural and non-structural measures. Under non-structural measures, with RMBA focusing on border areas, the scheme has provisions for hydro-meteorological observations, flood forecasting, survey and investigations on common rivers (namely Ganga, Brahmaputra and Indus) with the neighbouring countries. Under the structural measures (covered under FMP scheme), critical flood control, river management and anti-sea erosion works can be taken up in the entire country which covers interventions such as river management, flood control, anti-erosion, drainage development, flood proofing,

flood prone area development programme in critical regions, restoration of damaged flood control/management works and catchment area treatment.

Another scheme that focuses on flood management is the River Basin Management (RBM) scheme. RBM consists of two components: Brahmaputra board and Investigation of Water Resource Development Scheme (IWDS). Brahmaputra board focuses on planning and integrated implementation of measures for control of floods and bank erosion in Brahmaputra and Barak Valley (in the states of Arunachal Pradesh, Assam, Meghalaya, parts of the states of Manipur, Mizoram, Nagaland, Tripura, Sikkim and a part of West Bengal falling within the Brahmaputra Basin). It covers non-structural interventions such as survey, investigation, hydrological studies along with structural interventions such as drainage development, anti-erosion works and construction of Raised Platforms. The IWDS component is more focused on carrying out technical evaluations and research.



Hamish John Appleby / IWM



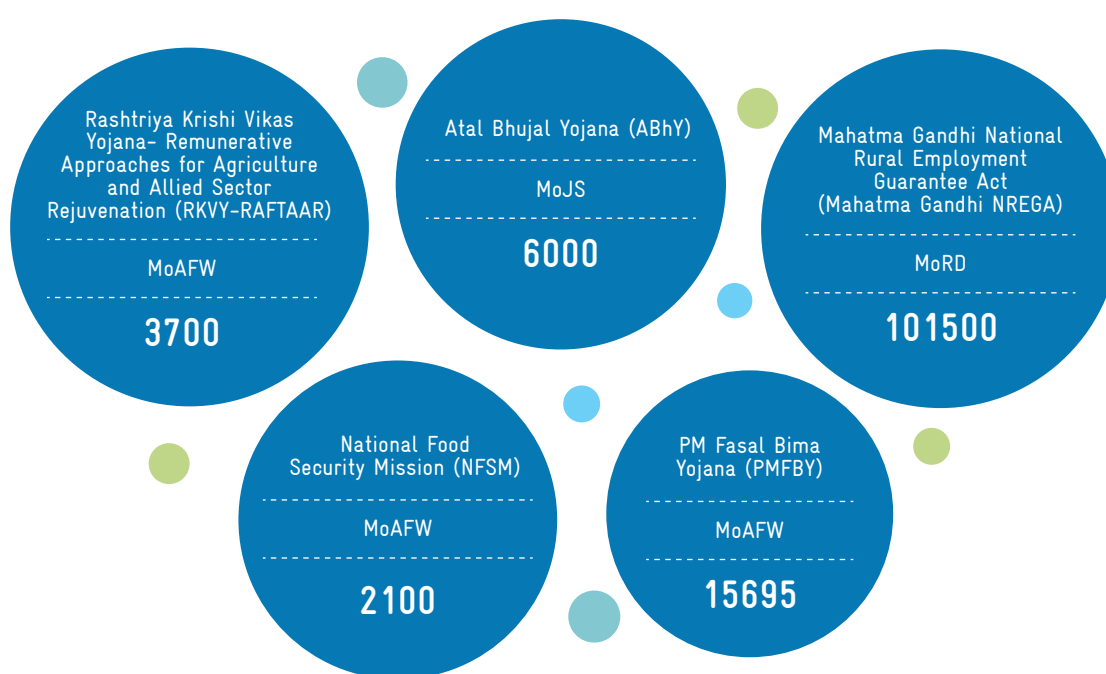
Other than that, there are schemes such as Mahatma Gandhi NREGA and MPLADS fund with provisions for carrying out flood control and protection related activities. Mahatma Gandhi NREGA have multiple provisions for flood control and protection include drainage in water logged areas, deepening and repairing of flood channels, chaur renovation, construction of stormwater drains for coastal protection etc. MPLADS has provisions for embankments, early warning systems, community centres, common shelters for cyclones, floods, etc. They can be used and converged with other schemes related to integrated flood management.

In addition, schemes which don't focus on flood management as such but focus on agriculture provide scope for interventions such as introduction of flood-tolerant seeds and crop insurances which increases the resilience of crops and farmers. NFSM and RKVY-RAFTAAR has provisions for flood-tolerant seeds whereas PMFBY exclusively focuses on crop insurance. These schemes can play an important role in making areas and people more flood resilient as structural measures cannot completely mitigate flooding.

## 4.5.2 Drought Management

Drought management activities aim to minimise adverse impacts caused by drought in which both water supply augmentation and water demand management, already covered before, play a critical role. However, in addition to supply and demand, there are certain interventions that can be taken up to further alleviate and

mitigate the impact of drought such as forecasting, monitoring and early warning systems, drought resistant crop varieties, advisories/contingency measures, crop diversification, afforestation, etc. This section looks at schemes which have specific provisions for these interventions.



Budget (in crore INR)

Central

Figure 9: Key Central Schemes under Drought Management



The main scheme with provisions for drought management interventions are summarised in *Figure 9*. Drought monitoring, forecasting and risk mapping requires water resource assessment for which there are specific organisations and schemes already discussed in *section 4.1*. These schemes are used for giving advisories and plans for contingency measures. As drought management relates to a wider ambit of activities, therefore specific components of individual schemes add to drought manage-

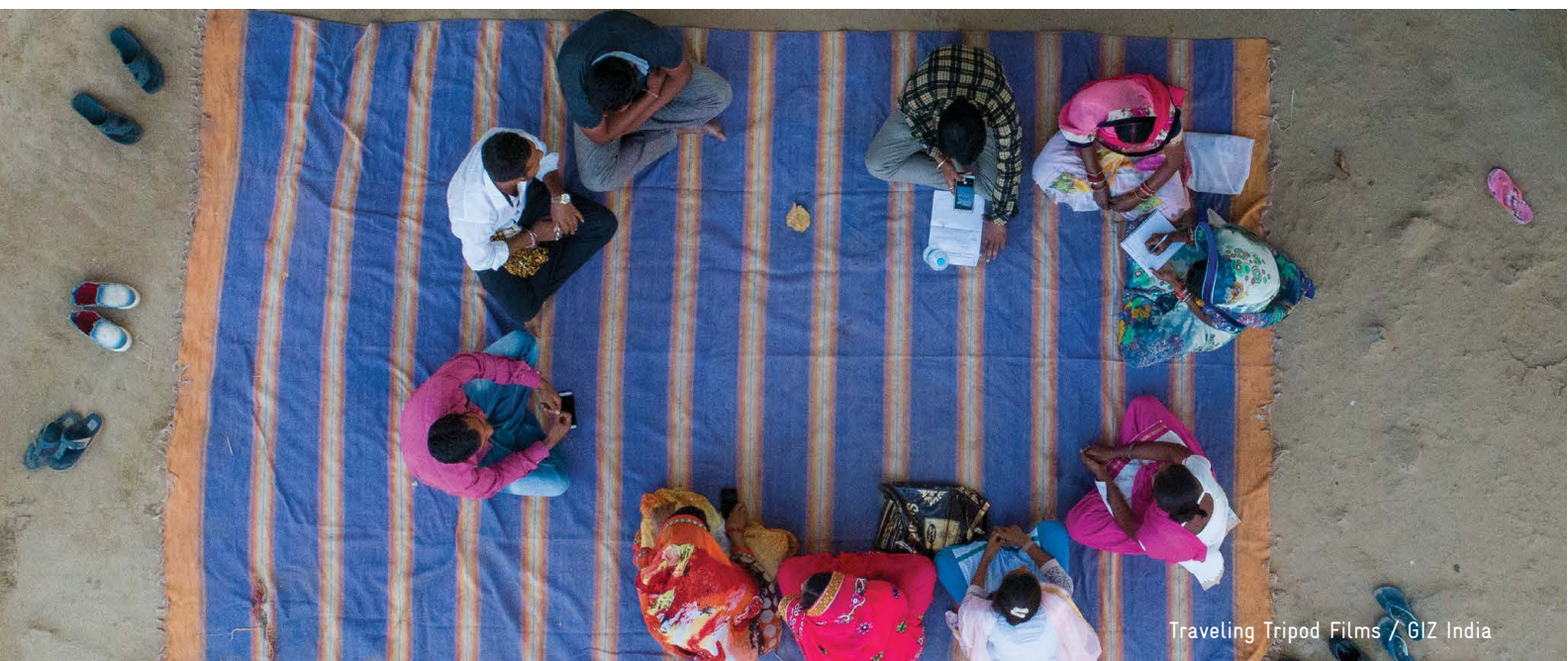
ment. For example, at national level, RKVY-RAFTAAR and NFSM have provisions for drought-resilient seeds, ABhY includes crop diversification among its range of activities, PMFBY provides crop insurance and Mahatma Gandhi NREGA includes drought proofing interventions such as afforestation and tree plantation.

No state-specific schemes strongly focusing on flood management and drought management were identified.

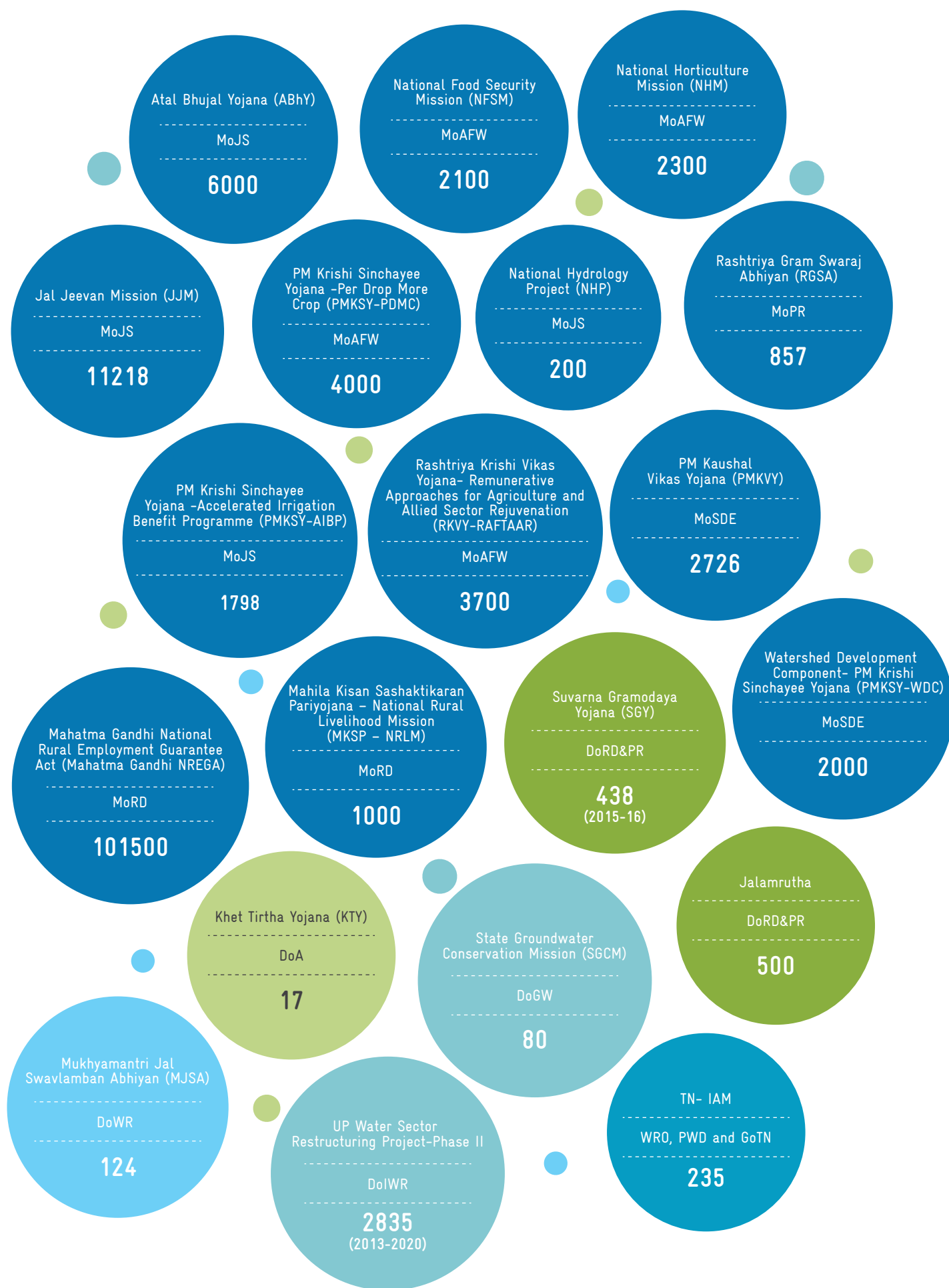
## 4.6 Capacity Building

Capacity building is key to effective CRWM implementation and long-term sustainability. Given that without adequate capacity, implementing any scheme or programme is not possible, most of the schemes/programmes have this component in varying proportions. To map the activities, capacity building is differentiated into two types: capacity building of institutions and capacity building of beneficiaries. Capacity building of institutions pertains to activities that build the capacity and skills of human resources that implement water related programmes, whereas capacity building of beneficiaries relates to building capacity and skills of end beneficiaries to implement water management interventions.

Both are important in the overall scope of convergence where strengthened institutions provide the technical and management skills to implement CRWM. Capacity building activities for end beneficiaries taps into opportunities to converge trainings, exposure visits and demonstrations. Other than capacity building activities of the schemes related to water management that have been mentioned in previous sections, key national schemes with a specific focus on capacity building, both institutional and beneficiary, are also covered in this section. Key national and state specific schemes are listed in *Figure 10*.



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Budget (in crore INR)

Central Karnataka Tamil Nadu  
Rajasthan Uttar Pradesh Madhya Pradesh

Figure 10: Key Central and State Level Schemes having Awareness/Capacity Building component

PMKVY skill development can be aligned with CRWM skills and the youth trained can be employed for effective implementation at local levels.

### Central Level Schemes

Most of the key national water schemes have components of capacity building. Mahatma Gandhi NREGA, ABhY, NHP, NFSM, NHM, PMKSY (PDMC, WDC, HKKP and AIBP), RKVY-RAFTAAR and JJM have specific components on capacity building for effective implementation of the schemes and its activities. ABhY and NHP focuses on building and strengthening institutional capacity at central, state and local levels to provide necessary trainings, exposure and professional development to build a trained pool of personnel. Similarly, Mahatma Gandhi NREGA has provisions to provide training to gram panchayat workers, field staff at various levels and other staff to strengthen planning, implementation and monitoring.

Other schemes such as NFSM, NHM and PMKSY with a focus on agriculture have many farmers' capacity building activities such as farmer fairs and exhibitions, orientation training programmes for farmers, demonstration of farm machine technology, marketing infrastructure, etc. Thus, all these schemes with various provisions on capacity building provide the scope for convergence to skill trained personnel who can effectively implement CRWM and build the capacities of end beneficiaries too.

Other than these schemes related to water, there are some specific schemes such as Pradhan Mantri Kaushal Vikas Yojana (PMKVY), Rashtriya Gram Swaraj Abhiyan and Mahila Kisan Sashaktikaran Pariyojana, a sub-component of Deendayal Antyodaya Yojana- National Rural Livelihood Mission with an exclusive focus on capacity building.

PMKVY is implemented by National Skills Development Corporation under the Ministry of Skill Development and Entrepreneurship (MoSDE) with the

objective to encourage and promote skill development for the youth throughout the country and also highlights the need to align it with other missions, such as Make in India, Digital India, Swachh Bharat, and Smart Cities. It provides for a range of skill development activities such as short-term training to either school/college dropouts or the unemployed along with training in soft skills, entrepreneurship, financial and digital literacy, and assessing and certifying prior learning skills. PMKVY skill development can be aligned with CRWM skills and the youth trained can be employed for effective implementation at local levels.

Rashtriya Gram Swaraj Abhiyan (RGSA) under the Ministry of Panchayati Raj, aims to strengthen technical and governance capabilities of Panchayati Raj Institutions (PRIs) for achieving Sustainable Development Goals (SDGs). RGSA has a strong focus on capacity building of PRIs with activities such as trainings/workshops, e-enablement of gram panchayats (GPs), and GP buildings, mobile applications and satellite communication to modernise and enhance citizen centric service delivery and governance in Panchayats, etc. The enhanced capacities of PRIs will be critical for effective last mile implementation of CRWM where RGSA can play an important role.

Mahila Kisan Sashaktikaran Pariyojana (MKSP) aims to improve the present status of women in agriculture, and to enhance the opportunities for their empowerment. MKSP focus on women to enhance the productive participation of women in agriculture by improving their skills and capabilities to support farm and non-farm based activities and enhance the managerial capacities of women in agriculture for better management of biodiversity among other activities. Given the centrality of women in agriculture with more than 80% of rural women engaged in



In Uttar Pradesh, SGCM have provisions for orientation workshops, creation of mobile apps and groundwater army for knowledge dissemination.

agriculture, MKSP can play an important role to impart training and building capacity for effective agriculture water management.

#### State Level Schemes

In **Rajasthan**, *Mukhyamantri Jal Swavlamban Abhiyan* (MJSA) organises workshops and conducts training activities for district officers and other stakeholders to ensure proper implementation of the programme.

In **Karnataka**, *Jalamrutha* includes water literacy awareness campaigns as a component of the programme. Trainings on vermicomposting, dairy management, goat and sheep rearing are promoted under *Suvarna Gramodaya Yojana* for livelihood diversification and development.

In **Madhya Pradesh**, *Khet Tirtha Yojana* primarily aims to enhance farmers' capacity through exposure visits within or outside the state. The scheme's main objective is to upgrade advanced farming techniques among farmers for improved productivity and income. Progressive farmers are provided with expert guidance during their visit to agricultural centres, agricultural science research centres, universities,

institutes, agricultural fields etc. on advanced farming techniques and practices for enhanced agricultural productivity.

In **Tamil Nadu's**, TN-IAM project has a strong focus on capacity building of both institutions and farmers. Specific components of projects focus on institutional strengthening and capacity building of water resources department and related agencies for water resources management. Some of the activities include technical assistance, equipment, services and institutional infrastructure to support data collection and analysis, training, policy analysis and partnerships to support awareness building, institutional synergy and decision support. Also, the project focuses on building capacity of WUAs by providing them intensive training on asset maintenance, operation and management of canals within their command areas.

In **Uttar Pradesh**, SGCM have provisions for orientation workshops, creation of mobile apps and groundwater army for knowledge dissemination. Under UPWSRP-2 project, awareness campaigns, demonstrations/trainings at field level to improve agricultural productivity are also taken.

## 4.7 Value/Income Enhancing Activities

Value/income enhancing activities refers to activities which add value to water interventions *i.e.* converting the means (increased and reliable water availability) to end (increased value/ income). This can lead to improved productivity, employment opportunities, income generation and better livelihoods for rural households, especially small farmers. With water being the entry point for productive agriculture, value/income enhancement practices in agriculture is critical to enhance the benefits of increased water security. These include practices like better agronomy, fertiliser and pesticide management, nutrient management, linkages with markets, processing units,

storage, etc. that can all increase the benefits of increased resilience developed through water supply, demand, quality and risk management.

Since these interventions can be both on-farm (nutrient management, fertilisers, machinery, HYV seeds etc.) and off-farm (storage, market linkages, food processing), value/income enhancement activities were divided into these groups. Key schemes/ programmes with provisions for these activities are summarised in *Figure 11*. Details of these multiple value/income enhancing activities are given in *Annexure C7*.

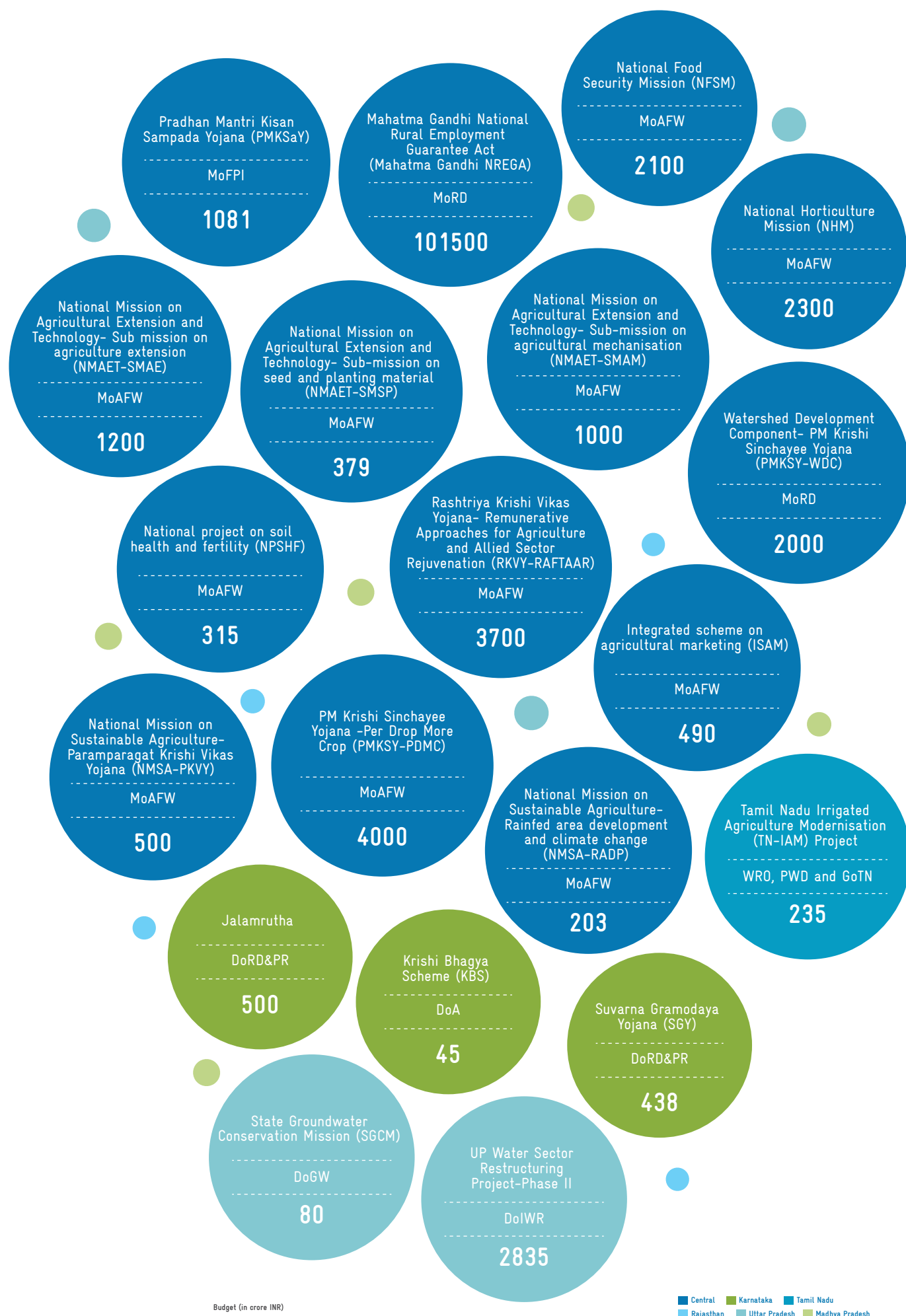


Figure 11: Key Central and State Level Schemes under Value/Income enhancing activities

Schemes such as Mahatma Gandhi NREGA, NHM and RKVY- RAFTAAR support many off-farm activities which further enhance the benefits of increased on-farm production.

### Central Level Schemes

Most of the activities mentioned in the previous section, especially with a focus on agriculture, have provisioned for these activities. For example, Mahatma Gandhi NREGA, NFSM, NHM, RKVY-RAFTAAR and PMKSY include a number of on-farm value/income enhancing activities such as horticulture, plantation, developing nurseries, HYV seeds, seed production, bio-fertilisers, bee-keeping, use of greenhouse/poly house, vegetable production, poultry farms, fisheries, etc. These interventions can enhance the benefits of water security and further increase farmers' resilience. Many of these schemes such as Mahatma Gandhi NREGA, NHM and RKVY-RAFTAAR also support many off-farm activities such as food grain storage, post-harvest management facilities, food processing units, cold storage, etc. which further enhance the benefits of increased on-farm production.

Other than that, there are specialised schemes on agriculture, mostly under the Ministry of Agriculture and Farmer Welfare, that include a number of interventions that can be built upon to multiply the benefits of improved water security of farmers (through supply, quality, demand management). Some examples of such schemes and their focus areas are listed below whereas detailed activities are shown in *Annexure C7*.

#### 1. National Mission on Agriculture Extension and Technology (NMAET) with its sub-missions:

- a. *Sub-Mission on Seed and Planting Material (SMSP)*: Interventions focusing on seeds (from production to supply).

- b. *Sub-Mission on Plant Protection and Plant Quarantine (SMPP)*: Interventions focusing on promotion of Integrated Pest Management practices.
- c. *Sub-Mission on Agriculture Extension (SMAE)*: Interventions focusing on awareness creating and enhanced use of appropriate technologies in agriculture through extension activities.
- d. *Sub-Mission on Agricultural Mechanisation (SMAM)*: Interventions focusing on farm mechanisation.

#### 2. National Mission on Sustainable agriculture (NMSA) with its sub-mission:

- a. *Rainfed Area Development (RAD)*: Interventions focusing on exploring potential utilisation of natural resources base, assets available/created through watershed development and soil conservation activities, appropriate farming systems by integrating multiple components of agriculture such as crops, horticulture, livestock, fishery, forestry with agro-based income generating activities and value addition.
- b. *Paramparagat Krishi Vikas Yojana (PKVY)*: Focus on interventions to support and promote organic farming, in turn resulting in improvement of soil health.

#### 3. National Project on Soil Health and Fertility (NPSHF): Facilitating and promoting Integrated Nutrient Management through judicious use of



chemical fertilisers, including secondary and micro nutrients, in conjunction with organic manures and bio-fertilisers, for improving soil health and its productivity.

4. **Integrated Scheme on Agricultural Marketing (ISAM):** Focus on agricultural marketing infrastructure, market information networks and integrated value chains.
5. **PM Kisan SAMPADA Yojana (PMKSaY):** Creation of modern infrastructure with efficient supply chain management from farm gate to retail outlet.

#### State Level Schemes

In **Tamil Nadu**, TN-IAM carries out works related to agriculture, horticulture, fishery, and agri-marketing. The interventions of this component are aimed

at increasing productivity of key crops, promoting diversification of agriculture production systems, enhancing resilience and improving farmer access to markets in project sub-basins.

In **Karnataka**, few schemes with value/income enhancing activities are *Krishi Bhagya Scheme* which includes interventions such as polysheds, fencing, pumpsets and *Suvarna Gramodaya Yojana* which undertakes a range of income/value enhancing activities such as construction of drains, community halls, manure pits, agro-service centres, horticulture, dairy farming, agro-forestry, sericulture.

In **UP**, under SGCM adoption of low water-consuming seeds in agriculture is encouraged. Under UPWRSP-2 project, interventions on timely irrigation for improved agriculture, poultry and fisheries are undertaken.

## 4.8 Co-Management/Indirect Management

Co-management/indirect management refers to actions and policies in interlinked sectors like energy and groundwater; water and food that have a direct and significant impact on water security. To design CRWM interventions, inter-sectoral policy linkages with water is imperative for ensuring sustainable operation. The complex water-energy-food nexus is primarily driven by policy interventions including farm power subsidies, food policy, and energy policies. For instance, subsidised farm power in northern states of India resulted in over-abstraction of water, hence depleting groundwater resources. Similarly, Minimum Support Price (MSP)

policy leads to decreased groundwater levels (as farmers opted to cultivate lucrative paddy having high MSP in Indian states (Sawkar, et al., 2018). Also, the recently launched Pradhan Mantri Kisan Urja Suraksha Utthan Mahabhiyan (PM-KUSUM) scheme for farmers for installation of solar pumps and grid connected solar can have strong implications for groundwater security and can be used as a tool for water demand management. Considering the water outreach across sectors, indirect management cannot be detached in order to have CRWM.



# 5

## RATING OF SCHEMES

Based on their key objectives, schemes are mapped and rated across eight non-mutually exclusive core components of CRWM: water resource assessment, supply augmentation, demand management, quality management, drought, flood, value addition / income enhancement, and awareness/training/capacity building.



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For rating schemes focusing on different CRWM components, scheme activities' synergy with CRWM and the designated budget is considered. Based on the schemes' focus on CRWM activities and overall budget, each scheme's rating under CRWM core components is indicated in *Table 2*. Three stars are allotted if a particular scheme under a CRWM core component has more than five works/activities, two stars for 2-4 activities and one for less than two activities. To assess the size of a particular scheme for convergence possibilities, the budget allocation to each scheme is also listed and colour-coded. The size of budget allocation along with the focus of the scheme (represented by stars given) represents the significance of the scheme for carrying out

convergence for a specific CRWM component.

At the national level, schemes like Mahatma Gandhi NREGA have a strong focus on water supply augmentation and value-added activities with a large budget and can be used as a central fulcrum when developing water supply augmentation interventions under CRWM whereas schemes such as RKVY, PMKSY-WDC can be used to get additional co-financing and convergence. Similarly, what becomes clear is that while most schemes have components for water supply, only few schemes focus on water resource assessment, demand management and risk adaptation/mitigation.

Schemes	Water resource assessment	Water supply augmentation	Water demand management	Water quality management	Flood management	Drought management	Value enhancing activities	Awareness/ Capacity building/Training
Central Schemes								
ABhY	★★	★★★★	★★★★	★		★★		★★
FMBAP	★★				★★★★			
ISAM							★★★★	
JJM		★★★		★★				★★
Mahatma Gandhi NREGA		★★★★	★★		★★★★	★★★★	★★★★	★
MPLADS		★★★★			★★			★★
MKSP – NRLM								★★
Namami Gange				★★				
NFSM		★★★★	★★★★		★	★	★★★★	★★
NHM		★★★★	★★				★★★★	★★
NHP	★★★★						★★	★★
NMAET-SMAE							★★	
NMAET-SMAM							★★★★	



Schemes	Water resource assessment	Water supply augmentation	Water demand management	Water quality management	Flood management	Drought management	Value enhancing activities	Awareness/ Capacity building/Training
Central Schemes								
NMAET-SMSP							★★★★	
NMSA-PKVY							★★★★	
NMSA-RADP							★★★★	
NPSHF							★★★★	
NRCP				★★				
PMAGY				★				
PMFBY					★	★		
PMKSaY							★★★★	
PMKSY-AIBP		★						★★
PMKSY-HKKP		★★★★	★★					
PMKSY-PDMC			★★★★				★★	★★
PMKVY								★
RBM	★				★★			
RGSA								★★
RKVY-RAFTAAR		★★★★			★	★	★★★★	★★
SBA-G				★★				
PMKSY-WDC		★★★★					★★★★	★
STATE SPECIFIC SCHEMES								
Rajasthan								
MJSA		★★★★	★★					★★
Madhya Pradesh								
KTY								★★
Karnataka								
Jalamrutha		★★★★	★★				★	★
KBS		★★	★★				★★	
SGY		★★	★★				★★★★	★

Note: Central Schemes Budget: FY 2020-21; State-Specific Schemes Budget: FY 2019-20

Schemes	Water resource assessment	Water supply augmentation	Water demand management	Water quality management	Flood management	Drought management	Value enhancing activities	Awareness/ Capacity building/Training
Tamil Nadu								
Kudimaramath scheme		★★★★						
RHRMP		★★★★						
MSDA		★★★★						
TN-IAM		★★★★	★★				★★★	★★
Uttar Pradesh								
SGCM		★★★★	★★				★	★
UPWSRP-2 (2013-2020)		★★★★					★★	★★

Table 2: Rating of Central and State Level Schemes based on their alignment to CRWM components and Budget

Budget (in crore INR)

- >5000
- 1000-5000
- <1000

Activity Rating

- ★★★★ More than 5
- ★★★ Between 2-4
- ★ Less than 2

## PRIVATE SECTOR PARTNERSHIPS, NGOs AND INTERNATIONAL FUNDING AGENCIES

Private players, non-government organisations (NGOs), and international and national funding agencies can be instrumental in filling up viable funding gaps for convergence and co-financing CRWM. Their pool of skilled personnel provide an opportunity to be leveraged for implementing CRWM.



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Partnership with potential private firms and NGOs may not only be limited to monetary terms but can also be considered for knowledge sharing and capacity building.

Apart from opportunities spread across national and state programmes, private players, non-government organisations, and international and national funds can play an important role in co-financing CRWM. Partnership with potential private firms (under Corporate Social Responsibility - CSR) and NGOs may not only be limited to monetary terms but can also be considered for knowledge sharing and capacity building. These are identified for convergence and co-financing for CRWM with specific focus on WASCA project states. The listing provided is not exhaustive. As done for government schemes, potential private firms contributing under CSR are identified based on their synergy with CRWM core components and overall CSR budget for Financial Year 2019-20. For NGOs and funds, programmes related to water security and climate adaptation are identified and listed for WASCA project states.

## 6.1 Private Sector

*Annexure E* gives potential private players working on CRWM components in the project states. These players which are already working in selected WASCA states offer significant co-financing opportunities for carrying out CRWM activities. The prioritisation of these private players can be undertaken considering their budget capacity, geographical presence, and their programme alignment with CRWM components. For instance, the Axis Bank Foundation focuses on watershed management and agricultural productivity as part of their rural livelihood strategy under CSR. With an overall budget of 83.7 crore and presence in states like Madhya Pradesh, Rajasthan and Tamil Nadu, Axis Bank Foundation exhibits good potential for co-financing

implementation of CRWM activities. Some of the largest organisations working in water conservation, restoration and quality management include Reliance Foundation, Unilever, Johnson & Johnson, Tata Motors Ltd, Hindalco etc.

The role of the Confederation of Indian Industry-Triveni Water Institute (CII-TWI) and the Federation of Indian Chambers of Commerce and Industry (FICCI) and ASSOCHAM Foundation for Corporate Social Responsibility (AFCSR) is important as they are the overarching organisations that are involved in private CSR activities. CII-TWI with its vision to make substantial progress towards achieving water security by 2022, works on cross-cutting themes such as environmental sustainability, improved water governance, awareness and behavioural change, training and skill development, technology and infrastructure in a multi-stakeholder partnership in sectors such as industrial, agricultural, domestic and ecosystems. FICCI plays a significant role in building policy dialogue and strong partnerships among government, industry and civil society to address water security challenges and is actually considered a one-stop solution for consensus building within and across sectors. AFCSR is another industry led foundation with its presence since 2013 has not only worked towards the SDGs by organising programmes and activities related to healthcare, hygiene and nutrition, environment and sustainability, but has also prioritised assistance to corporates in framing their CSR policies, identifying and suggesting activities under CSR aligning with the national priorities and facilitate networking for effective implementation of CSR projects.



## 6.2 Non-Government Organisations

Many non-government organisations working on programmes related to water and related sectors have been identified. Based on their focus and relation to CRWM, they are given star ratings. Five stars are allocated where more than 60% of programmes are dedicated to CRWM, four stars to 45-60% programmes, three stars to 30-45%, two stars to 15-30% and one star to less than 15% programmes dedicated to CRWM. This stars rating illustrates the organisation's priority to various CRWM components.

Broadly, the organisations having ratings up to three stars are primarily working on water management and conservation activities. Ratings above three focus additionally on water quality, flood management, and allied activities. For instance, Arghyam having five stars emphasises on activities under all CRWM core areas including supply augmentation, water quality, management of extreme events, value enhancing activities and capacity building. While the NGOs do not necessarily act as a source of funding, convergence can be built with their ongoing programmes and projects. Their pool of skilled personnel with field and community presence provides the opportunity to be leveraged for implementing CRWM.



Hamish John Appleby / IWMI



Organisations/ Foundations	Rating (based on programmes related to CRWM)	Rajasthan	Madhya Pradesh	Karnataka	Tamil Nadu	Uttar Pradesh
Development of Humane Action (DHAN) Foundation	★★★★	✓	✓	✓	✓	✓
Association for Sarva Seva Farms	★	✓	✓		✓	
Arghyam	★★★★★	✓	✓	✓	✓	✓
National Agro Foundation	★★	✓	✓	✓	✓	✓
Foundation for Ecological Security	★★★★★	✓	✓			
Watershed Organization Trust	★★★★★	✓	✓			
Aga Khan Rural Support Programme	★★★★		✓			
Centre for Advance Research and Development	★★★★		✓			
National Centre for Human Settlement and Environment	★★★★★		✓			
Development Support Centre	★★★★★		✓			
Action for Social Advancement	★★★★		✓			
MS Swaminathan Research Foundation	★★			✓	✓	
Care Earth	★★★★★				✓	
EcoPro	★★★★				✓	
Neer Foundation	★★★★★					✓

Table 3: Key NGOs closely working in CRWM in WASCA project states

## 6.3 International and National Funding Agencies

Table 4 below gives the key international and national funding agencies working closely on water and related sectors. Annexure F provides details on their ongoing projects in India. For co-financing, international funds such as

Green Climate Funds, Adaptation Funds, International Fund for Agriculture Development focusing on water and related sectors could be explored. Likewise, national agencies like NABARD having separate funds under Watershed Development Funds and Watershed Development Funds- Climate Proofing for water development and management offer significant co-financing opportunities.



Extent	Funding Agencies
International	World Bank (IDB, IRDA, IFC, MIGA, ICSID)
	Asian Development Bank
	European Investment Bank
	Asian Infrastructure Investment Bank
	Swiss Agency for Development and Cooperation (SDC)
	Green Climate Fund
	Adaptation Fund under United Nations Framework Convention on Climate Change (UNFCCC)
	International Fund for Agricultural Development
	International Climate Initiative
	US Aid
	Australian Centre for International Agriculture Research
	Japan International Cooperation Agency (JICA)
	OECD Development Centre's Network of Foundations Working for Development (netFWD)
	International Development Finance Club
	Bill and Melinda Gates Foundation
National	Watershed Development Fund (NABARD)
	Watershed Development Fund-Climate Proofing (NABARD)
	Rural Infrastructure Development Fund (NABARD)
	National Adaptation Fund for Climate change

Table 4: List of International and National Funding Agencies for Convergence and Co-financing of CRWM

## CRWM CONVERGENCE AND CO-FINANCING MODELS

Identified schemes and programmes of government and non-government can be used to develop innovative convergence and co-financing models for CRWM.



Prasanth Vishwanathan / IWM

Examples of possible convergence pathways both at state and district level include convergence with departments/schemes like agriculture, forestry, horticulture, fisheries, sericulture, animal husbandry, irrigation, minerals, etc.

Mapping of CRWM opportunities show that substantial public and private investments are available and that can contribute towards CRWM. For better planning, effective investments and optimising efforts, there is a need to bring convergence across different schemes and programmes. This will bring synergies between different government programmes/schemes in terms of planning, process and implementation (UNDP, 2013). Most of the central and state government schemes have their respective convergence guidelines. For example, Mahatma Gandhi NREGA offers a major opportunity for leveraging convergence which is emphasised and highlighted in scheme guidelines. Examples of possible convergence pathways both at state and district level include convergence with departments/schemes like agriculture, forest, horticulture, fisheries, sericulture, animal husbandry, irrigation, minerals etc.

As an illustration, two field level examples of convergence and co-financing are briefly discussed here. One such case of successful convergence examples is *Kapildhara* in Madhya Pradesh. *Kapildhara* was launched by the Government of Madhya Pradesh to provide irrigation facilities to small and marginal farmers to improve the quality of lives of farmers and make their agricultural lands more productive. Under *Kapildhara*, land development and dug wells was provided from Mahatma Gandhi NREGA, whereas, water lifting devices (diesel run) for farms were supported by Swarn Jayanti Gram Swarozgar Yojana, Bundelkhand Package and Agriculture Department. Gram Panchayats were extended technical

support in planning and execution of works by resource agencies and/or individuals. Over 2.7 lakh dug wells and lifting devices were provided to over 80,000 farmers. As a result, large parts of these areas have moved from single crop to double crop, a good example of CRWM through convergence.

Rajasthan initiated a campaign named *Mukhyamantri Jal Swavlamban Abhiyan* (MJSA) in the year 2016 which converges all existing schemes under various departments working on water conservation and water harvesting in rural areas. The main objective of the programme is to efficiently utilise water from rainfall, runoff, groundwater and in-situ soil moisture in a watershed approach. It is an example of creatively combining resources for improved water management and climate resilience. In 2015-16, for instance, MJSA secured INR 1,600 crores from various government programmes and contributions from civil society organisations to implement more than 95,000 water conservation works across 3,529 villages.

Above convergence examples present the processes and benefits of convergence and implementation of the same on the ground. However, both examples explicitly focus on supply side augmentation and drought component of CRWM with other components missing or less focused. Building upon these, below examples provide some potential convergence and co-financing models for CRWM incorporating various CRWM components that can be implemented at field.



## Integrating effective water conservation and water harvesting with solar and efficient irrigation

### 7.1 Mukhyamantri Jal Swavlamban Abhiyan

Rajasthan initiated a campaign named *Mukhyamantri Jal Swavlamban Abhiyan* (MJSA) in the year 2016 which converges all existing schemes under various departments working on water conservation and water harvesting in rural areas. The main objective of the programme is to efficiently utilise water from rainfall, runoff, groundwater and in-situ soil moisture in a watershed approach. It is an example of creatively combining resources for improved water management and climate resilience. In 2015-16, for instance, MJSA secured INR 1600 crores from various government programmes and contributions from civil society organisations to implement more than 95,000 water conservation works across 3,529 villages.

This can be further integrated with solar irrigation to increase access to water and

demand side interventions to enhance drought resilience. For solar irrigation, PM-KUSUM scheme launched by the Ministry of New and Renewable Energy (MNRE) to support installation of off-grid solar pumps in rural areas and reduce dependence on grid in grid-connected areas, can be converged with funds from NABARD and MNRE for infrastructure costs and *Atal Bhujal Yojana* scheme to provide attractive feed in tariff for groundwater conservation. Solar irrigation model by International Water Management Institute (IWMI) in Dhundi, Gujarat<sup>9</sup> serves as an example for this conservation model.

Demand side interventions can be integrated to build resilience to drought. This can be done through micro-irrigation with PMKSY-PDMC as the main scheme with support from micro-irrigation fund, participatory planning and management from *Atal Bhujal Yojana* and drought-resilient seeds and varieties from National Mission for Sustainable Agriculture (NMSA).



Hamish John Appleby / IWMI

<sup>9</sup>[http://www.iwmi.cgiar.org/iwmi-tata/PDFs/dhundi\\_solar\\_energy\\_producers\\_cooperative\\_society-tri-annual\\_report-2015-18.pdf](http://www.iwmi.cgiar.org/iwmi-tata/PDFs/dhundi_solar_energy_producers_cooperative_society-tri-annual_report-2015-18.pdf)

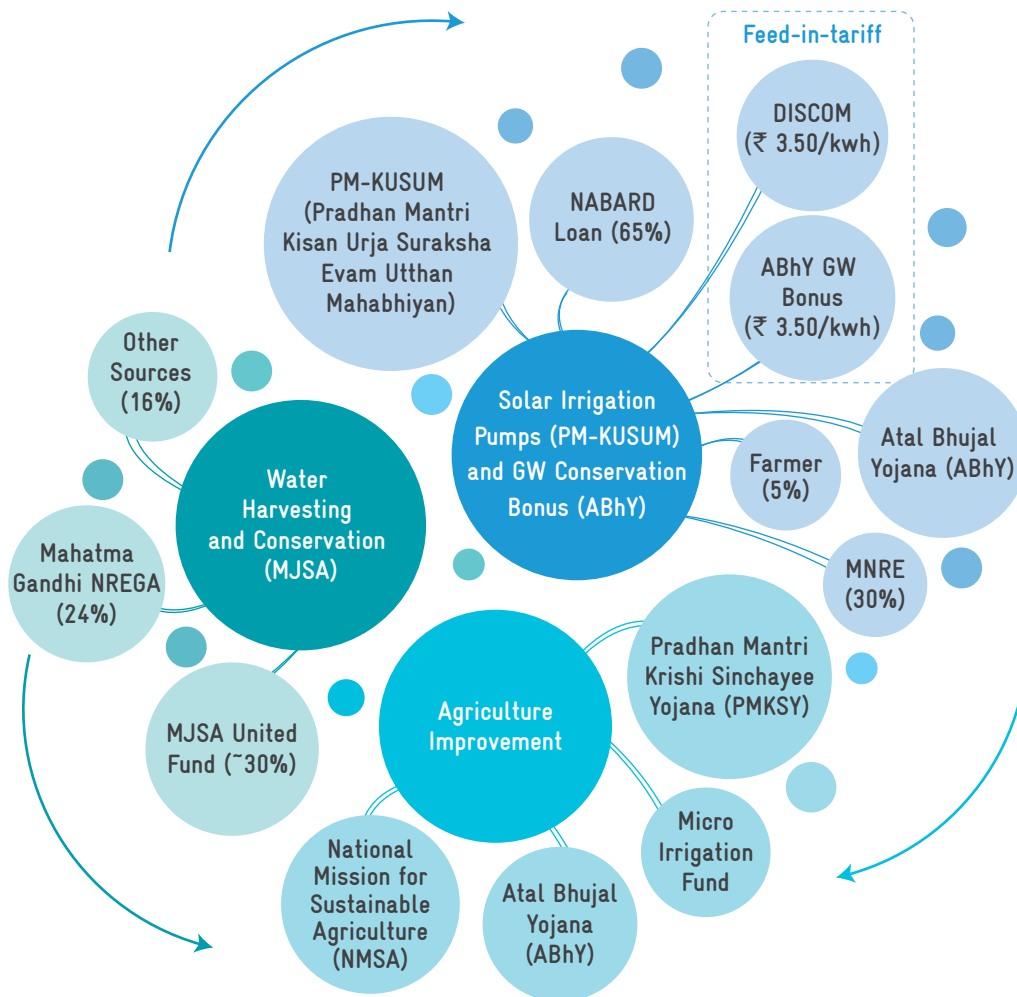


Figure 12: Convergence Model for effective water conservation and water harvesting under MJSA with solar and efficient irrigation

## 7.2 Underground Transfer of Floods for Irrigation

For building agriculture, groundwater and flood resilience

Underground Transfer of Floods for Irrigation (UTFI)<sup>10</sup> which involves targeted recharging of excess wet season flows in aquifers, is one novel way of operationalising integrated water management and build resilience to both floods and droughts. UTFI is a form of managed aquifer recharge that works at the

basin scale through the installation of groundwater recharge infrastructure at strategic sites distributed across a basin to recharge depleted groundwater storage capacity.

IWMI in collaboration with Indian Council of Agricultural research (ICAR), ICAR-Central Soil Salinity Research Institute and Krishi Vigyan Kendra-Rampur carried out pilot assessment of UTFI in Rampur. The project recommended and focused on convergence of multiple government

<sup>10</sup><https://www.iwmi.cgiar.org/publications/iwmi-research-reports/iwmi-research-report-165/>

schemes. The main components of UTFI include UTFI suitability and resource assessment, building UTFI infrastructure and UTFI operation and maintenance. This can be complemented with capacity building of GPs, drip irrigation for efficient use of water and solar irrigation for replacing diesel pumps. *Figure 13* shows how different schemes could be converged for upscaling UTFI and making it more resilient. Core infrastructure cost requirements could be co-financed through Mahatma Gandhi NREGA and the 15th Finance Commission; yearly operations

and maintenance that includes desilting and pond stabilisation can be carried out through Mahatma Gandhi NREGA whereas schemes like NHP can be used for UTFI suitability and resource assessments.

Further, resilience can be enhanced by bringing in demand management through micro-irrigation and bringing solar irrigation with feed in tariff as discussed above using PM-KUSUM scheme. *Atal Bhujal Yojana* can play a role in building capacity of gram panchayats for the management of UTFI and overall participatory groundwater management.

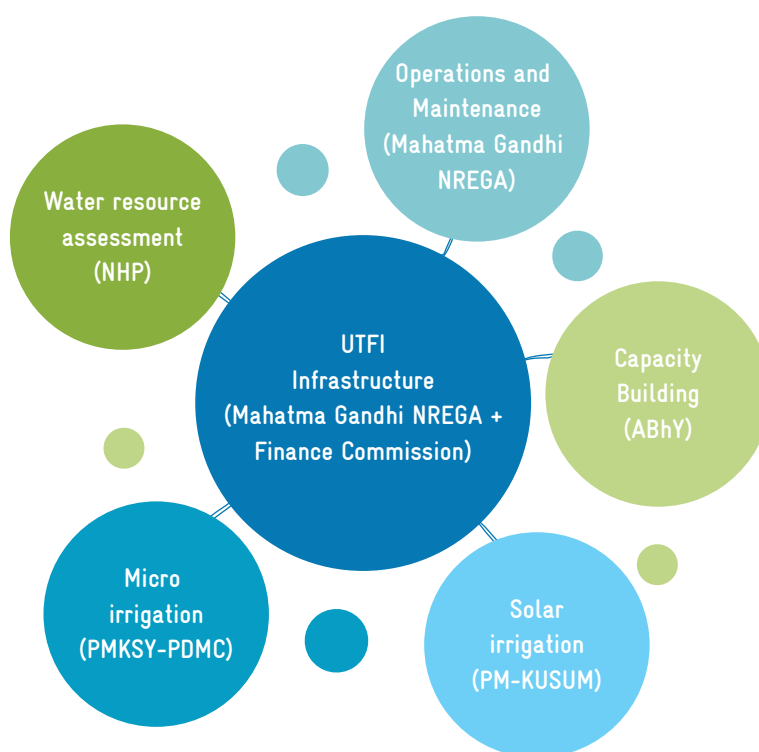


Figure 13: Convergence model for upscaling Underground Transfer of Floods for Irrigation (UTFI)



Improving agriculture productivity, resilience and contributing to mitigation

## 7.3 Upscaling Climate Smart agriculture

Climate Smart Agriculture (CSA) is an approach for developing agricultural strategies to secure sustainable food security under climate change and has three objectives of adaptation, mitigation, and improving food security for small-scale farmers<sup>11</sup>. This is achieved by implementing and developing a portfolio of climate smart interventions: water smart, weather smart, energy smart, carbon smart, nitrogen smart and knowledge smart. CSA is very much context specific and can be

implemented at local scale with the climate smart villages model. Water smart practices form a critical and significant part of the CSA practices portfolio and consists of a range of different interventions such as building storage in surface reservoirs, enhancing groundwater recharge, improving soil moisture and increasing water application efficiency. With water assured, other practices can be built upon to make the villages water resilient while increasing income and contributing to mitigation at the same time. Number of schemes already include these activities providing convergence opportunities to upscale climate smart agriculture (*Table 5*). *Figure 14* gives the convergence model for CSA.

CSV components	CRWM component	Activities	Scheme
Weather smart	Water resource assessment	Monitoring, advisories, forecasting, Insurance	IMD, NHP, CWC, NICRA, PMFBY
Water smart	Water supply + demand	Recharge, storage, soil moisture	Mahatma Gandhi NREGA, PMKSY
Nutrient smart	Value added activities	Nutrient management, precision fertilisers, Livestock	RKVY, DAY-NRLM, NMAET, NFSM
Energy smart	Demand + value added	Solar energy, minimum tillage, residue management	PM-KUSUM, RKVY-RAFTAAR
Knowledge smart	Capacity building	Trainings, visits, Farmer learning	NMAET, ABhY, NFSM

Table 5: CSA portfolio alignment with CRWM components and related schemes

<sup>11</sup><http://www.fao.org/climate-smart-agriculture/en/>

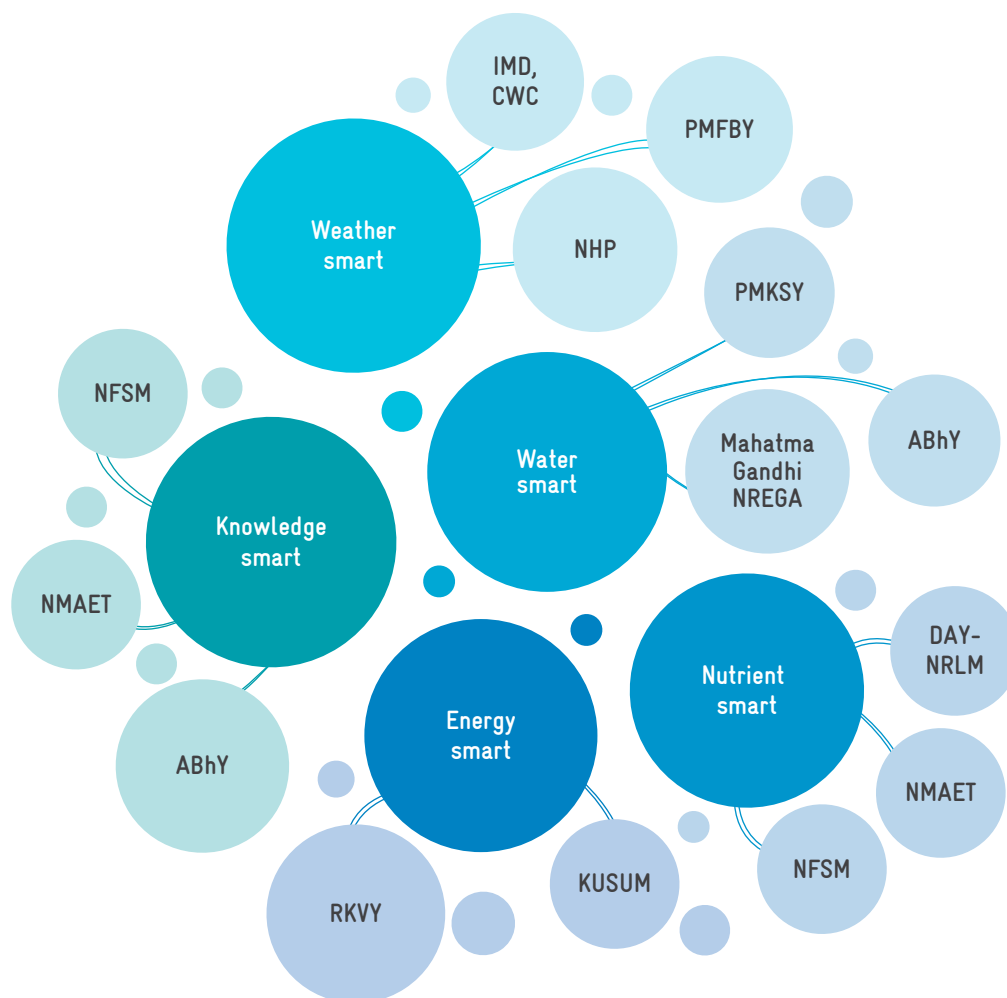


Figure 14: Convergence model for upscaling Climate Smart Agriculture (CSA)

## 7.4 Managing Climate Risks of Floods and Droughts

### Bundled Solutions of Index Insurance with Climate Information and Seed Systems to manage Agricultural Risks (BICSA)

Increasingly unpredictable weather is becoming a major hazard across the globe and especially in India with its large dependence on agriculture. To build the resilience of farmers to these weather extremes of water scarcity and abundance, there is a need for convergence across monitoring, forecasting, drought and flood management activities. The IWMI project

BICSA<sup>12</sup> focuses on this by providing an integrated solution through drought and flood insurance, improved seed varieties, weather forecasting services and climate smart farming practices. The identified schemes already have provisions for all these activities and can be converged for managing climate risks related to floods and droughts.

Table 6 provides CRWM convergence models for drought and flood. In case an area is prone to both floods and droughts, the interventions can be converged.

<sup>12</sup><https://wle.cgiar.org/bundled-solutions-index-insurance-climate-information-and-seed-systems-manage-agricultural-risks>

## Component

## What

## Scheme

Assessment and monitoring of risks	Vulnerability mapping; Risk monitoring and forecast	NICRA, NHP, IMD, CWC, ISRO
Building flood resilience	Insurance [Index-based]	PMFBY
	Submergence tolerant seeds	NFSM, RKVY-RAFTAAR
	Nature based solutions: Plantation, recharge,	Mahatma Gandhi NREGA
	Flood infrastructure	FMBAP, MPLADS
Building drought resilience	Insurance [Index based]	PMFBY
	Drought resilient seeds	NFSM
	Supply + demand measures	Mahatma Gandhi NREGA ,PMKSY, NGOs, Private sector CSR

Table 6: CRWM convergence model for drought and flood management

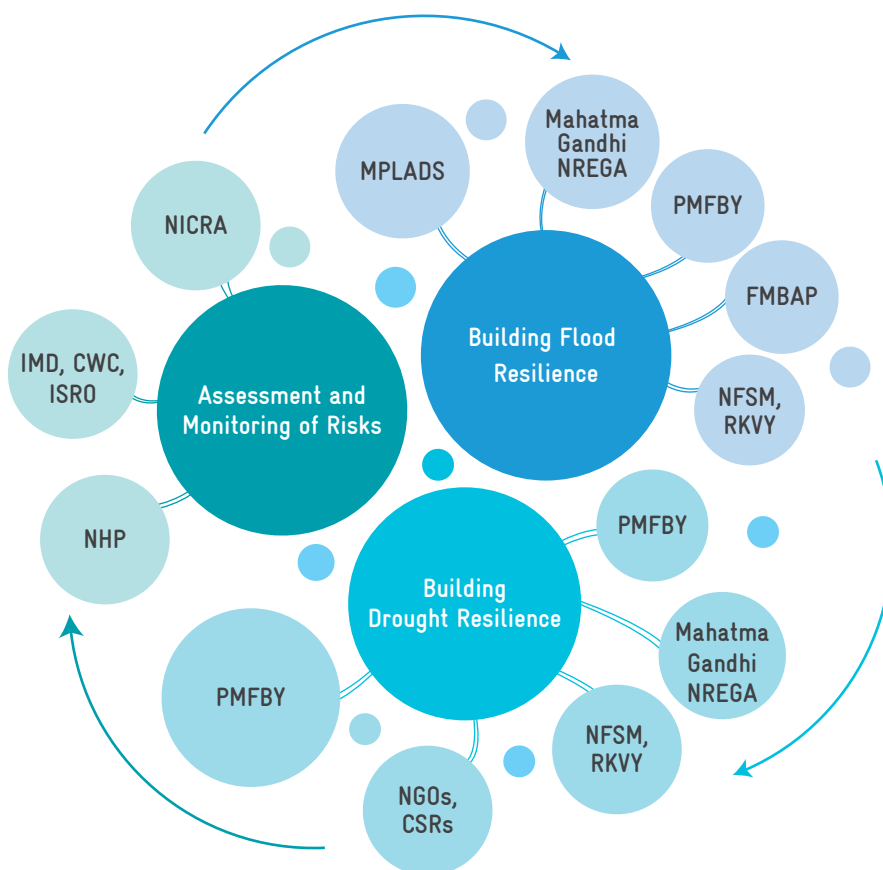


Figure 15: Convergence model for integrated drought and flood management



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## INSTITUTIONAL CONVERGENCE AND CO-FINANCING

Institutional convergence and co-financing at planning and implementation phase of CRWM is critical for arriving at a common and shared understanding of challenges. However, this process is challenging and beset with silo thinking.

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Having an institutional framework or arrangement for convergence is very critical for bringing in effective convergence.

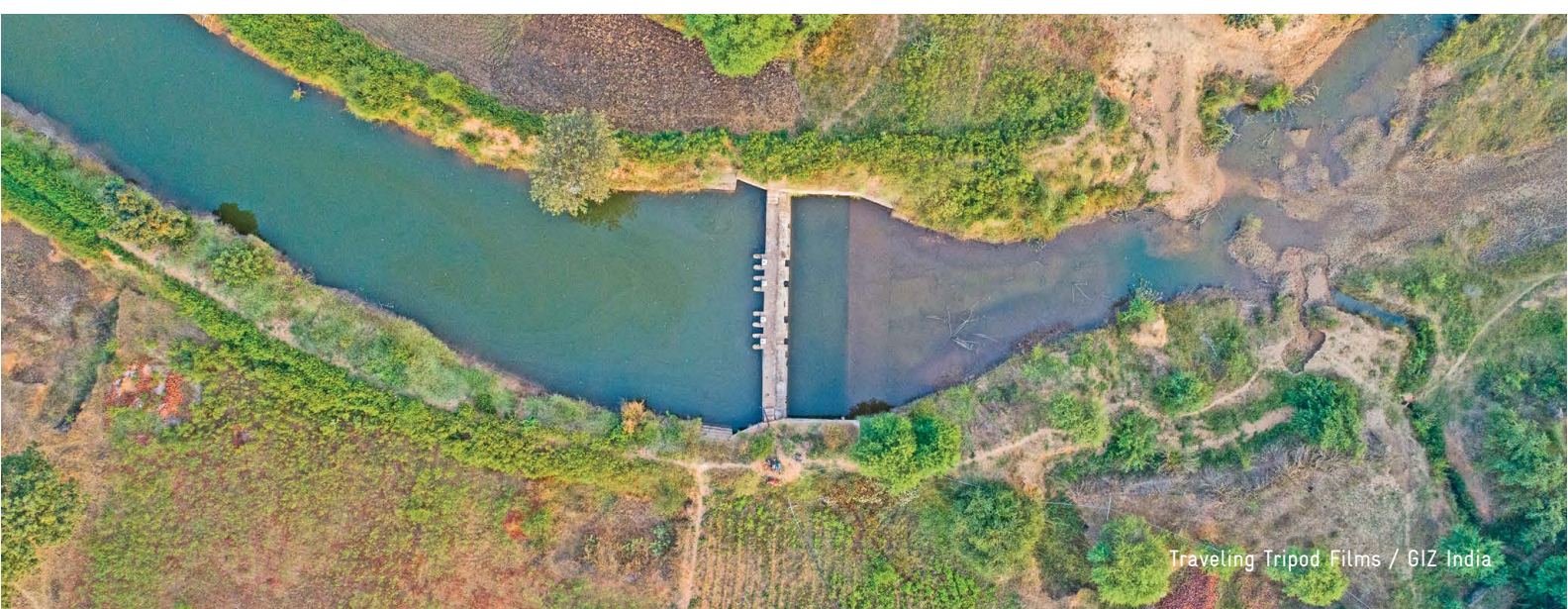
Integrating physical, institutional, social and economic capital is key for comprehensive development. Development through convergence is also a time consuming process and not without challenges. It is important to have a vision and a holistic design which is flexible before planning activities with various departments. This design should be continuously revisited to accommodate need based changes as we go forward. Institutionally, the process of convergence of resources should ideally start right from the planning stage itself. Collective planning and implementation among different departments/sectoral institutions will enhance social capital, common and shared understanding for improved operation and management. This will help in creating durable natural resource assets and when organically integrated with agricultural production systems, this will improve land productivity and income resilience to cope with climatic stresses. Having an institutional framework or arrangement for convergence is very critical for bringing in effective convergence.

All the central and state government schemes have their respective guidelines with a multi-level institutional structure where responsibilities such as guiding principles, finance, planning, admissibility of works/activities, entitlements,

identification of beneficiaries and implementation procedures are explained. To ascertain how institutional convergence can effectively take place, there is a need to identify the following for each of the schemes to be converged:

1. Existing institutional arrangements at central, state, district and sub-district level.
2. Key person(s) who are part of these institutional arrangements.
3. Main planning documents prepared at different level of institutional arrangements.
4. Current framework/guidance on convergence, if any. For instance, the Ministry of Rural Development (MoRD) developed Guidelines for Convergence of Mahatma Gandhi NREGA with different schemes in 2009.

Here we outline this procedure considering four schemes; Mahatma Gandhi NREGA, RKVY-RAFTAAR, PMKSY-PDMC and JJM. Based on the collected data, the same can be expanded for other schemes as well. They cover CRWM components of water supply, demand, value/income enhancement and capacity building. Mahatma Gandhi NREGA is under MoRD, RKVY and PMKSY-PDMC under MoAFW, and JJM under MoJS.



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## 8.1 Existing Guidelines on Convergence

SCHEME	Convergence process at different levels
Mahatma Gandhi NREGA	<p>District: Annual Action Plans relating to Mahatma Gandhi NREGA, IWMP and PMKSY are coordinated</p> <p>State: State's Annual Action Plan shall clearly reflect the convergence carried out with the various departments and schemes</p>
RKVY-RAFTAAR	<p>District: Strategies for convergences with other programmes are appropriately incorporated in District Action Plans</p> <p>State: Before recommending projects to the state level sanctioning committee, the state level screening committee (SLSC) will further examine and ensure that convergence with other State/Central Schemes has been attempted</p>
PMKSY-PDMC	<p>District: District Irrigation Plans (and State Irrigation Plans) will provide requisite emphasis on convergence by eliminating overlap of resources &amp; efforts and ensuring optimal utilisation of funds available through various Centrally Sponsored/State Plan Schemes</p> <p>State: SLSC to ensure convergence with other schemes and that no duplication of efforts or resources takes place</p>
JJM	<p>Institutional arrangements are to be established at all levels with linkages and convergence with other programmes</p> <p>District: District Action Plans (also State Action Plans) to identify sources of convergence to meet the requirements emerging from Village Action Plans and also include other activities taken up under different schemes/programmes to achieve long-term water security</p> <p>State: Convergence of activities and funds from different sources, viz. Mahatma Gandhi NREGA, IWMP, SBA-G, MPLADS, etc.</p> <p>Centre: Coordinate with other Ministries/Departments for convergence</p>

Table 7: Current framework/guidance on convergence under Mahatma Gandhi NREGA, RKVY, PMKSY and JJM schemes



From the scheme guidelines, it is clear that the emphasis on convergence is given in all the schemes. And already, some tasks have been identified for carrying out convergence. For example, Mahatma Gandhi NREGA has convergence guidelines with suggested works and modes of convergence along with reporting structure; RKVY-RAFTAAR encourages convergences with a wide range of schemes and state departments; PMKSY guidelines highlight ensuring convergence with all rural assets/infrastructure based programmes related to water conservation and management programmes/schemes; and JJM encourages exploring convergence with ongoing central and state funded schemes along with trusts/ foundations/ CSRs/ donors/ community initiatives, etc.

However, there is a lack of a consistent and concrete framework to ensure that the recommended convergence is carried out. *Table 7* gives the current responsibilities with regard to convergence at different levels. In most of the existing guidelines, the district is identified as the starting level where convergence opportunities have to be identified whereas at state level, reporting and recommendation of projects based on convergence have to be done. There is no clear planning and reporting structure as such to keep track of convergence in an integrated manner.

## 8.2 Existing Institutional Arrangements

*Table 8* shows the existing institutional structure, key members (chairmen) and planning documents prepared at different levels for selected schemes. For all the schemes, institutional arrangements exist at all tiers, except PMKSY-PDMC which formally doesn't have an arrangement at block or village level but guidelines recommend taking feedback from block officers and gram panchayat. The existing institutional arrangement already shows that there is overlap in terms of personnel, especially at district level where most of these schemes are implemented. While at the centre, all schemes are headed by respective Ministries, the common institution structure is clearer at the district level. At district level, most of the schemes are headed by district magistrate/collector (or CEO of Zila parishad). In most schemes, the plans originate and consolidate following a bottom-up approach. While Mahatma Gandhi NREGA and JJM focus on village action plans, both RKVY and PMKSY-PDMC documents are prepared at district level.

## Institutional arrangements

	Mahatma Gandhi NREGA	RKVY	PMKSY-PDMC	JJM
Centre	NMT and CEGC	DAC & FW	NEC and NSC	NJJM
State	SEGC and SMC	SLSC and SLSC	IDWG and SLSC	SWSM
District	DPC	DAPU	DLIC	DWSM
Block	PO, TM and BRC	BAPU/TAPU	-	VWSC
Village	Gram Panchayat	PAPU/VAPU	-	VWSC

## Members/Chairmen

	Mahatma Gandhi NREGA	RKVY	PMKSY-PDMC	JJM
Centre	Additional Secretary/ Joint Secretary (Mahatma Gandhi NREGA)	Secretary (DAC&FW)	NSC: Chairmanship of Prime Minister NEC: Vice Chairman, NITI Aayog	Mission Director (National Jal Jeevan Mission)
State	Senior IAS officer Secretary/Commissioner Mahatma Gandhi NREGA	SLCM: (APC) or nominated by CS SLSC: CS, State	IDWG: APC SLSC: CS, State	CS/Additional CS
District	(DC) or (CEO, ZP)	President of ZP and DC/DM	DC + CEO, ZP	CEO of ZP/DC
Block	Block / intermediate panchayat and BRC	President of Taluka/Block/Mandal	-	-
Village	GP	Sarpanch/President of GP	-	GP

## Planning documents

	Mahatma Gandhi NREGA	RKVY	PMKSY-PDMC	JJM
Centre	Guidelines and budget	Guidelines and budget	Guidelines and budget	Guidelines and budget
State	State plans	SAPs	SIP	SAP*
District	District plans	C-DAPs	DIPs	DAP
Block	Block plans	-	-	-
Village	Annual action plan of GP	-	-	VAP

Table 8: Existing Institutional Structure for Mahatma Gandhi NREGA, RKVY, PMKSY and JJM

#### Notes:

#### Institutional arrangements

NMT: National Management Team; CEGC: Central Employment Guarantee Council; DAR and FW: Dept. of agriculture, cooperation and farmers welfare (DAC & FW); NEC: National Executive Committee; NSC: National Steering Committee; NJJM: National Jal Jeevan Mission

SEGC: State employment guarantee council; SMC: State Mahatma Gandhi NREGA Mission/ Cell (SMC) within rural development Department; SLCS: State level screening committee; SLCS: State level sanctioning committee (SLSC) IDWG: Inter Departmental Working Group; SWSM: State Water and Sanitation Mission;

District agriculture planning unit (DAPU); District Level Implementation Committee (DLIC); District Water and Sanitation Committee (DWSM); Programme officer (PO); Technical team (TM); Block Resource Centre (BRC); Block or Taluka agriculture planning unit (BAPU/TAPU); Block Water and Sanitation Committee (BWSC); Village Water and Sanitation Committee (VWSC);

Panchayat or Village agriculture planning unit (PAPU/VAPU)

#### Members/chairmen

DPC: District Programme Coordinator; Agriculture Production Commissioner (APC); Chief Secretary of the State (CS); Indian Administrative Service (IAS) GP: Gram Panchayat ; District Collector (DC) or Chief Executive Officer, Zilla Parishad (CEO, ZP);

#### Planning documents

State agriculture plans (SAPs); State irrigation plan (SIP); Village action plan (VAP); District action plan (DAP); State action plan (SAP)\*; District Irrigation plan (DIPs); Comprehensive District agriculture plans (C-DAPs)

## 8.3 Suggested Institutional Arrangement

For facilitating the process of convergence, committees at different levels (state, district and block/taluka) representing relevant line departments are to be formed for better coordination. These committees should oversee the planning and implementation process. Key players from relevant line departments, who are already part of respective schemes, should be involved in the joint field visits, and in planning and preparation of action plans embedded with a clear convergence matrix indicating source(s) for leveraging funds for given components from respective schemes. The convergence matrix must clearly identify source of funding for each type/nature of activity/work including the quantity.

Ideally, for planning and implementation of CWRM, village/gram panchayat is the most appropriate unit to bring about meaningful impact through convergence and co-financing with Mahatma Gandhi NREGA as the central scheme for water adaptation to climate change. The primary objective of Mahatma Gandhi NREGA is

augmenting wage employment. At the same time, the choice of work allowed in the Act addresses causes of chronic poverty like drought, deforestation and soil and water conservation, so that the process of employment generation is maintained on a sustained basis through creation of durable assets. As discussed in previous sections of this report, there is a strong complementarity between Mahatma Gandhi NREGA and other Central and State Government Programmes/Schemes specially related to natural resources management and agriculture. Great benefit can be derived by seeking convergence of these schemes with Mahatma Gandhi NREGA by pooling their resources, financial and institutional, for building resilience to climate adaptation.

### Village

The potential schemes for convergence such as Mahatma Gandhi NREGA, JJM, PMKSY-WDC and RKVY consider village/GP or cluster of villages in a watershed (for IWMP) as the unit for planning and implementation. For other schemes, those are important but they consider district or any other unit for planning depending upon allocation and priorities, which can be suitably



dis-aggregated at sub-district level by the District Level Committee. For bottom-up planning, preparing action/work plan/project report at GP level, through a committee of representatives' drawn from local level Mahatma Gandhi NREGA, agriculture, irrigation and water resources, Block/Union office and other need based key sectoral schemes may be formed, and this could be headed by an Mahatma Gandhi NREGA nodal official.

### District

District Level Coordination and Convergence Committee (DLCCC), headed by the District Collector/District Magistrate or Chief Development Officer (CDO)/CEO (ZP) shall coordinate, guide, approve, oversee and monitor projects at district level. This will have district level officials representing line departments responsible for implementing Mahatma Gandhi NREGA, WDC-PMKSY, Agriculture Department for RKVY; PMKSY-PDMC, Irrigation/Water Resources (PMKSY, Groundwater Recharge, Jal Jeevan Mission), and other key schemes to be converged. Representatives responsible for

implementing other need based schemes as per local needs of CWRM components may be co-opted from time to time. District convergence plan for CWRM is developed by aggregating village/GP/Block level interventions. Also, it needs to be ensured that all the locally relevant CWRM components are arranged and collated, gaps identified and opportunities listed for convergence with available schemes. For any additional funding gaps, possibilities of co-financing from CSR funds of private sector and philanthropy organizations, international funding sources and other such sources may be explored to top up the viable funding gap.

### State

At the state level, a coordination committee under the chairmanship of Additional Chief Secretary/Development Commissioner/APC/Principal Secretary RD/Commissioner Mahatma Gandhi NREGA with members from key line departments will provide overall policy directions and ensure coordination and convergence at the district level.

*Table 9* gives the suggested institutional arrangements.



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	Committee	Chairmen	Task
Centre	-	-	Uniform convergence guidelines
State	Coordination committee	Additional Chief Secretary/Development Commissioner/APC/Principal Secretary RD/Commissioner Mahatma Gandhi NREGA	Overall policy directions and ensure coordination and convergence at the district level
District	District Level Coordination and Convergence Committee (DLCCC)	District collector/Magistrate or Chief Development Officer (CDO)/CEO (ZP)	To coordinate, guide, approve, oversee and monitor projects at district level.  District convergence plan for CWRM is developed by aggregating village/ GP/Block level interventions
Village	GP level committee of representatives	Mahatma Gandhi NREGA nodal official	Action/work plan/project report drawn from local level Mahatma Gandhi NREGA, agriculture, irrigation & water resources, Block/union office and other need based key sectoral schemes may be formed

Table 9: Suggested Institutional Arrangement for Convergence

It is also very important to note that every central and state scheme has its own guidelines and operating procedures, and convergence of resources and institutions will need to keep that in consideration as to how best these can be harmonised. For this to happen smoothly, district and state level committees are expected to provide necessary guidance on merit of the case. Along with institutional arrangements, there is a need for:

- **One window/Single portal for reporting** - if all the line management officials report on a common portal about planning, initiation and progress/status, completion of work/activities, this could help in improved convergence. Maintaining dedicated web-based MIS system for

convergence in consultation with nodal Ministries/departments will be a useful option. This should clearly facilitate monitoring status of creating planned assets and providing services/activities under convergence plan of CRWM.

- **Capacity of institutions and human resources for convergence** - building capacity of field level staff, officials and implementing institutions is the most important and critical element to develop improved convergence. Best practices and case studies may be shared to improve their understanding and instil confidence for building climate resilience through convergence of water and related production systems within the framework of CRWM.

## 8.4 Challenges in Convergence

While institutional mechanisms for forging coordination is the main fulcrum of convergence, it is best with following challenges which need to be looked into for successful convergence.

- **Diverse vision and narrow disciplinary/sectoral thinking-** Though every single scheme has its specific objectives but majority of these have overarching goals of improving income, livelihood, improved natural resources, resilience, production, productivity and food security. It's also important to note the officials carry their disciplinary baggage and/or look at their works/activities from a sectoral angle with a narrow perspective. Therefore, it is important to educate and sensitise them to broader thinking and a holistic approach towards value proposition of synergised efforts and convergence with other relevant schemes to link **Means to Ends**. This will bring more impact and visibility to what they have otherwise been doing as standalone. This should thus lead to building a common perspective with clearly defined involvement and contribution to accomplish the ultimate goal of building resilience to climate change adaptation.
- **Lack of flexibility-** Non-uniform norms/provisions for implementation of similar types of works/ activities under different scheme guidelines is something that has to be worked with. At the same time of planning and implementing interventions, flexibility is required to accommodate changes as and when required within the scope of guidelines for convergence.
- **Sequencing and synchronisation of activities/works-** When a multitude of line departments are involved in implementing works/activities through convergence, it's critical to develop a proper schedule of work with time lines clearly spelling out the sequencing of works as implementation of activities are contingent upon each other and which one follows what. This is particularly very crucial in the case of implementing CRWM, firstly because of a short window of operation and secondly because of the sequence of activities. For instance, the construction of water harvesting and conservation system has to be followed by field preparation and crop sowing.
- **Lack of incentives for convergence-** Invariably all the scheme guidelines encourage convergence within their ambit. Yet, development of convergence is considered challenging. A reason for this, perhaps is the lack of incentive for line departments or their officials to follow convergence, unless made mandatory which is perhaps not the case. One option is to convince them that convergence brings more visibility and impact to what they are otherwise doing standalone, and this can be supported by sharing best practices and case studies/success stories. Another suggestion would be to have a special mention and weightage for convergence initiatives in their performance reporting.



- **Power structure and dynamics:** Line management is key for convergence. So if at the district level, there is a consensus building on common perspective, line management becomes easy with clear roles and this could take care of power dynamics to a desirable extent.
- **Political and social dynamics-** More often than not, there could be political and social factors that play out, sometimes in a subtle way and at times openly, at the village/GP level particularly in selecting and prioritising works and activities. But in

general, the cumulative experience of working in such situations do also suggest that if we strictly follow scientific reasoning/principles in planning works and activities related to CRWM including the type of interventions and their site selection/location within the scheme related guidelines, quite a lot of such conflicts of interest could be resolved. In some cases, this will have to be resolved through mediation by the senior level, and building some sort of consensus involving locally respected individuals.



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# CONCLUSION

Integrating the physical, institutional, social and economic capital is key for comprehensive development.

Climate change impact on the water cycle is likely to get amplified in agriculture-dependent developing economies like India; putting current water management practices and dependent communities at risk. With water being at the heart of climate change adaptation, we must relook at the way water is being managed to adapt to climate change and achieving Sustainable Development Goals. For this, the adoption of climate-resilient water management (CRWM) is crucial for India's 'water future'. Within this larger context, this report focuses on identifying CRWM interventions and mapping convergence and co-financing opportunities for executing them with existing institutional regimes.

Conceptual and analytical framework for identifying and mapping convergence and co-financing opportunities for CRWM consisted of a) identifying and defining CRWM components, b) identifying and mapping the most important government schemes and programmes with activities relating to CRWM, c) categorising schemes' recommended activities under respective CRWM components, d) rating of schemes based on the overall synergy with CRWM components and their total budget, e) building convergence and co-financing models for CRWM and f) suggesting institutional convergence. The

schemes were reviewed for their overall objectives, budget, synergy of provisioned activities with CRWM components and coverage (areas or population specific, if any). Also, opportunities of complementing resources from private organisations' CSR activities, NGOs and internationally funded projects are also identified and recommended. Overall, 30 national and 11 state specific schemes, were identified with components contributing to CRWM and reviewed. In addition, more than 15 private sector companies, 15 NGOs and 19 international and national funds were identified which provide the opportunity for cofinancing CRWM.

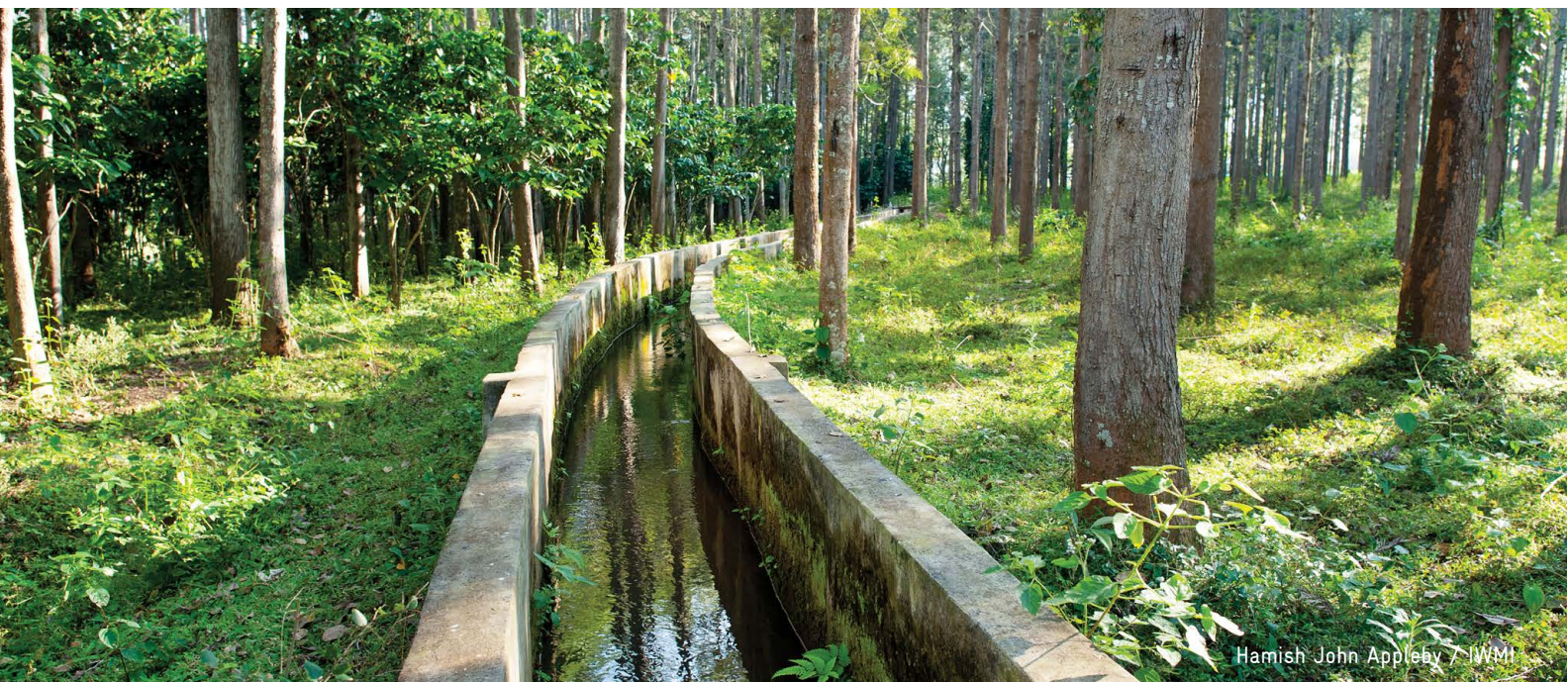
The key components of CRWM that have been considered and for which schemes are mapped include water resource assessment, water supply augmentation, demand management, water quality water management, and water risk management strategies to enhance resilience against droughts and floods. To make this holistic and connecting Means with Ends, cross-cutting interventions that focus on livelihood support including agriculture or income-enhancement, capacity development and co-management of inter-related sectors such as the water-energy-food-climate nexus have been recommended in the CRWM framework.

Often these involve policies and interventions *outside the water sector* but can have significant impact on water governance and climate resilience. Building capacity of individuals and institutions is also a key component of CRWM framework. Collaboration of the government with NGOs to facilitate CRWM activities capturing complementing opportunities from CSR funds, philanthropy foundations, and national and international funds is strongly recommended. Based on the identified convergence and co-financing opportunities, some potential convergence models for CRWM execution with a specific focus on WASCA project states are presented.

Integrating the physical, institutional, social and economic capital is key for comprehensive development. Development through institutional convergence is a must for implementing CRWM and it is not without challenges. It is important to have a vision and a holistic design which is flexible. Based on review of current convergence guidelines and existing institutional structure, institutional convergence framework for

institutionalising convergence for planning and implementation of CRWM is also suggested. Some of the key challenges in institutional convergence are highlighted which requires specific focus to overcome silo thinking and process.

Overall, analyses shows that convergence and co-financing opportunities exist across several government schemes and civil society initiatives. Further, convergence opportunities are best found where two or more inter-connected sectors/systems create complex problems. A prime example of this is the water-energy-food nexus – where interventions in any one of the three sectors can have significant consequences for the other two. Convergence and co-financing are not just opportunities but become inevitable, as silo interventions in one sector may not be successful or may even be counter-productive. While convergence has been the underlying *mantra* of a majority of development schemes and programmes and rightly so, as a way forward, it is recommended to employ and pilot the proposed CRWM framework in few selected districts of the WASCA project states. This feedback will further help in refining and fine tuning of the CRWM convergence and co-financing framework.



Hamish John Appleby / IWM



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# ANNEXURE A

## Summary of Central and State Level schemes

Tick mark indicates that the scheme has activities matching with specific CRWM component.

Scheme Name	Acronym	Ministry	Budget FY 2020-21 (in INR crore)	Geographical area focus*	CRWM Components**							
					WRA	WSA	WDM	WQM	FM	DM	VEA	CB/T/A
Central Schemes												
Atal Bhujal Yojana	ABhY	MoJS	6000	Yes	✓	✓	✓	✓		✓		✓
Flood management and border areas programme	FMBAP	MoJS	750	No	✓				✓			
Integrated scheme on agricultural marketing	ISAM	MoAFW	490	No							✓	
Jal Jeevan Mission	JJM	MoJS	11218	Yes		✓		✓				✓
Mahatma Gandhi National Rural Employment Guarantee Act	Mahatma Gandhi NREGA	MoRD	101500	No		✓	✓		✓	✓	✓	✓
Member of Parliament Local Area Development Scheme	MPLADS	MoSPI	3960	Yes		✓			✓			
Mahila Kisan Sashaktikaran Pariyojana-National Rural Livelihood Mission (MKSP – NRLM)	MKSP – NRLM	MoRD	1000	No					✓			✓
Namami Gange	Namami Gange	MoJS	800	Yes				✓				
National Food Security Mission	NFSM	MoAFW	2100	No		✓	✓		✓	✓	✓	✓
National Horticulture Mission	NHM	MoAFW	2300	Yes		✓	✓				✓	✓
National Hydrology Project	NHP	MoJS	200	No	✓							✓
National Mission on Agricultural Extension and Technology- Sub mission on Agriculture Extension	NMAET SMAE	MoAFW	1200	No	✓						✓	

Scheme Name	Acronym	Ministry	Budget FY 2020-21 (in INR crore)	Geographical area focus*	CRWM Components**							
					WRA	WSA	WDM	WQM	FM	DM	VEA	CB/T/A
Central Schemes												
National Mission on Agricultural Extension and Technology- Sub mission on Agricultural Mechanisation	NMAET SMAM	MoAFW	1000	No							✓	
National Mission on Agricultural Extension and Technology-Sub-mission on Seed and Planting Material	NMAET SMSP	MoAFW	379	No							✓	
National Mission on Sustainable Agriculture-Param paragat Krishi Vikas Yojana	NMSA-PKVY	MoAFW	500	No							✓	
National Mission on Sustainable Agriculture-Rainfed Area Development and Climate Change	NMSA-RADP	MoAFW	203	Yes							✓	
National project on Soil Health and Fertility	NPSHF	MoAFW	315	No							✓	
National River Conservation Plan	NRCD	MoJS	1060	Yes				✓				
PM Adarsh Gram Yojana	PMAGY	MoSJE	700	Yes				✓				
PM Fasal Bima Yojana	PMFBY	MoAFW	15695	Yes					✓	✓		
PM Kaushal Vikas Yojana	PMKVY	MoSDE	2726	No		✓						✓
PM Kisan Sampada Yojana	PMKSaY	MoFPI	1081	No							✓	
PM Krishi Sinchayee Yojana -Accelerated Irrigation Benefit Programme	PMKSY-AIBP	MoJS	1798	Yes		✓						✓
PM Krishi Sinchayee Yojana -Per Drop More Crop	PMKSY-PDMC	MoAFW	4000	No			✓				✓	✓
PM Krishi Sinchayee Yojana-Har Khet Ko Pani	PMKSY-HKKP	MoJS	1050	No		✓	✓					
Rashtriya Gram Swaraj Abhiyan	RGSA	MoPR	857	Yes								✓



Scheme Name	Acronym	Ministry	Budget FY 2020-21 (in INR crore)	Geographical area focus*	CRWM Components**							
					WRA	WSA	WDM	WQM	FM	DM	VEA	CB/T/A
Central Schemes												
Rashtriya Krishi Vikas Yojana- Remunerative Approaches for Agriculture and Allied Sector Rejuvenation	RKVY- RAFTAAR	MoAFW	3700	No		✓			✓	✓	✓	✓
River Basin Management	RBM	MoJS	200	No	✓				✓			
Swachh Bharat Abhiyan-Gramin	SBA-G	MoJS	9994	No				✓				
Watershed Development Component- PM Krishi Sinchayee Yojana	WDC- PMKSY	MoRD	2000	Yes		✓					✓	✓
Rajasthan												
Mukhyamantri Jal Swavlamban Abhiyan	MJSA	DoWR	124	Yes		✓	✓				✓	
Karnataka												
Jalamrutha	-	DoRD&PR	500 <sup>a</sup>	Yes		✓	✓				✓	✓
Krishi Bhagya Scheme	KBS	DoA	45 <sup>a</sup>	Yes		✓	✓				✓	
Suvarna Gramodaya Yojana	SGY	DoRD&PR	438 <sup>b</sup>	NA		✓	✓				✓	✓
Madhya Pradesh												
Khet Tirtha Yojana	KTY	DoA	17	No								✓
Tamil Nadu												
Kudimaramath scheme	-	PWD	300	No		✓						
Tamil Nadu Irrigated Agriculture Modernisation (TN-IAM)	TN-IAM	WRO, PWD and GoTN	235	Yes		✓	✓				✓	✓
Rainwater Harvesting and Runoff Management Programme	RHRMP	DoA	120 <sup>a</sup>	Yes		✓						
Mission on Sustainable Dryland Agriculture	MSDA	AED	292	Yes		✓						
Uttar Pradesh												
State Groundwater Conservation Mission	SGCM	DoGW	80	Yes		✓	✓				✓	✓
UP Water Sector Restructuring Project-phase II	UPWSRP-2 (2013-2020)	DoIWR	2835 <sup>c</sup>	Yes		✓					✓	✓

Notes:

\* Indicates whether scheme focus on specific geographical area or states. No means scheme is applicable pan India.

\*\* WRA: Water Resource Assessment; WSA: Water Supply Augmentation; WDM: Water Demand Management; WQM: Water Quality Management; FM: Flood Management; DM: Drought Management; VEA: Value Enhancing Activities; CB/T/A: Capacity Building/Training/Awareness

<sup>a</sup>for 2019-20, <sup>b</sup>2015-16, <sup>c</sup>2013-2020

# ANNEXURE B

## Geographical Focus Areas of Schemes

Scheme/ Programme	Ministry/ Department	Geographical focus areas	Budget FY 2020-21 (in crore INR)
Central Schemes			
ABHY	MoJS	Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan, and Uttar Pradesh	6000
FMBAP	MoJS	All states along with Ganga, Brahmaputra, Kosi embankment in Nepal, Ichhamati, Dibang and Lohit river basin	750
ISAM	MoAFW	No	490
JJM	MoJS	Quality affected areas, DPAP, DDAs, Aspirational districts, Sansad Gram Panchayat Yojana villages, Revenue Villages, etc.	11218
Mahatma Gandhi NREGA	MoRD	100% urban populated districts exempted	101500
MPLADS	MoSPI	SC & ST dominant areas and calamity affected areas	3960
Namami Gange	MoJS	River Ganga and its tributaries	800
National River Conservation Plan <sup>13</sup>	MoJS	River Ganga and its tributaries; any polluted stretches of river	1060
NFSM	MoAFW	No	2100
NHM	MoAFW	NHM aims to cover all states except North East and Himalayan Region as it comes under Horticulture mission for the North East and Himalayan states	2300
NHP	MoJS	No	200
NMAET-SMAE	MoAFW	No	1200
NMAET-SMAM	MoAFW	No	1000
NMAET-SMSP	MoAFW	No	379
NMSA-PKVY	MoAFW	Not area-specific; gives priority to small and marginal farmers and women farmers	500
NMSA-RADP	MoAFW	Only selected arid, semi-arid, sub-humid and humid (<30% cultivated area under irrigation) districts	203
NPSHF	MoAFW	No	315
PM-KUSUM	MNRE	No	1000
PMAGY	MoSJE	PMAGY focuses on SC dominant areas. Usually a certain number of SC majority Villages will be taken up for integrated development during a certain phase of the programme. e.g. in the Pilot Phase, 1000 villages were chosen for funding and in the Phase-I, 1500 villages were chosen under PMAG	700

<sup>13</sup>Provision is for National River Conservation Programme relating to River Ganga and its tributaries. Under this programme, World Bank assisted projects under National Ganga River Conservation Authorities are executed as National Mission for Clean Ganga.

Scheme/ Programme	Ministry/ Department	Geographical focus areas	Budget FY 2020-21 (in crore INR)
PMFBY	MoAFW	No	15695
PMKsaY	MoFPI	No	1081
PMKSY-AIBP	MoJS	To bridge the requirement of funds for completion of the identified (presently 99) irrigation projects	1798
PMKSY-HKPP	MoJS	PMKSY-HKPP is not area-specific yet it gives priority to small/medium farmers and SC/ST population	1050
PMKSY-PDMC	MoAFW	No	4000
PMKVY	MoSDE	No	2726
RBM	MoJS	No	200
RGSA	MoPR	117 Aspirational districts	857
RKVY-RAFTAAR	MoAFW	No	3700
SBA-G	MoJS	No	9994
WDC-PMKSY	MoRD	Cluster of micro-watersheds of area of about 5000 ha in rainfed/degraded areas having no assured irrigation	2000
Rajasthan			
MJSA	DoWR	MJSA prioritises villages under certain criteria such as villages having IWMP/other watershed project, bad water quality, lack of drinking water supply, water deficit areas, rainfed agriculture dominant, Adarsh villages under Chief Minister, MP, MLA & other schemes, etc.	124
Madhya Pradesh			
Jalamrutha	DoRD&PR	Jalamrutha only covers rural areas	300
KBS	DoA	Rainfed areas, coastal and Malnad areas- 25 districts are covered	45
SGY	DoRD&PR	NA	438
Tamil Nadu			
Kudimaramath scheme	PWD	No	500
RHRMP	DoAE	All Districts (except Chennai and The Nilgiris) under the Rural Infrastructure Development fund of NABARD	120
MSDA	AED	Cuddalore, Villupuram, Vellore, Tiruvannamalai, Salem, Namakkal, Dharmapuri, Krishnagiri, Coimbatore, Tiruppur, Erode, Karur, Tiruchirapalli, Pudukottai, Ariyalur, Perambalur, Madurai, Dindigul, Virudhunagar, Sivagangai, Ramanathapuram Tirunelveli Thoothukudi, Tiruvallur, Thanjavur and Tiruvarur districts.	292
TN-IAM	WRO, PWD and GoTN	66 sub basins in Tamil Nadu state	235
Uttar Pradesh			
SGCM	DoGW	Bundelkhand and Vindhyan area-54; exploited, critical, semi critical groundwater areas-217 and 22 cities	80
UPWSRP-2 (2013-2020)	DoIWR	Areas covered under UPWSRP are Lower Ganga Canal system, Haidargarh branch and Rohini, Jamni and Sajnam dam canal system	2835



# ANNEXURE C

## Annexure C1: Schemes with water resource assessment component and their activities

Schemes	Ministry/ Department	Budget FY 2020-21 (in crore INR)	Activities
Central schemes			
ABhY	MoJS	200	Monitoring and disseminating groundwater data, aquifer mapping
FMBAP	MoJS	750	Flood forecasting, hydrological modelling
NHP	MoJS	200	Under 3 key components <i>i.e.</i> water resource monitoring system, water resource information systems and water resource operation and planning system, activities supported include water resource assessment tools, ground water modelling, digital technology for river basin and investment planning, measurements of stream flow, groundwater and water storage, hydro-informatics centres for hydrological modelling, strengthening of India's water resources information systems and regional /state water resources information systems
RBM	MoJS	200	Mapping river migration zones

## Annexure C2: Schemes with supply augmentation and their activities

Schemes Programme	Ministry/ Department	Budget FY 2020-21 (in crore INR)	Activities
Central Schemes			
ABhY	MoJS	200	water harvesting and artificial recharge, surface water harvesting are key components under which following activities are undertaken: piped irrigation networks in canal command areas, check dams, percolation tanks & desilting tanks, recharge shafts/wells/ trenches/bunds, rooftop surface water harvesting, stormwater harvesting structures, farms ponds/farm ditches

Schemes Programme	Ministry/ Department	Budget FY 2020-21 (in crore INR)	Activities
JJM	MoJS	11218	dedicated bore well recharge structures, rain water recharge, rejuvenation of existing water bodies, building canals and canal channels, canal networks, functional household taconnections/ drinking water supply
Mahatma Gandhi NREGA	MoRD	101500	contour trenches, contour bunds, boulder checks, gabion structure, underground dykes, earthen dam, stop dam, farm pond, dug well, spring shed development activities, renovation of traditional water bodies, de-silting of tanks
MPLADS	MoSPI	3960	rain water harvesting structures, boring construction, handpumps, tubewells, water tanks, water tankers, lift irrigation, culverts, rainwater harvesting parks, public groundwater recharging facilities, piped water supply
NFSM	MoAFW	2100	community and field ditches linking natural drains, water harvesting structures, ponds, tanks, site specific rain water management activities, water carrying pipe
NHM	MoAFW	2300	community tanks, farm ponds, reservoirs with plastic/RCC lining, water harvesting system for individuals, pond, dug wells, tube wells
PMKSY-AIBP	MoJS	1798	Through Long Term focus on faster completion of ongoing Major and Medium Irrigation Irrigation Fund including National Projects (LTIF) in NABARD
PMKSY-HKKP	MoJS	1050	water bodies restoration, rainwater harvesting structures, groundwater recharge structures, water storage structures, water distribution network, command area development, creation of new water sources through Minor Irrigation (both surface and ground water), Diversion of water from source of different location where it is plenty to nearby water scarce areas, lift irrigation from water bodies/rivers at lower elevation to supplement requirements
RKVY-RAFTAAR	MoAFW	3700	community tanks, farm ponds, plastic/RCC lining/water storage structures on farm, terracing, gully control measures, spill ways, check dams, diversion drains and spurs, protection walls, percolation and minor irrigation tanks
PMKSY-WDC	MoRD	2000	ridge area treatment, drainage line treatment, rain water harvesting, in-situ moisture conservation, check dams, nalabund, farm ponds, tanks; Converging with Mahatma Gandhi NREGA for creation of water potential in identified backward rainfed blocks including renovation of traditional water bodies; Effective rainfall management like field bunding, contour bunding/trenching, staggered trenching, land levelling, mulching etc.
Rajasthan			
MJSA	DoRD&PR	124	water harvesting structures, groundwater recharge structures, farm ponds, ponds, percolation tanks, river channelling, bunds, gabion, tanks, check dams, drain widening, nala bunds, water structure restoration

Schemes Programme	Ministry/ Department	Budget FY 2020-21 (in crore INR)	Activities
Karnataka			
Jalamrutha	DoRD&PR	300	check dams, reservoir, small irrigation ponds, bunds, barrage dam, farm ponds, rejuvenation of water bodies, rainwater harvesting
KBS	DoA	250	farm ponds, rainwater conservation practices
SGY	DoRD&PR	438	irrigation tanks and canals developed/restored, water supply for drinking purposes, check dams
Tamil Nadu			
Kudimaramath scheme	PWD	300	tank restoration, farm pond, canals, repair/ reconstruction of sluices/wedges, desiltation of canals etc
RHRMP	DoAE	120	percolation tanks, check dams, farm ponds, village tanks/ooranies, recharge shaft
MSDA	AED	292	Construction of Water Harvesting Structures like Check dams, village ponds, community Ponds, Sunken Ponds, Deepening of Ooranies in the dryland.
TN-IAM	WRO, PWD and GoTN	235	the expected works will include modernization of control structures (diversion weirs), supply channels, cross-masonry structures, construction of recharge well structures and strengthening and up gradation of tank bunds, installation of flow measurement, up gradation of distribution systems(OFD), and improvements of irrigation and drainage canals, and introduction of modern quality testing devices to determine soil compaction parameters as well as the modern quality testing devices for meticulously maintaining the specified cover to reinforcement steel in the construction of reinforced concrete structures for their long-term durability
Uttar Pradesh			
SGCM	DoGW	80	check dams, ponds, peripheral bunds, ground water recharge structures, farm ponds, contour bunds, trenching, gabion, renovation of water bodies
UPWSRP-2 (UP work for Water Sector Restructuring Project-Phase II)	DoIWR	2835	canal renovation, water drainage network for irrigation, restoration dam canal system, barrage modernisation, lake restoration for rain water harvesting, check dams



## Annexure C3: Schemes with demand management and their activities

Scheme/ Programme	Ministry/ Department	Budget FY 2020-21 (in crore INR)	Activities
ABHY	MoJS	200	Introducing bottom-up planning of groundwater interventions through community-led Water Security Plan (WSPs); improving government spending through the planning process; and implementing participatory groundwater management, including both supply and demand side measures. WSP to include: improved irrigation technologies, managing energy-irrigation nexus, groundwater metering, water-efficient technologies at community level; crop management and diversification
Mahatma Gandhi NREGA	MoRD	101500	construction of canal, distributary & minor: lining of canals; correction of water conveyance system, system deficiencies above outlet up to distributaries, community micro irrigation system
NFSM	MoAFW	2100	sprinkler irrigation systems, drip irrigation systems, laser land levelling, mobile rain guns, direct seeded rice
NHM	MoAFW	2300	drip irrigation, sprinkler, mulching
PMKSY-PDMC	MoAFW	4000	micro sprinklers, mini sprinklers, drip irrigation systems, semi-permanent sprinkler irrigation systems, rain gun, topping up of input cost particularly under civil construction beyond permissible limit (40%), under Mahatma Gandhi NREGA for activities like lining inlet, outlet, silt traps, distribution system
PMKSY-HKKP	MoJS	1050	improvement in water management and distribution system, At least 10% of the command area to be covered under micro/precision irrigation.
Rajasthan			
MJSA	DoRD&PR	124	Micro-irrigation tanks, drip and solar pumps, water budgeting
Karnataka			
Jalamrutha	DoRD&PR	500	water efficiency through micro irrigation
KBS	DoA	250	micro-irrigation
SGY	DoRD&PR	438	sprinkler and drip irrigation system
Tamil Nadu			
TN-IAM	WRO, PWD and GoTN	235	concrete lining of irrigation channels in a short reach downstream of the irrigation sluice, desilting irrigation channels, construction in concrete of a measuring device of cut-throat flume type
Uttar Pradesh			
SGCM	DoGW	80	drip/ sprinkler systems, field bunding, gully plug

## Annexure C4: Schemes with quality management and their activities

Scheme/ Programme	Ministry/ Department	Budget FY 2020-21 (in crore INR)	Activities
Central Schemes			
ABhY	MoJS	200	community level groundwater quality monitoring; to planning and monitoring of groundwater quality; Interventions related to groundwater quality will be restricted to monitoring and dissemination of groundwater quality data; community level groundwater quality monitoring
JJM	MoJS	11218	water quality monitoring; treatment, testing, monitoring; Grey water management, water treatment plant (in case, source is quality-affected), Drinking water quality monitoring and water quality
Namami Gange	MoJS	800	sewage treatment infrastructure, river-surface cleaning, industrial effluent monitoring, riverfront development activities
NRCP	MoJS	1060	Interception and diversion works to capture the raw sewage flowing into the river through open drains and divert them for treatment, Sewage Treatment Plants for treating the diverted sewage, low cost sanitation works to prevent open defecation on riverbanks, Electric Crematoria and Improved Wood Crematoria to conserve the use of wood and help in ensuring proper cremation of bodies brought to the burning ghats, riverfront development works such as improvement of bathing ghats
PMAGY	MoSJE	700	safe drinking water supply
SBA-G	MoJS	9994	construction of Individual Household Latrines; Community Sanitary Complexes comprising of an appropriate number of toilet seats, bathing cubicles, washing platforms, wash basin; Solid and Liquid Waste Management. Under liquified waste management: For treatment of waste water, the following technologies, inter-alia, may be considered: a. Waste Stabilization Pond technology b. Duckweed based waste water treatment c. Phytoid Technology (developed by NEERI) d. Anaerobic decentralized waste water treatment

## Annexure C5: Schemes with flood management and their activities

Scheme/ Programme	Ministry/ Department	Budget FY 2020-21 (in crore INR)	Activities
Central Schemes			
FMBAP	MoJS	750	critical flood control, river management and anti-sea erosion works in the entire country would be covered. These works would include the works related to river management, flood control, anti-erosion, drainage development, flood proofing, flood prone area development programme in critical regions, restoration of flood control/management works damaged due to force majeure like conditions, anti-sea erosion and catchment area treatment.
Mahatma Gandhi NREGA	MoRD	101500	flood control and protection works including drainage in water logged areas, deepening and repairing of flood channels, chaur renovation, construction of storm water drains for coastal protection; Diversion channel, Peripheral bunding, Drainage in water logged areas, Construction of intermediate and link drains, Spurs and torrent control measures, Bio-drainage.
MPLADS	MoSPI	3960	embankments, early warning systems, community centres, common shelters for cyclones, floods,
NFSM	MoAFW	2100	flood resistant high yield variety seeds
PMFBY	MoAFW	15695	crop insurance
RKVY-RAFTAAR	MoAFW	3700	flood-tolerant seeds
RBM	MoJS	200	upstream dams, floodplain zoning, vegetative measures, flood risk maps



## Annexure C6: Schemes with drought management and their activities

Scheme/ Programme	Ministry/ Department	Budget FY 2020-21 (in crore INR)	Activities
Central Schemes			
ABhY	MoJS	200	develop climate resilient agricultural practices to drought proof crops, crop diversification (drought & salt resistant crops)
Mahatma Gandhi NREGA	MoRD	101500	drought proofing including afforestation and tree plantation
NFSM	MoAFW	2100	drought resistant high yield variety seeds
PMFBY	MoAFW	15695	crop insurance
RKVY-RAFTAAR	MoAFW	3700	stress-tolerant varieties

## Annexure C7: Schemes having value enhancing component and their activities

Scheme/ Programme	Ministry/ Department	Budget FY 2020-21 (in crore INR)	On-farm interventions (inside farm)	Non-farm interventions (outside farm)
Central Schemes				
ISAM	MoAFW	490		Warehouses, godowns, primary processing infrastructure such as cleaning, cutting, de-podding, de-cortication, bleaching, grading, sorting, packing, labelling, waxing, ripening, chilling, pasteurization, homogenization, freezing, refrigeration etc., ancillary/supporting infrastructure like parking sheds, internal roads, garbage disposal arrangements, boundary walls, drinking water etc., market related extension, e-trading infrastructure, mobile infrastructure for post-harvest operations viz. grading, packaging, quality testing etc., agribusiness ventures

Scheme/ Programme		Ministry/ Department	Budget FY 2020-21 (in crore INR)	On-farm interventions (inside farm)	Non-farm interventions (outside farm)
Mahatma Gandhi NREGA		MoRD	101500	Horticulture, plantation, nursery, composting structures, infrastructure for liquid bio manure, fish drying yard, livestock shelter, infra for azola cultivation(fodder), grasslands, bamboo, rubber and coconut plantation, perennial grass plantation(e.g.stylo, vertiver, etc), fodder trough for cattle	Workshed for livelihood activities, food grain storage
NFSM		MoAFW	2100	HYV seeds, demonstration of certified seed production, bio-fertilizers, plant protection chemicals, weedicides, bee keeping in arhar, city compost, promotion of arhar on rice bunds, promotion of plantation crops on bunds, demonstration kits	Godowns
NHM		MoAFW	2300	Nursery, establishment of new gardens, mushroom production, beekeeping, horticulture mechanization (power tillers), on-farm collection and storage units, spawn production and compost making units, construction of green houses, shade net house, plastic mulching, plastic tunnels, anti-bird/ hail nets	Markets, post-harvest management facilities, food processing units, tissue culture units, seed infrastructure like drying platform, storage bins, packaging unit and related equipment
NPSHF		MoAFW	315	Promoting use of Integrated Nutrient Management organic manuring, soil amendments (lime/ basic slag) in acidic soils, distribution of micro- nutrients.	Soil testing laboratories, Fertilizer Quality Control Laboratories
NMAET		MoAFW			
NMAET	SMSP	MoAFW	379	Repair, purchase of farm machinery & equipment	Seed testing labs, equipment for seed testing laboratories, renovation of seed testing laboratory, equipment for DNA finger printing / varietal purity-testing laboratory, specialised seed health testing units, seed processing plant, seed processing machinery/supporting equipment etc, seed storage godown, construction of building, receiving shed, drying platform, etc
NMAET	SMAE	MoAFW	1200	Personnel trained under Agri-Clinics and	Agri-Business Centres Scheme (ACABC) and Diploma in Agriculture Extension Services for Input Dealers (DAESI) will also provide extension services to the farmers, mobile based services, Kisan Call Centres (KCCs) etc. will be used and convergence brought among extension efforts under different programmes and schemes at village level through the institution of ATMA (Agriculture Technology Management Agency) and Block Technology Teams (BTTs).

Scheme/ Programme		Ministry/ Department	Budget FY 2020-21 (in crore INR)	On-farm interventions (inside farm)	Non-farm interventions (outside farm)
NMAET SMAM		MoAFW	1000	Farm mechanisation through custom hiring, mechanization of selected villages, subsidy for procurement of machines & equipment, farm machinery banks, post-harvest technology distribution and management	
NMSA		MoAFW			
NMSA	PKVY	MoAFW	500	<p>Model Organic Cluster Demonstrations: Conversion of land into organic, Integrated Manure Management, Custom Hiring Centres, Packing, Labelling and Branding of produce</p> <p>Model Organic Farm practices: Vermi-compost, manure management, bio-fertilisers, input distribution to local groups and organic farmers, soil sampling for residue testing, biological nitrogen harvesting</p>	Under Model organic farm practices: organic input production units, organic fairs,
NMSA	RAD	MoAFW	203	Vermicomposts, farm mechanisation inputs such as seeds, fertilizers, manure, plant nutrients etc, horticulture, livestock, fishery, apiculture etc. mushroom, medicinal & aromatic plantation, on farm development such as silage making, seed bank, seed production, green house, low tunnel polyhouse, lining of ponds/wells constructed under Mahatma Gandhi NREGA, water lifting devices (solar, electric, diesel) Besides, soil test/soil health card based nutrient management practices, farmland development, resource conservation and crop selection conducive to local agro climatic condition will also be promoted.	Storage/packing/processing units
PMKSY-PDMC		MoAFW	4000	Fertigation, solar pumps	
PMKsAY		MoFPI	1081		Food processing units, cold chains, pack houses, pre-cooling units, ripening chamber, transport infra, reefer trucks/ mobile pre-cooling trucks, deep freezers/ frozen storage, ware houses, site development, testing laboratories, cleaning grading, sorting and packing facilities, minimal processing facilities for agri-horti produce, milk chilling centres, training centres, institutional strengthening, temperature controlled solar powered retail carts



Scheme/ Programme	Ministry/ Department	Budget FY 2020-21 (in crore INR)	On-farm interventions (inside farm)	Non-farm interventions (outside farm)
RKVY-RAFTAAR	MoAFW	3700	Green house/poly house/shade net house infrastructures, nurseries, vermi compost units, solar pumps, solar drying, solar energy in green house, distribution of farm equipment, bio-pesticide, poultry farms, cattle feed units, dairy assisting equipment, breeding farms, nursery	Tissue culture labs/units, soil and pest testing labs, ATMA infrastructure, establishment/strengthening of bio-fertiliser production units, seed processing facilities and seed storage godowns, construction/maintenance of godowns and warehouse, vaccine production unit, milk processing units, cold storage, fish ponds/reservoirs, post harvesting technology units, kisan call centres, infrastructure for azola production, infra for hydroponic fodder, feed processing units, fodder block making
PMKSY-WDC	MoRD	2000	Nursery raising, afforestation, horticulture, pasture development, livelihood activities	
Karnataka				
Jalamrutha	DoRD&PR	500	Afforestation	
KBS	DoA	250	Shadenets, fencing	
SGY	DoRD&PR	438	Manure pits, horticulture, dairy farming, agro-forestry, sericulture	Construction of drains, community halls, agro-service centres
Tamil Nadu				
TN-IAM	WRO, PWD and GoTN	235	Agricultural intensification and Diversification: a) promoting cultivation of short duration, high yielding, drought-, pest- and disease-tolerant crops/varieties of pulses, maize, oilseeds, millets, vegetables and fruits; (b) installation of micro irrigation drip and fertigation systems; and (c) promoting water saving agronomic practices like the system of rice intensification and the sustainable sugarcane initiative	Improving alternative livelihood sources through livestock and inland aquaculture; and Marketing, value-addition and post-harvest management
Uttar Pradesh				
UPWSRP-2	DoIWR	2835	Timely irrigation for improved agriculture, poultry, fisheries	
SGCM	DoGW	80	Promotion of low water consuming seeds	

## Annexure C8: Schemes with capacity building component and their activities

Scheme/ Programme	Ministry/ Department	Budget FY 2020-21 (in crore INR)	Activities	
			For Institutions	For Beneficiaries
Central Schemes				
ABhY	MoJS	200	Activities will include building institutional capacity at the central and state levels by adequate training provision. At the local level, the GPs will be trained in technical matters related to participatory groundwater management.	Farmer field schools, training community for self-governance and regulation
JJM	MoJS	11218	Training to project team, organizing workshops/ seminars/ symposia, exposure visits, support to village level institutional arrangement, water testing laboratories	Capacity building for masons, pump operators, plumbers, electricians, motor mechanics, etc. for construction and operation & monitoring
Mahatma Gandhi NREGA	MoRD	101500	Training of field staff at the block, cluster and GP; classroom training to contractual/ field staff by the regular & senior field staff	
NFSM	MoAFW	2100	Orientation training progs for functionaries, supervisors and officers	Farmer fairs and exhibitions, orientation training progs for farmers, demonstration of farm machine technology and marketing infrastructure
NHM	MoAFW	2300	Exposure visits and training to field functionaries and technical staff, training programme for supervisors, entrepreneurs	Training programme for farmers
NHP	MoJS	200	Institutional capacity enhancement, customized training, workshops for knowledge exchange and professional networking; centres of excellence (national as well as regional):  (i) water resources knowledge centres, (ii) professional development, (iii) project management, and (iv) operational support	

Scheme/ Programme	Ministry/ Department	Budget FY 2020-21 (in crore INR)	Activities	
			For Institutions	For Beneficiaries
PMKVY	MoSDE	2726	The Short Term Training imparted at PMKVY Training Centres for school/college dropouts or unemployed, training in Soft Skills, Entrepreneurship, Financial and Digital Literacy; individuals with prior learning experience or skills shall be assessed and certified under the Recognition of Prior Learning component of the Scheme; facilitate trainings in special areas and/or premises of Government bodies, Corporates or Industry bodies, and trainings in special job roles not defined under the available Qualification Packs/National Occupational Standards	
PMKSY-AIBP	MoJS	1798		Training trails, demonstrations, resources
PMKSY-PDMC	MoAFW	4000	Extension activities and training for promotion of scientific moisture conservation and agronomic measures, campaigns, workshops, conferences	Training of beneficiaries for system operation
RGSA	MoPR	857	Capacity building of PRIs including Trainings/workshops, administrative and technical support including e-enablement of GPs, and GP buildings; E-enablement of PRIs for citizen centric service delivery and governance in Panchayats; Develop governance capabilities of PRIs to deliver on the SDGs.  • Enhance capabilities of Panchayats for inclusive local governance with focus on optimum utilization of available resources and convergence with other schemes to address issues of national importance.  • Enhance capabilities of Panchayats to raise their own sources of revenue.  • Strengthen Gram Sabhas to function effectively as the basic forum of people's participation, transparency and accountability within the Panchayat system.	

Scheme/ Programme	Ministry/ Department	Budget FY 2020-21 (in crore INR)	Activities	
			For Institutions	For Beneficiaries
RKVY-RAFTAAR	MoAFW	3700	Skill development workshops, media publicity for promotion of skill development, handholding support, training and skill development to KVKs, state institutions	Training and demonstration
PMKSY-WDC	MoRD	2000		Training, trials, demonstrations, micro enterprises for small and marginal farmers
Rajasthan				
MJSA	DoRD&PR	124	Workshop and training to district officers and other stakeholders	
Madhya Pradesh				
KTY	DoA	17		Exposure visits and training for progressive farmers
Karnataka				
Jalamrutha	DoRD&PR	500		Awareness campaign
SGY	DoRD&PR	438		Trainings on vermicomposting, dairy management, goat and sheep rearing and non-agricultural activities,
Tamil Nadu				
TN-IAM	WRO, PWD and GoTN	235	Strengthening WRD and related agencies for water resources management, including the State Water Resources Management Agency (SWaRMA), Institute for Water Studies (IWS) and State Ground Water and Surface Water Data Center (SG&SWRDC), this will include technical assistance equipment, services and institutional infra-structure to support data collection and analysis, building a modern knowledge base development of modern ICT enabled knowledge products and services, training, policy analysis and partnerships to support awareness building, institutional synergy and decision support  (i) Mainstreaming of Participatory irrigation management approach within WRD  (ii) Establishing new WUAs under TNIAM and strengthening their capacities  (iii) Existing WUAs to undergo intensive training on asset maintenance, operation and management of canals within their command areas	Communication Training and Capacity Building: Trainings and capacity building activities will be organized for 96,600 farmers; 78,000 farmers will be trained in the latest crop production technologies and 900 farmers will be involved in exposure visits to other states and countries
Uttar Pradesh				
UPWSRP-2	DoIWR	2835		Awareness campaign, demonstration/ training at field level to improve agricultural productivity
SGCM	DoGW	80	Oriental workshops	



# ANNEXURE D

## Agencies undertaking water resource assessment

Agencies	Ministry	Activities	Budget FY 2020-21 (in crore INR)
Central Ground Water Board (CGWB)	MoJS	Exploration and assessment of groundwater resources, monitoring of groundwater, policy guidelines on planning and management	245
Central Water Commission (CWC)	MoJS	Surface water (rivers) data collection, survey and investigation, hydrological observations and studies, maintenance of flood forecasting, warning centres	411
National Institute of Hydrology (NIH)	MoJS	Hydrological modelling and forecasting	25
India Meteorological Department (IMD)	MoES	Meteorological observations stations and forecasting sector-specific weather forecasts	443
Indian Space Research Organisation (ISRO)	MoES	National natural resource management, satellite mapping of resources, disaster management support	194

# ANNEXURE E

## List of Potential Private Sector Partnership having synergy with CRWM

Project States	Private Companies	CRWM Components				Overall CSR Budget (in crore INR) FY 2019-20
		Water Management (Supply, demand, assessment)	Water risk management (floods or drought)	Value enhancing activities	Capacity Building	
Rajasthan	Cairns India	✓				NA
	Dalmiabharat	✓				2
	Shree Cements	✓				30
	Chambal Fertilizers and Chemicals Ltd	✓		✓	✓	14
	ITC Rural Development Trust	✓	✓	✓	✓	339
	Hindustan Zinc Limited	✓				221
	Shree Cements	✓				30
	AXIS Bank	✓		✓		84
	IndusInd Bank	✓				99
	Bharat Petroleum Corporation	✓		✓	✓	218
	UltraTech Cements Ltd	✓	✓	✓	✓	71
	HDFC Foundation	✓			✓	261
	NTPC Limited	✓				247
	Larsen & Toubro Ltd (L&T)	✓			✓	155
Madhya Pradesh	HDFC Foundation	✓			✓	261
	AXIS Bank	✓		✓		84
	HUL Foundation	✓			✓	148
	Lupin	✓				55
	ITC	✓	✓	✓	✓	339
	National Mineral Development Corporation Ltd	✓		✓		167
Karnataka	HDFC Foundation	✓			✓	261
	UltraTech Cements Ltd	✓	✓	✓	✓	71

Project States	Private Companies	CRWM Components				Overall CSR Budget (in crore INR) FY 2019-20
		Water Management (Supply, demand, assessment)	Water risk management (floods or drought)	Value enhancing activities	Capacity Building	
Karnataka	Bharat Petroleum Corporation	✓		✓	✓	218
	Dalmia Bharat	✓				2
	Wipro Ltd	✓				185
	ITC	✓	✓	✓	✓	339
	National Mineral Development Corporation Ltd	✓		✓		167
Tamil Nadu	Oil and Natural Gas Corporation Ltd (ONGC)	✓				627
	Bharat Petroleum Corporation	✓		✓	✓	218
	ITC Limited- Integrated water shed programme	✓	✓	✓	✓	339
	NLC India Limited	✓				52
	TVS groups of Companies					
	Dalmiabharat	✓				2
	ICICI Bank	✓				150
	AXIS Bank	✓		✓		84
	Larsen & Toubro Ltd (L&T)	✓			✓	155
	Hindustan Petroleum Corp Ltd	✓				184
	Chambal Fertilizers and Chemicals Ltd	✓		✓	✓	14
Uttar Pradesh	Jubilant Foodworks Ltd			✓		6
	Standard Chartered Finance Pvt Ltd	✓				NA
	My Healthscape medicals private limited	✓		✓		NA
	Coca-Cola India Foundation	✓		✓		17
	Container Corporation Ltd			✓	✓	37

# ANNEXURE F

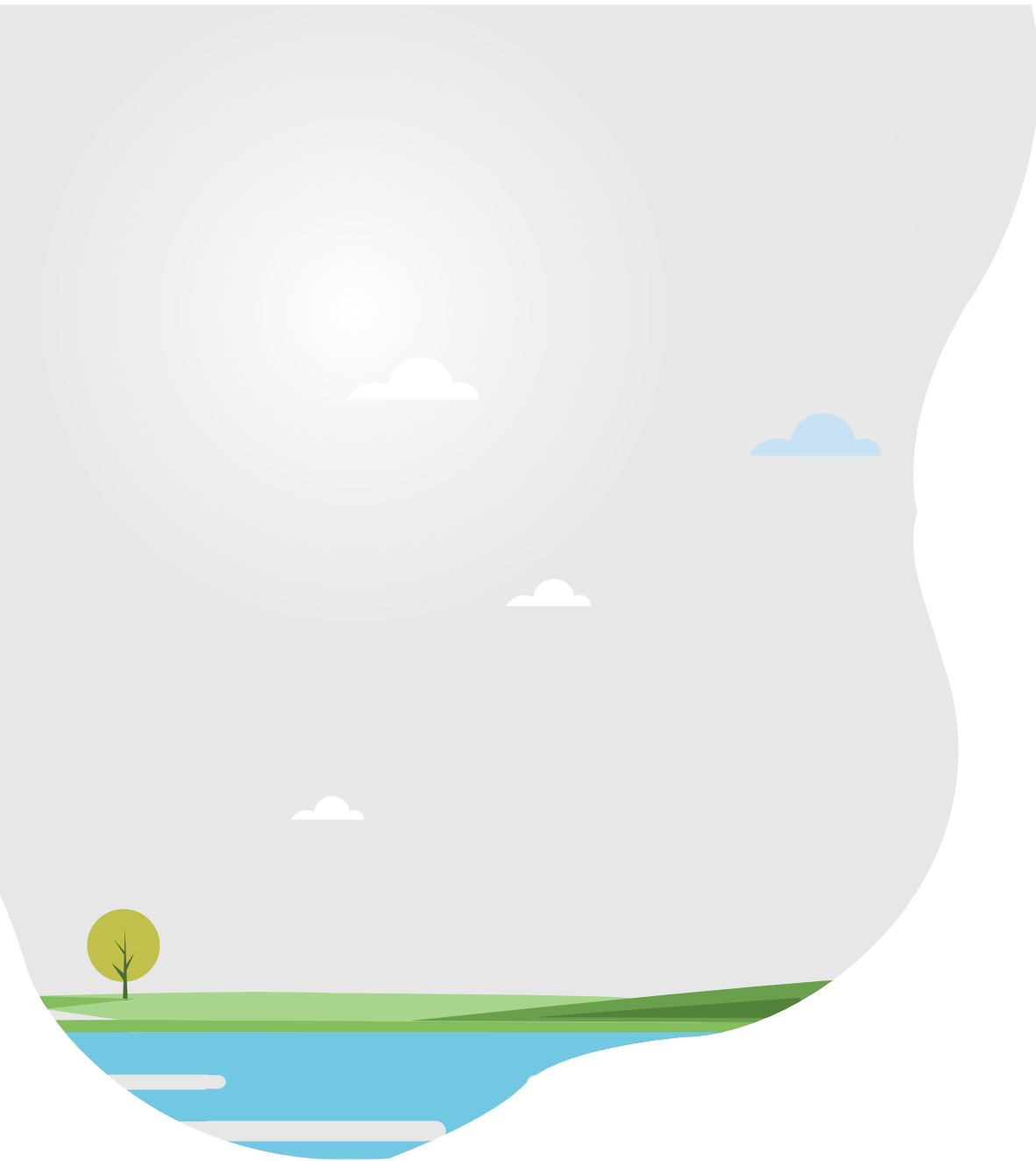
## International and National Funding Agencies working on CRWM related projects in India

S.No.	Organisation/ Funding Agencies	Key projects in India
1.	World Bank (IDB, IRDA, IFC, MIGA, ICSID)	Karnataka Watershed Development Project, National Ganga River Basin Project, Climate Change & Livelihoods projects, Funding for Atal Bhujal Yojana, National Hydrology Project etc.
2.	Asian Development Bank	Karnataka Integrated and Sustainable Water Resources Management Investment Programme, Karnataka Integrated Urban Water Management Investment Programme-Tranche 2, Tamil Nadu Urban Flagship Investment Programme, Madhya Pradesh Irrigation Efficiency Improvement Project, Karnataka Integrated and Sustainable Water Resources Management Investment Programme - Tranche 2, Climate Adaptation in Vennar Sub-basin in Cauvery Delta Project - Tamil Nadu
3.	European Investment Bank	South Asia Growth Fund on water and sanitation, energy, climate change adaption and mitigation etc.
4.	Asian Infrastructure Investment Bank	West Bengal Minor Irrigation & Flood Management Project, Andhra Pradesh Urban Water Supply & Septage Management Improvement Project
5.	Swiss Agency for Development and Cooperation (SDC)	Indian Himalayas Climate Adaptation Programme, Capacity Building for Low Carbon and Climate Resilient City Development in India (CapaCITIES)
6.	Green Climate Fund	Project on groundwater recharge and solar micro irrigation to enhance resilience and ensure food security in Odisha; climate resilience of coastal communities
7.	Adaptation Fund under United Nations Framework Convention on Climate Change (UNFCCC)	Programmes: Building Adaptive Capacities of Small Inland Fishermen Community for Climate Resilience and Livelihood Security, Madhya Pradesh, India; Climate smart actions and strategies in north western Himalayan region for sustainable livelihoods of agriculture-dependent hill communities
8.	International fund for agricultural development	Projects focusing Watershed development, livelihood improvements, drought mitigation and climate resilient upland farming systems
9.	International Climate Initiative	Support to institutionalising capacity building and Climate Change in India (I-CCC); also focuses on sustainable energy supply/renewable energy sector
10.	US Aid	Partnership for water sanitation and hygiene (WASH) to create healthier urban communities by increasing access to clean water and sanitation
11.	Australian Centre for International Agriculture Research	Government of India and ACIAR cooperation across water management expertise, science, technology and agriculture
12.	Japan International Cooperation Agency (JICA)	Ganga Action Plan Project (Varanasi), Jharkhand Horticulture Intensification by Micro Drip Irrigation Project, Rajasthan Rural Water Supply and Fluorosis Mitigation Project (Nagaur), Delhi Water Supply Improvement Project
13.	OECD Development Centre's Network of Foundations Working for Development (netFWD)	Facilitates collaborative efforts in improving water management, energy efficiency through common understanding, solutions (policy focused review and solutions)and well aligned incentives



S.No.	Organisation/ Funding Agencies	Key projects in India
14.	International Development Finance Club	Provides public development and climate finance to implement SDGs and Paris Agreement agendas; Small Industries Development Bank of India (India) (IDFC member) finances domestic projects on green finance and micro, small and medium enterprises
15.	Bill and Melinda Gates Foundation	Working in Bihar and UP across four sectors viz, health, sanitation, agricultural development and financial services for the poor
16.	Watershed Development fund (NABARD)	Participatory watershed development programme in 18 states and Union Territories namely Andhra Pradesh, Bihar, Chhattisgarh, Gujarat, Haryana, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Tamil Nadu, Telangana, Uttar Pradesh, Uttarakhand and West Bengal.
17.	Watershed Development fund-Climate Proofing (NABARD)	Climate Proofing of Watershed Development Projects in the States of Rajasthan and Tamil Nadu
18.	Rural Infrastructure development fund (NABARD)	Supports projects on Agriculture, irrigation and allied sectors (44%), Social sector (17%), Rural roads and bridges (39%)
19.	National Adaptation fund for climate change	Conserve water through the management of run-off in the river basin to reduce vulnerability and enhance resilience for traditional livelihood in Nuapada, Odisha; Increasing Adaptive Capacity to Climate Change through Development of Climate-Smart Villages in Select Vulnerable Districts of Madhya Pradesh; Climate proofing of rainfed watersheds in Salem and Virudhunagar districts of Tamil Nadu





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