

WATER AND FEDERALISM: WORKING WITH STATES FOR WATER SECURITY

December 2021

Srinivas Chokkakula

Avani Kapur

Arkaja Singh



WATER AND FEDERALISM: WORKING WITH STATES FOR WATER SECURITY

LEAD RESEARCH TEAM

Srinivas Chokkakula
Avani Kapur
Arkaja Singh

WITH THE ASSISTANCE OF

Prakriti Prajapati
Jaidev Joshi
Meghna Paul
Vastav Irava
Rakshita Goyal
Snehal Shah
Devashish Deshpande

A collaborative effort of

Transboundary Rivers, Ecologies and Development Studies (TREADS)
Accountability Initiative (AI)
State Capacity Initiative (SCI)



TREADS (Transboundary Rivers, Ecologies and Development Studies)

TREADS programme is a research cluster around the MoJS Research Chair - Water Conflicts and Governance, established by the Ministry of Jal Shakti (MoJS), Government of India at the Centre for Policy Research (CPR). The programme pursues research and policy interests in transboundary political ecologies, river water governance and development studies. While our theoretical interests lie in the broader space of politics and ecologies (relationships) of resource use across shared boundaries and scales, our policy interests are focused primarily on transboundary river water sharing and governance within India and across India's borders. The scope of our work extends further - building on our earlier diverse engagement – to federalism and politics of infrastructure development (dams, roads, smart cities, etc).

The cluster of projects addresses both theoretical and policy questions of immediate relevance.

- ▶ What is the nature of transboundary river water political ecologies? How does this set limits on legal adjudication? What kind of supplemental responses – political and institutional – are needed to address transboundary river water governance challenges?
- ▶ Why is it that the courts' jurisdiction, including that of the Supreme Court, barred over interstate river water disputes?
- ▶ How did the River Boards Act 1956 turn a 'dead letter' and what led to its 'disuse'?
- ▶ How does interstate river water governance in India shape transboundary river water relations in South Asia?

The MoJS Research Chair takes up other research initiatives that break new grounds by addressing contemporary governance challenges.

- ▶ What does the remarkable track record of interstate river water cooperation in India offer to conceive and design an ecosystem for interstate cooperation? What does such an ecosystem entail: laws, politics, policies, institutions and practices? How can we build on the experiential knowledge of existing interstate river water institutions?
- ▶ Is India ready for interstate water trading?
- ▶ What is the nature of India's water federalism? How do we strengthen federal water governance towards long-term water security, and addressing evolving challenges such as climate change, floods, dam safety etc.?
- ▶ What kind of subnational regulatory regimes are required for India?

TREADS regularly hosts TREAD Talks and other events as part of its outreach and dissemination activities. The CPR-CWC Dialogue Forum, a collaborative platform between CPR and the Central Water Commission (CWC), Government of India, is the primary platform for these activities.

TREADS also disseminates its research through occasional working papers and policy briefs. You can find more about TREADS programme at <https://treads.cprindia.org>. This site aims to become a single-point reference knowledge portal for research on transboundary water sharing in India and South Asia. An interactive mapping of conflict and cooperation in India on a pilot scale is available at <https://treads.cprindia.org/ccmap>.

You can also reach us at treads@cprindia.org.

SUGGESTED CITATION:

Chokkakula, S., Kapur, A., Singh, A. (2021). *Water and federalism: Working with states for water security*. TREADS working paper. Centre for Policy Research, New Delhi.

TABLE OF CONTENTS

List of Abbreviations

List of Figures

List of Tables

Executive Summary	8
1. Water resource management in India	15
1.1. State of India's water resources	15
1.2. India's water resource management (WRM)	17
1.3. The study	22
2. Water and federalism	24
2.1. India's federal governance of water	24
2.2. The Centre's 'lost ground'	25
3. Rescaling to States	29
3.1. The state of States' WRM	30
3.2. States' strategies and rationalities	34
3.3. WRM performance of the States: Progressive pathways and subnational nexuses	37
4. The Centre's leverage	40
4.1. Policy leverage	40
4.2. Legal leverage	43
4.3. Institutional leverage	45
4.4. Fiscal leverage	47
5. Lessons from national and international experiences	50
6. Recommendations	54
References	60
Annexures	64

LIST OF ABBREVIATIONS

AIBP	Accelerated Irrigation Benefits Programme	GAP	Ganga Action Plan
ASER	Annual Status of Education Report	GED	Groundwater Extraction Device
BCM	Billion Cubic Metre	GIS	Geographic Information System
BE	Budget Estimate	GoI	Government of India
BNR	Build-Neglect-Rebuild	GoK	Government of Karnataka
BOD	Biochemical Oxygen Demand	GoM	Government of Maharashtra
CADP	Command Area Development Programme	GoP	Government of Punjab
CAG	Comptroller and Auditor General of India	GST	Goods and Services Tax
DAP	District Agriculture Plan	GWI	Groundwater Irrigation
DPL	Development Policy Loan	ICA	Irrigated Command Area
CGWA	Central Ground Water Authority	ICRIER	Indian Council for Research on International Economic Relations
CGWB	Central Ground Water Board	IDA	International Development Agency
CoAG	Council of Australian Governments	IDC	Irrigation Development Corporation
CPCB	Central Pollution Control Board	IGFT	Intergovernmental Fiscal Transfer
CPR	Centre for Policy Research	INDCs	Intended Nationally Determined Contributions
CS	Central Sector Scheme	IPC	Irrigation Potential Created
CSS	Centrally Sponsored Scheme	IPU	Irrigation Potential Utilised
CWC	Central Water Commission	IRWDA 1956	Inter-State River Water Disputes Act, 1956
CWMA	Cauvery Water Management Authority	ISRO	Indian Space Research Organisation
CWMI	Composite Water Management Index	IWRM	Integrated Water Resources Management
CWPRS	Central Water & Power Research Station	km ²	Square Kilometre
DPL	Development Policy Plan	LAWA	Working Group of the Federal States on Water Issues, Germany
Environment Act	The Environment (Protection) Act, 1986	m ³	Cubic Metre
ETO	Exploratory Tubewells Organization	mg ^l ⁻¹	Milligrams Per Litre
FC13	13th Finance Commission, India	MI	Minor Irrigation
FC14	14th Finance Commission, India	MMI	Major and Medium Irrigation
FC15	15th Finance Commission, India	MNRE	Ministry of New and Renewable Energy
FYP	Five Year Plan		

LIST OF ABBREVIATIONS

MoAFW	Ministry of Agriculture and Farmers' Welfare	PIM	Participatory Irrigation Management
MoEFCC	Ministry of Environment, Forests and Climate Change	PMGSY	Pradhan Mantri Gram Sadak Yojana
MoF	Ministry of Finance	PMKSY	Pradhan Mantri Kisan Sinchai Yojana
MoJS	Ministry of Jal Shakti	PM KUSUM	Pradhan Mantri Kisan Urja Suraksha Evam Utthan Mahabhayan
MoP	Ministry of Power	RBA 1956	River Boards Act, 1956
MoWR	Ministry of Water Resources, River Development & Ganga Rejuvenation	RBO	River Basin Organization
MSP	Minimum Support Price	RBI	Reserve Bank of India
MW	Megawatt	RE	Revised Estimate
MWRRA	Maharashtra Water Resources Regulatory Authority	RKVY	Rashtriya Krishi Vikas Yojana
NABARD	National Bank for Agriculture and Rural Development	Rs.	Rupees
NDMA	National Disaster Management Authority	SAP	State Agriculture Plan
NGT	National Green Tribunal	SDG	Sustainable Development Goals
NHP	National Hydrology Project	SWP	State Water Policy
NITI	National Institute for Transforming India	TGR	Total Groundwater Resources
NMCG	National Mission for Clean Ganga	UN	United Nations
NRRDA	National Rural Roads Development Agency	UP	Uttar Pradesh
NRDWP	National Rural Drinking Water Program	USD	United States Dollar
NSSO	National Sample Survey Office	USGS	United States Geological Survey
NWIC	National Water Informatics Centre	UT	Union Territory
NWP	National Water Policy	VS.	Versus
O&M	Operation and Maintenance	Water Act	The Water (Prevention and Control of Pollution) Act, 1974
OECD	Organisation for Economic Cooperation and Development	WFD	Water Framework Directive
PIB	Press Information Bureau	WRD	water resource department
PIL	Public Interest Litigation	WRI	World Resources Institute
		WRM	Water Resources Management
		WUA	Water User Association

LIST OF FIGURES

Figure 1.1: State-wise groundwater resource (in bcm) and stage of development (%)	16
Figure 1.2: Share of WRM capital expenditure in total public capital expenditure	18
Figure 1.3: Share of WRM revenue expenditure in total public revenue expenditure	18
Figure 1.4: Share of MMI in total WRM expenditure (including revenue and capital)	19
Figure 1.5: Share of capital expenditure to total expenditure on MMI and MI	19
Figure 2.1: Percentage expenditure on WRM in various FYPs in India	26
Figure 2.2: Maharashtra's expenditure on irrigation	27
Figure 3.1: WRM revenue expenditure share in total revenue expenditure	31
Figure 3.2: WRM capital expenditure share in total capital expenditure	31
Figure 3.3: Number of large dams till 2016	32
Figure 3.4: Net irrigated area as a share of net sown area, 2016-17	32
Figure 3.5: IPU as a share of IPC, 2017	32
Figure 3.6: Share of irrigation sources to net sown area, 2017	33
Figure 3.7: Energized tube well density (Tube wells/km ² of net sown area till 2015)	33
Figure 3.8: Shares of overexploited blocks, 2013	34
Figure 3.9: Agriculture pump subsidy as a percentage of State water budgets, 2015-16	34
Figure 4.1: National Projects – IPC and IPU	49

LIST OF TABLES

Table 1.1: Cost escalations and delays in irrigation projects	21
Table 3.1: States' WRM strategies: Drivers and rationalities	35
Table 3.2: Progressive pathways	37

EXECUTIVE SUMMARY

1. WATER RESOURCES MANAGEMENT IN INDIA

India is “water stressed” by Falkenmark Stress Indicator and is moving towards the “water scarce” condition with its declining per capita availability of resources. This does not capture the spatial and temporal uncertainties of water availability and access to its populations. The challenge is not limited to quantity but is increasingly quality related. The rising reliance on, and the dangerously depleting levels of groundwater expose large populations to heavy metals and other pollutants, adversely affecting their productivity and potential. River stretches across India show high pollution loads. India’s intractable interstate river water disputes are increasingly about quality concerns. Climate change poses new challenges, with growing risks of droughts and floods. The World Resources Institute’s (WRI) Aqueduct Water Risk Atlas puts India in the “Extremely High” risk category and ranks it as the 13th country in the world most at risk in terms of water scarcity.

Historically, India’s approach to water resource management (WRM) relied on the paradigm of supply augmentation of both surface water and groundwater – with continued preference for, and emphasis on capital investments in major and medium irrigation (MMI) projects. The public irrigation systems, caught in the ‘Build-Neglect-Rebuild’ (BNR) syndrome, have turned inefficient with poor management, neglect of maintenance, and suffer from inequities between head and tail reaches. On the other hand, groundwater irrigation (GWI) driven by private investments has boomed due to improved access to low-cost pumping technologies. But combined with the perverse incentive of farming electricity subsidies, this is contributing to falling groundwater levels.

India’s water governance narrative thus is one of poorly managed public irrigation systems, anarchic rise of private GWI, inequities and declining quantity and quality of water resources. These are a cumulative outcome of its federal constituents’ choices and approaches to WRM within their respective territories, akin to the ‘tragedy of the commons.’ Under the Constitutional organization of powers, the States’ powers over water are subject to the Central government’s powers over regulation and development of interstate rivers. The emerging risks and new governance challenges warrant its role beyond this narrowly defined interstate river water regulation and development. It should play a central role in anchoring States’ WRM towards better outcomes while ensuring national water security and sustainable WRM in the long run.

The study explores this precise of dimension of India’s federal governance for a broader conception of the Centre’s role in influencing and incentivizing better States’ WRM outcomes through the policy, legal, financial and institutional instruments at its disposal. This is also crucial for India’s ambitious development goals, which include interlinking of rivers, inland waterways and river

rejuvenation, besides shifting to Integrated Water Resources Management (IWRM) for long-term water security. The study examines the Centre's leverage in this respect by using a combination of quantitative and qualitative methods, supported by case studies of the three States of Punjab, Karnataka and Maharashtra.

2. WATER AND FEDERALISM

The mainstream discourse on federal water governance limits itself primarily to the federal organization of powers under Article 246 of the Constitution of India. Water is a State subject (Entry 17 of the State List), subject to the powers of the Centre under Entry 56 (regulation and development of interstate rivers) of the Union List. Entry 24 of the Union List to do with inland waterways has been receiving attention of late with the growing interest in the subject. The discourse is, however, largely dominated by the provisions for interstate river water disputes resolution under Article 262.

Literature and evidence show that the Centre's role in water governance has been neglected. The provisions to engage with the States have not been adequately consolidated with robust structures and practices for federal governance. For instance, the River Boards Act 1956, the legislation enacted under the Entry 56 provisions, has never been used or improved. On the other hand, the Centre has pursued several other means beyond these provisions to engage with the States over water governance, which include environmental protection, coping with disaster risk, expenditure and social impacts of dams.

The neglect of structural relationships and institutional processes for federal water governance is attributed to the trajectory of the Indian state's transformation from 'strong Centre-weak States' to 'weak Centre-strong States'. The Centre relied on its political dominance and fiscal power during the early period of single-party dominance. It 'lost' ground with the onset of coalitional politics in the 1980s, followed by the political and economic assertion of States post-liberalization in the 1990s. Despite the current reversal to single-party dominance, the Centre can recover the 'lost ground' only through a fresh federal consensus and by strategically locating itself to influence States' WRM approaches.

3. RESCALING TO STATES

Rescaling the gaze to States is necessary for an understanding of how they choose, rationalize and prioritize their WRM strategies and approaches – which in turn contribute to the unfavourable outcomes at the national level. This requires suitable metrics for assessing the WRM performance of the States—a difficult undertaking for two reasons. One is the difficulty of arriving at comparable

uniform WRM performance indicators for States located in diverse hydro-ecological contexts and having varied trajectories of water resource development. The other is the data availability on water resources, their use and the outcomes. Federal institutions like the Central Water Commission (CWC) are limited by their mandate and capacities. States are the primary producers of such data and their reporting often suits their immediate interests. Federal water governance is handicapped by an absence of uniform procedures, protocols and practices for producing and interpreting data.

States' historical choices of WRM strategies and approaches resonate with Lawrence Saez's description of Indian federalism as "federalism without a Centre." The supply augmentation paradigm has defined and determined budgetary allocations, intergovernmental fiscal transfers (IGFTs), and institutional cultures – both at the Centre and the States. Within this broader landscape, the States' prioritization of strategies is varied and rationalized by endogenous factors linked to their context, conditions and constituencies. Context refers to the ecological setting and physical attributes linked to water availability, and potential for augmentation. Conditions refer to the historical trajectories and geographic conditions of water resources development. Constituencies refer to political rationalities of preferences such as those for building dams or electricity subsidies for farming.

The character of States' WRM approaches is marked by their continued preference for capital expenditure works. Reflecting the BNR syndrome, the Irrigation Potential Utilized (IPU)/Irrigation Potential Created (IPC) ratios have been declining. The water sector's share in revenue expenditure remains low. During 2017-19, this is 2-3% for Maharashtra, 3-5% for Karnataka, and 3% or less for Punjab. In contrast, the corresponding shares in the total capital expenditure are much higher, at 38% for Karnataka, 21% for Punjab and 37% for Maharashtra. States persist with the perverse incentives of subsidies for farming electricity. For instance, Punjab's farming electricity subsidy is close to Rs 8000 crore per year, almost 160% of the entire water budget allocation of the State.

Recent trends, however, indicate a slow but definitive course-shift away from supply augmentation strategies. Along what can be termed the 'progressive pathways continuum' – away from development (supply augmentation) towards emphasis on use efficiency (increasing agricultural productivity) and sustainability (institutions, regulation, financial sustainability) – States are showing preferences for a greater focus on minor irrigation (MI), watershed development, setting up regulatory frameworks, etc. These are often responses of the States at disrupting their particular water-food-energy nexuses.

The central role of endogenous factors in driving States' choice of strategies may suggest the unavoidable 'opportunistic' behaviour of federal constituents in the provisioning of public goods, as with water. It does not mean to discount the influence of exogenous forces, the Centre and the IDAs, in the observed progressive course-shifts. This federal leverage of the Centre can be fully realized, as Jenna Bednar (2009) argued, by investing in a robust federal system design of structural, political, judicial instruments and processes.

4. THE CENTRE'S LEVERAGE

The exploration of the Centre's leverage across the spaces of policy, legal, institutional and fiscal instruments argues for channeling these instruments towards forging stronger Centre-States partnerships for sustainable WRM.

Policy leverage

There is no discernible influence of national water policymaking on States' policymaking or progressive shifts. The limited influence of fiscal transfers also suffers from the Centre's equivocal translation of its policies into its own programmes and projects, i.e. the design of the Central Sector Schemes (CSs)/Centrally Sponsored Schemes (CSSs). An analysis of budgetary allocations shows that the CSs/CSSs have primarily supported supply augmentation strategies. The recent flagship programme Pradhan Mantri Kisan Sinchai Yojana (PMKSY) is no exception despite its explicitly articulated intent of promoting IWRM. The trends of the 'campaign' mode of CSS structuring are unlikely to produce enduring outcomes due to lack of institutionalization by States. The Centre's leverage in the pursuit of sustainable WRM goals also suffers from credibility perceptions due to the cross-sectoral contradictions. For instance, the Union policy to extend Minimum Support Price (MSP) for paddy works against Punjab's interest to shift its farmers away this water-intensive crop. Similarly, the Centre's proposed solarization of agriculture pumps may help in meeting India's Intended Nationally Determined Contributions (INDCs) commitments but would defeat the plans to arrest depletion of groundwater levels.

Though endogenous factors and pressures drive the progressive course-shifts by States, these are often reinforced by inputs from the Centre or the IDAs. External assistance is likely to produce long-lasting impacts when it is strategically located to build on the latent intent for change within the States.

Legal leverage

Legal leverage of the Centre in terms of water could be extended beyond the limited reading of Article 246 (Entries 56 and 17) and Article 262, through an innovative application of a variety of other powers within the Constitutional scheme. Article 252 allows the Parliament to enact laws on a State subject if two or more States consent to it. Under Article 253, the Centre can legislate on any subject to meet the obligations of an international treaty or an agreement.

Deploying the provisions of Articles 252 and 253 as well as its powers in the Concurrent List (subjects on which both the Centre and States have powers, but the Centre can prevail over the States), the Centre has gone beyond the role envisaged at the time of the framing of the Constitution, especially in the domain of environmental law. It has enacted key legislations such as the Water (Prevention and Control of Pollution) Act 1974, the Wildlife (Protection) Act 1972, the Forest (Conservation) Act 1980, and the National Disaster Management Act 2005. These experiences show the States' acceptance of the Centre's pre-eminent role in environmental law

making. Considerable opportunities for extending the Centre's leverage in terms of federal water governance lie in this direction – in coping with the environmental risks of pollution, disasters and climate change. In the interconnected and interdependent hydro-geographies being produced by India's ambitious development goals, the Centre can explore new and innovative avenues for improved federal water governance.

Institutional leverage

The Centre's institutional leverage over States is also prone to narrow delineation, limited to the Finance Commission for distribution of taxes under Article 280 and grant making under Article 282. Article 293 also provides for the Centre's considerable influence over States' borrowings. The instance of GST reforms and the role of the GST Council showcases how the Centre can expand its leverage when it is supported by federal consensus amongst the States. The States have agreed to concede some powers to empower the GST Council – where they are represented – to set the taxation rates.

Article 263 provides for constituting the Interstate Council with a similar intent of enabling interstate coordination. This institutional space can be potentially used for deliberating on subjects of common interest to the States and the Centre, and for federal consensus building. This is an opportunity lost due to the Interstate Council's positioning – as a department of the Ministry of Home Affairs, liable to be perceived as politically subjective.

There are other avenues offering potential leverage for the Centre to engage usefully with the States. Leverage through technical institutional relationships between federal institutions such as CWC and the State water resource departments (WRDs) has not been adequately utilized. This is primarily due to the failure of federal institutions to adapt and rise to meet the changing and growing needs of the State WRDs. Another arena that is not adequately appreciated is the judicial one: public engagement through environment PILs (public interest litigations) has expanded the scope for environmental regulation by the Centre. For instance, a PIL has led to creation of the Central Ground Water Authority (CGWA).

Fiscal leverage

The Centre relies heavily on its fiscal leverage to promote its WRM objectives; yet flaws in the design and approach of the fiscal instruments have marred its effectiveness in achieving the objectives. The Centre has considerable leverage through the centralized and tightly controlled release of funds from CSs/CSSs, but these have been criticized for stifling State-level innovation, and incentivizing conditions for the BNR syndrome. Their continued support to supply augmentation strategies through the Accelerated Irrigation Benefits Programme (AIBP) and the subsequent PMKSY highlights the design flaws of the CSSs for WRM. The CSSs supported projects are found to suffer from delays, cost overruns and failure to achieve improved operation and maintenance (O&M).

Other CSSs such as the National Rural Drinking Water Programme (NRWDP) or the CSs such as the National Projects too suffer from similar design flaws: absence of clear assessment of

requirements, limited monitoring and poor delivery of outcomes. The Centre's attempts to provide reform-linked support suffer from design flaws as well. The 13th Finance Commission's allocation of a grant for putting in place regulatory institutions had no uptake from the States. Even Maharashtra, which is the only State to have an operating water regulatory authority, did not tap into these funds. A key takeaway from the experiences of the CSSs is that the specific-purpose IGFTs are not significant enough to effect a course-shift by the States. These need to be strategically located and appropriately designed to extract the maximum possible leverage.

5. LESSONS FROM NATIONAL AND INTERNATIONAL EXPERIENCE

There is little comparative literature on the federal governance of water resources, but the experiences of Canada, Australia, Germany and the USA in federal water governance are useful references. We have also studied CSSs in other sectors – the Rashtriya Krishi Vikas Yojana (RKVY) for agriculture development and the Pradhan Mantri Gram Sadak Yojana (PMGSY) for building rural roads - to draw lessons for improved federal water governance.

For federal spending to achieve enduring impacts and outcomes, it must build on appropriate deliberative and institutional processes. A deliberative process sets the common agenda and collective responsibility, while the institutional process ensures effective implementation. The other necessary condition is the existence of independent institutional architecture for credible data production to support federal consensus, knowledge exchange, monitoring and evaluation of outcomes. The literature and the experiences of CSSs bring out the following key features, among others, for successful CSs/CSS and sustainable WRM outcomes: accommodate for the diversity in States' contexts, clarity of objective, consistency to allow long-term planning, transparency for enabling consensus and incentives for efficient fiscal management by States.

6. RECOMMENDATIONS

The Centre's leverage in influencing States for better WRM outcomes can be realized when all the instruments at its disposal are coherently deployed, appropriately integrated and strategically located. But the edifice of federal governance reforms to effect this leverage needs to be built on two key pillars: (a) a federal consensus on the Centre's role, and (b) an autonomous and independent institutional architecture for gathering data and producing knowledge on water resources. Specific recommendations in this direction include:

- (1) Elevate sustainable WRM agenda and build a federal consensus on the respective functional roles of the Centre and States, and their integration.

- (2) Empower the Interstate Council to achieve federal consensus through an inclusive and deliberative process.
- (3) Redefine and expand the scope of Entry 56 (Union List) for locating the Centre strategically. Ensure coherent integration of this leverage with that of other instruments – policy, institutional and fiscal – to establish a concerted role for the Centre in federal water governance.
- (4) Reorient State WRDs and their cultures towards progressive pathways, beyond supply augmentation.
- (5) Invest, strengthen and reorient the capacities of Central institutions to address the new challenges of interstate dependencies and risks beyond the conventional moulds of supply augmentation, appraisal and monitoring.
- (6) Reconsider deployment of fiscal transfers strategically with other instruments, as fiscal instruments alone cannot effect a course-shifts to better WRM.
- (7) Consider locating specific-purpose IGFTs as grants or loans, but as conditional upon agreed progressive reforms and achieving targets.
- (8) Address contradictory policymaking across sectors and scales which defeat the sustainable WRM agenda.
- (9) Embed fiscal instruments linked to federal consensus-based policy and institutional instruments. Consider reorienting the goals towards greater federal integration.
- (10) Invest in an institutional architecture for credible data gathering and knowledge production.

1

WATER RESOURCE MANAGEMENT IN INDIA

1.1. State of India's water resources

India entered the “water stressed” state a couple of decades ago.¹ A recent report by the Central Water Commission (CWC) and Indian Space Research Organization (ISRO) estimates that India's per capita water availability in 2011 has reduced to 1651 m³/year from 1820 m³/year in 2001 (CWC 2019). The report projects that the per capita availability will drop to 1228 m³/year in 2051, approaching the “water scarce” condition. However, India's water concerns are not limited to availability in terms of quantity; the challenges are deeper, about quality and access. These are manifested as unsafe and depleting groundwater reserves, inequities in access, polluted rivers and water bodies, and their adverse impacts on people's health and productivity.

Groundwater levels across the country are depleting. In the 6584 blocks monitored by the Central Ground Water Board (CGWB) across the country, 1034 are overexploited.² The number of blocks under stress is increasing, and the quality of accessible groundwater is also deteriorating. The overall groundwater development in India is about 62% (CGWB 2018). Out of the 253 billion cubic metres (bcm) of groundwater drafted (in 2013), about 90% is for irrigation. The usage by the industry and domestic sectors is only about 25 bcm, accounting for the rest of the 10% groundwater drafted. But this situation is highly uneven across States and Union Territories (UTs). In Delhi, Haryana, Punjab and Rajasthan, the groundwater drafting is higher than 100%; in some other states, it is above 70%. See Figure 1.1 for a representation of the groundwater development status. The dangerously depleting groundwater levels expose large populations in India to fluoride, arsenic and heavy metals with deleterious health impacts (see Ayoob and Gupta 2006, Chakraborti et al. 2003).

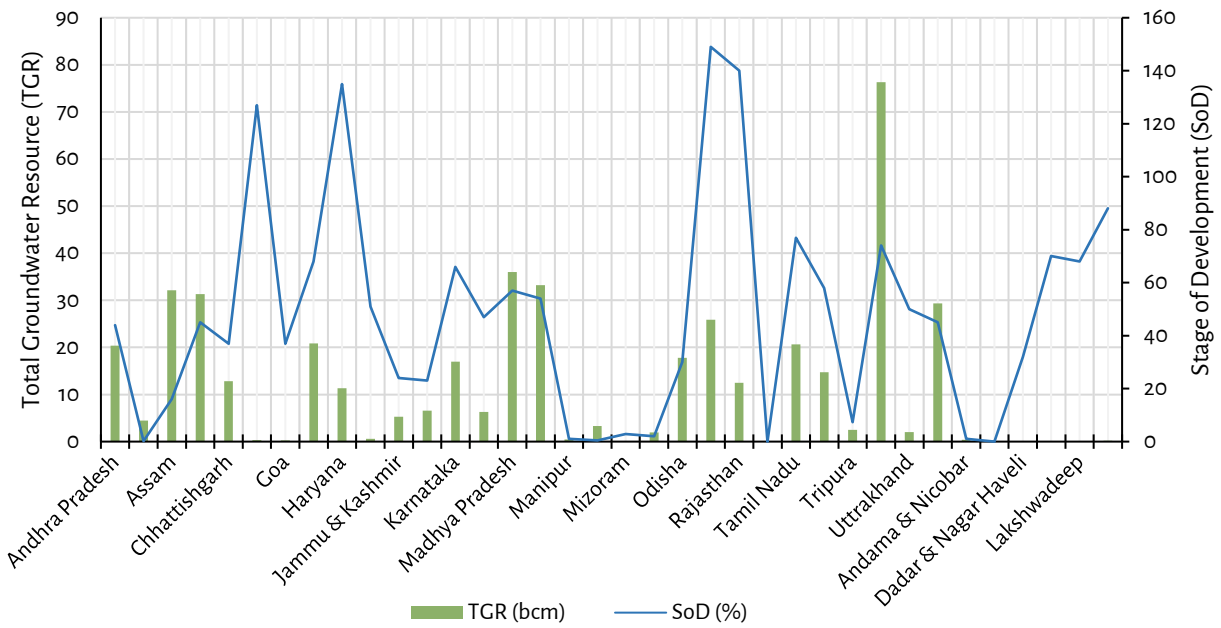
Deteriorating water quality in rivers is another rising concern. The Central Pollution Control Board's (CPCB) National Water Quality Monitoring Programme (CPCB 2018) has recently concluded that the Biological Oxygen Demand (BOD) levels in 45 river stretches (out of 351 stretches monitored) exceed discharge standards for treated sewage into freshwater sources (30 mg/l of BOD). BOD levels in all the 351 monitored stretches are more than the desired levels of 3 mg/l. These stretches are located in 31 out of the 36 States and UTs, suggesting uniform levels of deterioration across the country.

1 According to the Falkenmark Stress Indicator, per capita availability of under 1700 m³ denotes a “water stressed” condition; if this falls below 1000 m³, it is a “water scarce” condition (Falkenmark et al 1989).

2 CGWB publishes the Groundwater Yearbook every year, but the most recent dynamic groundwater estimations are from an assessment in 2013. The same is reported in all the subsequent Yearbooks.

The water quality problem appears much deeper and perilous. India’s green revolution, driven by extensive and intensive use of fertilizers, has led to nitrate contamination of aquifers as well as surface waters. A recent report (Damania et al. 2019) draws attention to an ‘invisible water quality crisis’, with potential long-term impacts on India’s economic productivity and adverse implications for its human potential.

Figure 1.1: State-wise groundwater resource (in bcm) and stage of development (%)



Source: CGWB 2018

The CWC (2019) projections say that India will eventually become a “water scarce” nation, using the Falkenmark Stress Indicator. This does not reflect the actual risk. The World Resources Institute’s (WRI) Aqueduct Water Risk Atlas, using a more comprehensive set of 13 indicators, puts India in the “Extremely High” stress category (WRI 2019). The Risk Atlas ranks India as the 13th country in the world most at risk of water scarcity. This, combined with climate change-linked spatial and temporal uncertainties of water availability, presents a challenging scenario for the future. On the other hand, the demand of India’s growing urban and middle class populations for safe and secure water supply poses a formidable challenge as well.³

These conditions of stress and risks are manifested most visibly in the frequently emerging and recurring interstate water disputes; these directly relate to federal governance challenges, often posing constitutional crises.⁴ In the past few years, there has been an increase in water disputes,

3 See e.g. Water Aid India (2005), McKenzie and Ray (2009) for a detailed discussion of the complex challenges of water supply access and coverage in India.

4 The Ravi-Beas and Cauvery disputes are typical examples of States refusing to comply with judicial directives, often relying on legislative resolutions.

not just between states, but also between districts and communities. More problematically, the disputes are not just about water shares, but also increasingly about water quality. Water quality is the new bone of contention between states already embroiled in disputes such as those involving the Cauvery, Mahanadi and Mahadayi rivers. The enormous material costs incurred by these disputes do not often receive attention. The following instances give a sense of the scale of these costs. In a recent suit, the State of Tamil Nadu has claimed a compensation of Rs 2480 crore for its losses due to the delay caused by Karnataka in releasing the former's due share of Cauvery waters over just one season.⁵ The ASSOCHAM (Associated Chambers of Commerce and Industry of India) has estimated that the unrest and agitation during a Cauvery dispute episode in 2016 led to a loss of 25,000 crores in Bengaluru alone.⁶

1.2. India's water resource management (WRM)

The conditions of water stress and risk, inequities and inequalities in access, deteriorating quality and increasing contestations over water are an outcome of the WRM strategies pursued so far in the country. India's approach to WRM has essentially relied on the paradigm of supply augmentation. Historically the emphasis has been on capital investments in public systems of irrigation and water supply – building dams and canal networks, and also on promoting groundwater irrigation – rather than on improved management.

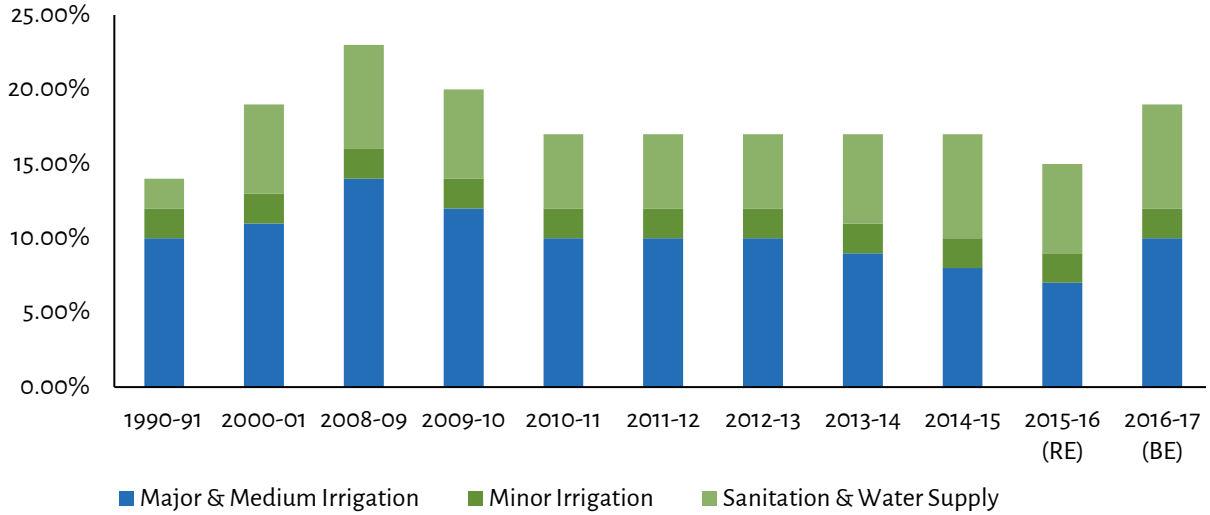
India's historical emphasis on supply augmentation strategies can be seen in the predominance of capital expenditure in the water sector. Figures 1.2 and 1.3 below show that the relative share of WRM in both revenue and capital expenditures (to corresponding total public revenue and capital expenditures) has declined. But expenditure for irrigation development accounts for the lion's share in the total WRM expenditure.

Further, Major and Medium irrigation (MMI) projects have been the mainstay of India's WRM since the First Five Year Plan (FYP) covering the period 1951-56. Several multipurpose and major irrigation projects were taken up in the first few plan periods, resulting in MMI expenditure dominating total irrigation expenditure (See Figure 1.4). While there was some degree of attention to minor irrigation (MI) schemes, which also includes groundwater irrigation (GWI), the focus has largely remained on MMI projects (Planning Commission 2002). However, MI has received greater attention since the Eighth FYP, indicating subtle course shifts. Figure 1.5 shows the capital expenditure for MMI and MI from this point of time. The proportion of MI expenditure increases gradually and picks up significantly in the Tenth FYP.

5 <https://indianexpress.com/article/india/cauvery-water-issue-tamil-nadu-seeks-rs-2480-crore-as-compensation-from-karnataka-4466146/>, last accessed 30 September 2019.

6 <https://economictimes.indiatimes.com/news/politics-and-nation/cauvery-dispute-causes-rs-25000-crore-loss-to-karnataka-assochem/articleshow/54314316.cms>, last accessed 30 September 2019.

Figure 1.2: Share of WRM capital expenditure in total public capital expenditure



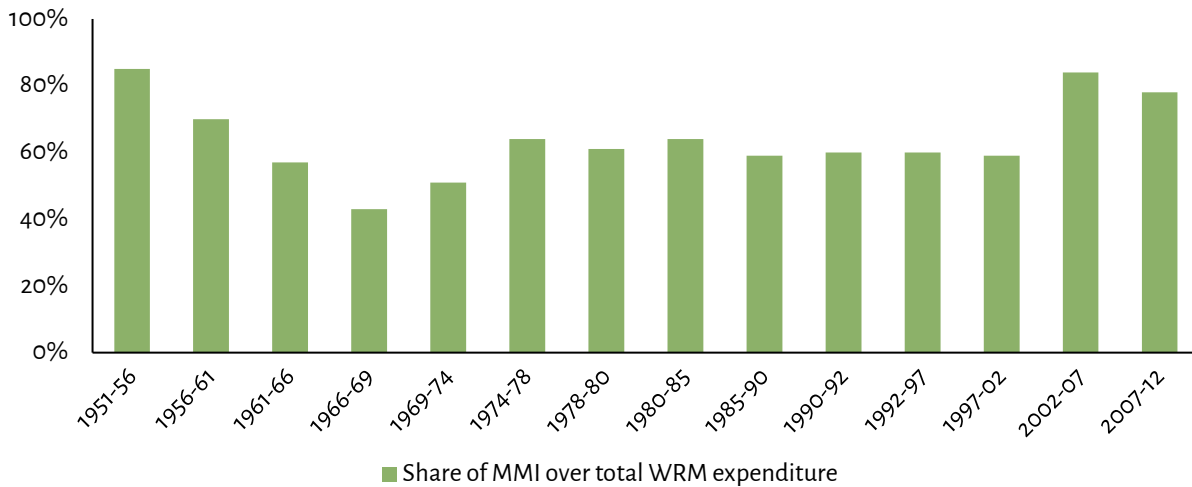
Source: Ministry of Finance 2018

Figure 1.3: Share of WRM revenue expenditure in total public revenue expenditure



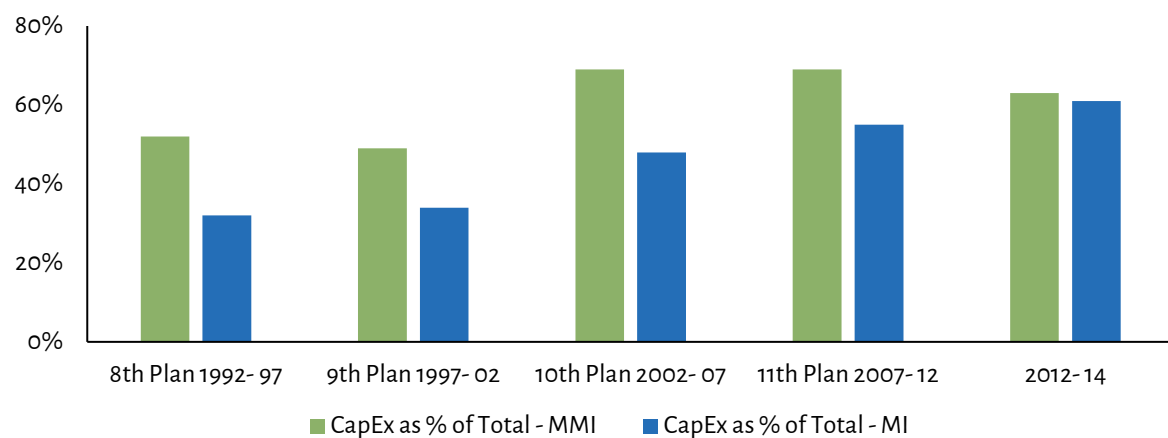
Source: Ministry of Finance 2018

Figure 1.4: Share of MMI in total WRM expenditure (including revenue and capital)



Source: CWC 2015a

Figure 1.5: Share of capital expenditure to total expenditure on MMI and MI



Source: CWC 2015a

Reliance on supply augmentation strategies applies not just to surface water development but also to groundwater. GWI is popular globally, in semi-arid and arid regions like India in particular due its reliability and flexibility in its access that canal irrigation cannot match; groundwater. Further, groundwater is a buffer against drought for both agriculture use and human consumption, and is seen less prone to pollution (Siebert et al 2010, Famiglietti 2014). The Government of India’s (GoI) programmes for GWI development go back to 1950s; later, such programmes formed part of the Green Revolution phase of agriculture development. The Indo-US Technical Cooperation supported an All India Groundwater Exploration Project in 1952, which resulted in the setting up of the Exploratory Tubewells Organization (ETO) under the Ministry of Food and Agriculture.

This was perhaps the beginning of groundwater development in its current form.⁷ The ETO was eventually renamed the Central Ground Water Board (CGWB) under the erstwhile Ministry of Water Resources (now Ministry of Jal Shakti – MoJS) in 1970.⁸ The CGWB has largely clung to the mode of supply augmentation, even though it was allocated a regulatory function in 1997, with the constitution of the Central Ground Water Authority (CGWA).⁹

GWI was promoted through government-funded tube well drilling and development in the initial years. Later, GWI development burgeoned through extensive private investments, primarily enabled by improved access to pump-based irrigation technology (Shah 2010). The increase in MI expenditure in recent years does not imply the growth of public systems of GWI. Public GWI systems account for less than 1.5% of the total GWI (MoWR 2017). In addition to being stimulated by improved access to technologies, GWI driven by private investments has also thrived as a response to the inefficiencies and inefficacies of the public surface water irrigation systems.

India's WRM, however, suffers from greater maladies, beyond just the deficiencies of the public irrigation systems. We discuss these briefly.

First, irrigation development is highly inequitable across the States. Almost 94% of the MMI expenditure is concentrated in just 14 states (Planning Commission 2011).

Second, despite significant investments in the construction of dams and physical works, the outcomes of these projects in terms of cost effectiveness are questionable. Until the beginning of the Sixth FYP, Irrigation Potential Created (IPC) and Irrigation Potential Utilized (IPU) progressed in tandem, though their growth patterns varied. Subsequent to the Sixth FYP, IPC has consistently outpaced IPU due to the continued focus on development as opposed to sustaining and improving efficiencies (Datta et al. 2008).

The third problem is that of inefficiencies and cost overruns in the execution of projects. Project implementation invariably suffers from delays. Delays escalate costs, which in turn lead to the demand for additional investments. The cost escalations sometimes go as high as 3000%, as in the Choudhary Charan Singh Lalchura project in Uttar Pradesh. These inefficiencies put pressure on budgetary allocations for new projects (see Table 1.1).

7 <https://www.thehindu.com/thread/science-health-environment/the-quest-for-groundwater-in-post-colonial-india/article19968118.ece>, last accessed 30 July 2019.

8 <http://cgwb.gov.in/aboutcgwb.html>, last accessed 30 July 2019.

9 *M C Mehta vs Union of India* 1997

Table 1.1: Cost escalations and delays in irrigation projects

(2008-17)	MMI Projects	MI Projects
Projects under implementation	201	11,291
Projects completed	62	8,014
Sanctioned cost of projects	Rs 2,22,799.98 crore	Rs 16,800.78 crore
Central assistance released	Rs 28,334 crore	Rs 12,809 crore
Projects with time overrun	105	153
Extent of time overrun	Up to 18 years	Up to 12 years
Extent of cost overrun	Rs 1,20,772.05 crore	Rs 61.61 crore

Source: CAG 2018a

The fourth issue is a bigger syndrome that impacts the preceding two. The development of India's public irrigation systems is caught in the 'Build-Neglect-Rebuild' (BNR) syndrome with skewed prioritization: the emphasis is on building capital assets, with limited focus on their operation and maintenance (O&M). Maintenance and repair costs in MMI as a share of total revenue expenditure declined from 46% in the Eighth Plan period to 5% in the Eleventh Plan period. This neglect of O&M has led to growing inequities between head and tail reaches. On the other hand, receipts in MMI cover less than 20% of the revenue expenditure, barely enough to cover the costs under "Direction and Administration". This is significantly low compared to other countries. The Jaiba project in Brazil, for instance, achieved 52% recovery of the total costs. In OECD (Organisation for Economic Co-operation and Development) countries such as Austria, Denmark, Finland and Sweden, projects recover both capital and O&M expenditures entirely. Similarly, in Australia, the US and Canada, the O&M costs are fully recovered in addition to partial recovery of capital costs (Bergvall et al. 2006).

India's water governance narrative thus is one of poorly managed public irrigation systems, anarchic rise of private GWI, inequities and declining quantity and quality of water resources. However, it is necessary to recognize that this picture emerges as a cumulative outcome of its federal constituents' choices and approaches to WRM within their respective territories. India's federal organization of powers lists water as a State subject, locating States as the primary drivers for managing water resources within their territories. The collective outcome of worsening conditions is akin to the 'tragedy of the commons', raising concerns about the Centre's role.¹⁰

¹⁰ In this report, the federal government in India is referred as the Centre, the Union government or the federal government depending on the context of discussion. These terms are used synonymously.

The States' powers over water is subject to the Union government's powers over regulation and development of interstate rivers. However, reducing its role to this alone would amount to a narrow and legalist understanding of the Centre's role. The discourse about governance of water in India is often prone to this erroneous interpretation. The Centre's role is much greater, and should be oriented to anchoring states' WRM towards better outcomes and ensuring national water security and sustainable WRM in the long term. The study explores this precise dimension of India's federal governance.

1.3. The study

Even if one chooses to restrict the Centre's responsibility to interstate river regulation and development, the importance of a coherent and coordinated role for the Centre cannot be overemphasized. India's ambitious development goals include interlinking of rivers, inland waterways and river rejuvenation, besides shifting to Integrated Water Resources Management (IWRM) for long-term water security. These plans call for the Centre to work closely with the States – in other words, a robust and resilient interstate river water governance framework. The increasing and intractable interstate river water disputes and the relatively unsuccessful interstate river water development programmes do not inspire confidence about the Centre's ability to work with States towards achieving the country's development goals, or its long term water security. The study aims to address this problem, and takes a closer look at the Centre's leverage in terms of the spectrum of instruments at its disposal: policy, legal, institutional and financial instruments.

Additionally, in broader conceptions of the Centre's role, some recent developments assume significance with respect to the Centre-States relations. The 14th Finance Commission (FC14) – covering 2015-2020 – has increased the States' tax revenue share from 32% to 42%, and also set in motion a greater rationalization of allocation of resources (Ministry of Finance 2015). The terms of reference of the 15th Finance Commission (FC15) – which is to cover 2020-25 – include further rationalization of resources through the channel of Central Sector Schemes (CSs) or Centrally Sponsored Schemes (CSSs), possibly linking them to performance-based indicators. The Centre's role in engaging with states for better WRM needs to be reconsidered against this broader canvas of reforms.

Within this background, the study seeks to understand the Centre's leverage and possible ways of incentivizing better WRM outcomes by states. The idea of improved WRM by States is a difficult one to define, but generally indicative of better outcomes towards sustainability – addressing both quantity and quality issues. It also includes improved resource use, especially in agriculture, and putting in place policy and institutional arrangements and practices for ensuring sustainability.

There are three challenges at the core of this exploration. One, there is the challenge of federal governance to be addressed by locating the inquiry in the evolving nature of Centre-States relations. Two, water resource development and management trajectories of States vary. They respond to the respective historical, political and ecological contexts. The Centre's leverage needs to be understood in this contextual diversity, and also the States' preferred choices of water resource development strategies. Third, closely associated with the second, is that

WRM performance has to contend with the complexities of its apparent inconsistent goals: development, use efficiency and sustainability. These challenges set the contours for this inquiry, with its goal of understanding and augmenting the Centre's leverage in shaping and influencing States' WRM approaches towards improved outcomes. In more specific terms, the study explores the Centre's leverage through the policy, legal, institutional and financial instruments at its disposal to influence and incentivize States' WRM choices and priorities, and seeks answers to the following questions.

- (i) What is the division of powers between the Centre and States in terms of the federal arrangements for WRM? What does the existing body of work tell about how the federal governance is practised in comparison to the letter of the law?
- (ii) What is the state of WRM in India and in the individual States? What are the specific drivers, priorities and strategies of states that can be linked to their WRM status?
- (iii) How and what kind of influence does the Centre exert in WRM strategies of the States? What are the intent and nature of application of the instruments – policy, legal, institutional and financial – so far? What kind of impact have they had on States' approaches to WRM?
- (iv) In exerting its leverage, is the Centre's potential to influence the States' approaches to WRM fully realized? Specifically, do the financial instruments in the form of inter-governmental transfers (CSs/CSSs – output-based or otherwise) offer any significant leverage?
- (v) Are there lessons from experiences of other sectors within India, or other federal contexts outside India in leveraging the Centre's influence for better WRM by the States?
- (vi) What are the opportunities – across the spectrum of legal, institutional and financial instruments – to incentivize better performance of states?

These objectives have been pursued using a combination of quantitative and qualitative methods. These include (a) an extensive review of literature and secondary sources about Centre-States relations over water; (b) an analysis of budgetary allocations by the Centre and States, supplemented by policy and institutional analysis for an understanding of their respective prioritization of water resource development strategies.

In addition, we also carried out case studies of three States of Punjab, Karnataka and Maharashtra to further qualify and understand the leverage of the Centre in shaping the States' approaches to WRM. The case studies included background studies of budgetary allocations, key informant interviews, and focus group discussions in the three States. Key informant interviews have also been carried out with important institutions at the Centre level. The study also benefitted from inputs received at two consultation workshops, an inception workshop, and another workshop where we shared our findings with wide-ranging stakeholders. This report presents the findings of the study.

WATER AND FEDERALISM

2.1. India's federal governance of water

The Indian federation is a “Union of States”, as the Constitution describes it, and has some defining and distinct characteristics: asymmetrical, quasi-federal and cooperative (see Rao and Singh 2004, Arora and Kailash 2018, Bagchi 2003). These features of India's federalism are attributed to its particular historical evolution, and the manner in which the structural organization of the legislative powers have translated into practice over time. Indian federalism is often analysed in politico-economic and fiscal terms, but rarely through the lens of governance of natural resources such as water. The only way federal water governance challenges are addressed is through the politics of interstate river water disputes and sharing. Even so, the federal water governance dynamics present an interesting perspective.

Article 246 and the Seventh Schedule delineate the federal organization of legislative powers over various subject matters. These are organized in three lists: the Union List, the Concurrent List, and the State List.¹¹ The Parliament has exclusive powers to frame laws about subject matters in the Union List. Similarly, with the State List the States have exclusive domain over law making. The third or Concurrent List includes the subjects on which both the Centre and States can formulate laws. With water-related powers, the discourse often focuses on the following. Entry 17 of the State List reads: “Water, that is to say, water supplies, irrigation and canals, drainage and embankments, water storage and water power subject to the provisions of entry 56 of List I.” Entry 56 of List I, the Union List, reads: “Regulation and development of inter-State rivers and river valleys to the extent to which such regulation and development under the control of the Union is declared by Parliament by law to be expedient in the public interest.” These are the explicit listings related to water. There is another entry linked directly to governing water bodies, Entry 24 of the Union List on inland waterways. It has not been a prominent subject of discussion so far, but this is changing with the increased interest of recent governments in developing waterways.

Another important Constitutional provision is with respect to the resolution of interstate river water disputes under Article 262. This is a reiteration of the Union's domain over interstate river waters (as in Entry 56), though treated with some distinction. Article 262 provides for a peculiar provision for barring the jurisdiction of courts, including that of the Supreme Court, for the resolution of interstate river water disputes.¹² It is in furtherance of these provisions that the Interstate River Water Disputes Act 1956 (IRWDA 1956) was enacted. The Act bars the jurisdiction

11 The Constitution refers to the federal government as the Union and not “the Centre” – a term in vogue and often preferred one. The term may reflect the manner in which the federal government was perceived in the early years of the Indian state's formation, and the centralization power associated with it at that time.

12 Article 262. Adjudication of disputes relating to waters of inter-State rivers or river valleys:

(1) Parliament may by law provide for the adjudication of any dispute or complaint with respect to the use, distribution or control of the waters of, or in, any inter-State river or river valley.
 (2) Notwithstanding anything in this Constitution, Parliament may by law provide that neither the Supreme Court nor any other court shall exercise jurisdiction in respect of any such dispute or complaint as is referred to in clause (1).

of the Supreme Court or any other court over interstate river water disputes, and provides for setting up tribunals for their adjudication.

This is a simplified narrative of the federal organization of powers relating to water. The mainstream discourse primarily engages with the issue of federal governance within these contours. However, there are several other related ways in which the Centre engages with the States over water governance: water as an environmental resource, coping with the risk of disasters, expenditure, social impacts of water supply augmentation structures, etc. The later parts of the report elaborate scope of this engagement.

But generally, water is assumed to be exclusively a State subject. Even though it is subject to the Union's powers over interstate rivers and other domains, the manner in which these are translated into practice makes all the difference. Entry 17 of the State List gives State governments direct executive powers with a wide scope, whereas to exercise its powers under Entries 56 and 24 or Article 262, the Centre needs the support of a law of Parliament. For this reason, the Centre's powers are limited, though the precise extent of this limit depends on the political configuration of Parliament at any given time. The practice of this organization of powers is thus linked to the politics of evolution and transformation of the Indian state, in particular the Centre-State relations. The trajectory of this transformation suggests a negligence, if not abdication, of its role by the Centre in governing water resources. It is necessary to recognize this 'lost ground' of the Centre to put our search for its leverage in the right context.

2.2. The Centre's 'lost ground'

The literature on India's federal water governance is limited and highly skewed. It is excessively invested in interstate river water disputes. The limited rest of the literature engages with the project of interlinking of rivers. Interstate river water disputes emerge and recur frequently, and often lead to conditions of impasse with States defying judicial directives, including those of the Supreme Court. They often derive support from their legislative assembly resolutions to do so (Chokkakula 2017, Iyer 2002). These are the moments when federal water governance comes into sharp focus. Exasperation and/or desperation with these episodes often trigger popular demands, however untenable, for shifting the subject of water to the Union List (see Reddy 2013).

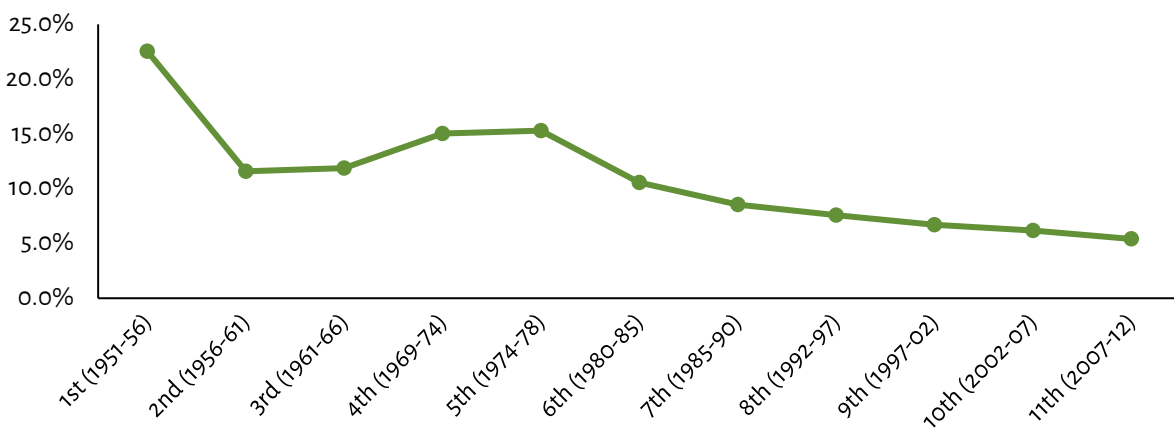
A more considerate engagement with this issue has led to the argument of a "wilful abdication" of its role by the Centre (Iyer 1994). Powers under Entry 56 have not been fully realized by the Centre (Iyer 1994, 2002). This is best illustrated by the manner in which the River Boards Act 1956 (RBA 1956) has been used. RBA 1956, a compliant legislation under Entry 56 to exercise its powers, has remained a 'dead letter'. The Act has never been used to create any river board; all the existing river boards rely on alternative sources of power (Doabia 2012). On the other hand, curiously, RBA 1956 has not been amended or replaced, in spite of recommendations of consecutive commissions on Centre-State relations (Sarkaria Commission 1988, Punchhi Commission 2010). This peculiar absence of the Centre, or indifference towards deploying its powers under Entry 56, has led to a couple of key conclusions on the part of scholars engaging with federal water governance. One, the

Indian state's initial centralized nature, attributed to single party dominance, has contributed to presumptive notions about the Centre's ability to prevail over States and ensure their compliance with any decision over interstate river water disputes (Nariman 2009). Two, the weak legal and institutional framework for Entry 56 provisions does not mean that the Centre cannot engage effectively with States in shaping their policies. It has several other means of exercising influence over States' WRM approaches. These include via Entry 20 in the Concurrent List – economic and social planning – requiring States to get water resource development projects of a certain size cleared by the Centre. Or it can use other provisions associated with its powers related to forest or environment protection (Iyer 2002).

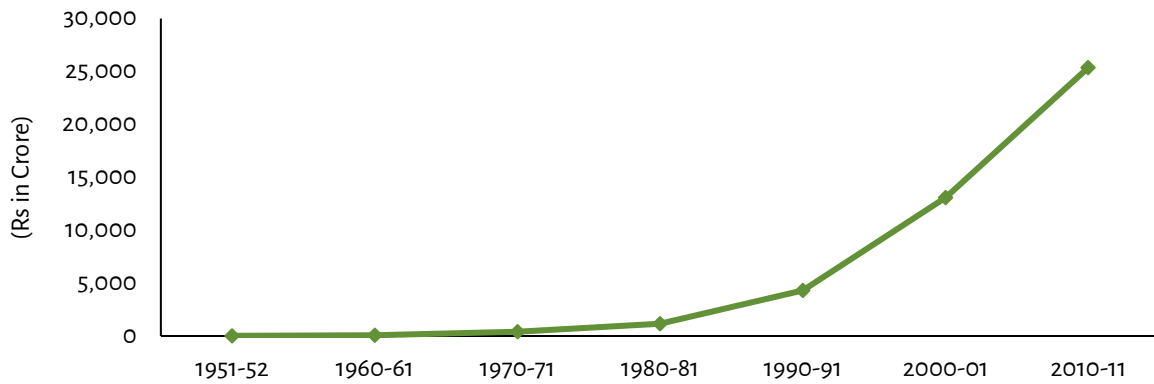
Both these conclusions align and resonate with those of the larger body of work on Indian federalism. There is a rich body of work that recognizes the rather uniquely centralized yet federal nature of the Indian state – ascribed to the single party dominance of Congress in the early decades. The decay of single party dominance began in the 1980s, which led to coalitional politics featuring a greater assertion of regional powers (see Kohli 2001). Coalitional politics and the transformation of the Indian state and federalism have received considerable attention. Political economy narratives of decentralized federation have attributed it to the market forces unleashed by the economic liberalization policies beginning in the late 1980s (see Saez 2002, Mawdsley 2002, Kale 2014). The shift from “inter-governmental cooperation” up to the 1980s to “inter-jurisdictional competition” in the later years marked the transformation of federal relations in India (Saez 2002).

A quick look at the engagement of the Centre vis-à-vis the States in water resource development supports this trajectory of transformation. This may need a more comprehensive investigation, but the following observations suggest an indicative alignment with the notion of the weakening Centre and stronger States. Traced across the plan periods, over time the Centre's contribution to MMI and MI expenditure has declined gradually. Its share in the total plan expenditure decreased from 23% in the First FYP to 6.3% in the 10th FYP (see Figure 2.1). Figure 2.2 shows how Maharashtra's contribution has increased over the corresponding time horizon, suggesting an aggressive impetus to irrigation development by the State.

Figure 2.1: Percentage expenditure on WRM in various FYPs



Source: Planning Commission 2011

Figure 2.2: Maharashtra's expenditure on irrigation

Source: CoM 2012

Notwithstanding the current apparent reversal of single party dominance, the trajectory of the Indian state's transformation from 'strong Centre-weak States' to 'weak Centre-strong States' has had significant consequences for the federal structure and governance of water resources.¹³ The Centre's 'lost ground' in water governance is manifested through two inter-related historical processes of Indian state's evolution. One, single party dominance and a strong Centre in the initial phase of centralized federalism led to the neglect of the consolidation of its powers in water governance. The Centre relied on non-statutory bodies such as the Planning Commission and the 'fiscal power' attached to them to engage with States (Swenden and Saxena 2017). In the process, it disregarded the creation of strong structural relationships and robust institutional processes under Entry 56 and other provisions to strengthen the federal governance of water resources. This overlooking of structural and institutional relationships manifested in the weakening of reliance of State water resource departments (WRDs) on central institutions such as the CWC for technical inputs. Two, in the 'decentralized federalism' of the coalitional politics phase, the regional powers and States took advantage of this vacuum to further assert their autonomy over water and aggressively pursued water resource development, essentially supply augmentation.¹⁴ This was aided by the increasing economic power of the States post liberalization (see Saez 2002). The economic liberalization policies have improved their access to external sources of investments and technical inputs.

13 The current BJP-led NDA regime shows similar dominance as that of the Congress in independent India's early years. However, single party dominance in the current times is likely to be different from earlier times of such dominance. It has to now grapple with the challenge of regaining its 'lost ground' in these changed times of Centre-State relations. The States are no longer dependent and subservient as earlier, but are 'opportunistic' and assertive, emboldened by fortified regional identities and subnationalism.

14 There are historical reasons that help the presumptive notions of exclusive powers over water by States. Water was a provincial subject even under colonial administration since 1919, and eventually under the Government of India Act 1935, even though there was strong Central regulation. This was further subjected to hard negotiation at the time of the formation of the Indian Union by both provinces and the princely states. The large number of princely states did not want to part with powers over water and other resources forming the core of their agrarian economies (see D'Souza 2006).

These trends of decentralized and State-driven WRM strategies have contributed to the conditions of ‘tragedy of commons’ pointed out earlier. Concerns of long-term water security and increasing interdependencies for pursuing the larger development goals call for an active role for the Centre and strong federal relations. This is particularly critical for India’s ambitious plans. The grandiose plans of interlinking rivers, river rejuvenation and inland waterways are increasingly nudging the Centre into the realm of proactive federal governance. These plans need robust and efficient Centre-States and interstate relations.

This challenge of Centre-States and interstate relations can best be articulated through an examination of interstate river water disputes. The resolution of disputes suffers from not only lengthy litigations and other inefficiencies, but also two crucial gaps that are institutional in nature.

One is ensuring States’ compliance with the decisions. There is an acute absence of reliable and resilient mechanisms for implementing the decisions of the adjudication process (Chokkakula 2014). The Centre’s abject failure to influence States to comply with the decisions brings the poor state of federal relations into sharp focus. The recent episodes of the recurrence of the Cauvery dispute even after a decision by the tribunal in 2007 are illustrative. The Supreme Court’s recent and unprecedented intervention in 2018 has eventually led to the creation of a Cauvery Water Management Authority (CWMA) to implement the Cauvery decision.¹⁵ It is too early to comment on the CWMA’s effectiveness. But there is already resistance from States to its proposed operational procedures for monitoring and collecting data about water availability in States’ structures and facilities.

Two, the resolution and implementation of decisions also suffer from an absence of credible data about water resources. The disputing States disagree with each other’s’ data and also challenge the data supplied by the CWC and other central institutions (Chokkakula 2014, 2017, D’Souza 2006). The critical nature of credible data in effective resolution has been recognized through a proposed amendment to the IRWDA 1956 to create a databank.¹⁶ Questions have been raised over the feasibility of such an arrangement without a deliberate consensus and participation of the party States.¹⁷

The lack of credible data and knowledge about water resources is a much deeper and greater challenge that extends beyond interstate water disputes. Absence of comprehensive data about quantity and availability of water resources and their quality over space and time is a huge conundrum afflicting water policymaking, both at the Centre and the States. The recent ruckus over NITI Aayog’s projections about India’s water crisis is an example. The instance highlights not just the absence of data, but also more critical issues of credibility and institutional accountability of data and knowledge production. These issues point to two important federal governance challenges: the acceptance and legitimization by States of an institution responsible for producing knowledge about water resources, and consensus on the procedures and protocols of data and knowledge production to provide the necessary credibility.¹⁸

15 <https://indianexpress.com/article/opinion/columns/cauvery-dispute-verdict-parting-the-waters-5069108/>, last accessed 30 September 2019.

16 Interstate River Water Disputes Amendment Bill 2019, passed by the Lok Sabha on 31 July 2019.

17 <https://indianexpress.com/article/opinion/columns/cauvery-water-dispute-supreme-court-cauvery-management-board-5226169/>, last accessed 30 September 2019.

18 <https://www.thehindu.com/opinion/op-ed/rethinking-water-governance-strategies/article28984738.ece>, last accessed 30 September 2019.

RESCALING TO STATES

Lawrence Saez (2002) called Indian federalism a “federalism without a Centre,” relying on his examination of the evolving and assertive subnational political economies. This is an apt description of India’s federal water governance, even in these times of apparent revival of centralization of power. This chapter aims to provide a basis for this premise. It requires rescaling our gaze to States for an understanding of how the subnational entities choose, prioritize and reconsider their WRM strategies and approaches. It also involves arriving at a sense of how these choices are influenced by the Centre. We pursued this objective by first looking at the patterns of budgetary allocations of select States, and supplemented this understanding with field visits to the States which also included key informant interviews.

As part of the study design, we relied on case studies of three states: Karnataka, Punjab and Maharashtra. These three states were selected using two broad categories of criteria, in addition to the geographic distribution and diversity of ecological contexts of the States: (a) water resource development and deterioration indicators; and (b) qualitative indicators of progressive policymaking, such as establishment of a regulatory institutional framework, a noticeable shift away from conventional supply augmentation strategies, emphasis on participatory water resource development, etc. In finalizing the case studies, we also gave due consideration to our existing access to the State governments keeping in view the short time frame of the study. Annexure 1 provides details of the selection of the case study States.

The challenging part, however, is to define what does it mean by improved WRM performance of a State – in a more generic sense of a territorial entity, i.e. understood as an entity with an identity and political control of its own. This calls for reflection from two perspectives. First, territorial entities choose and pursue WRM strategies that suit their respective hydro-ecological contexts. Can universally designed indicators capture this diversity to make their assessments comparable? Second, there is the federal context of States in India. Indian States vary not just in their hydro-ecological contexts, but also in their uneven histories of water resource development. Some States have advanced irrigation development in comparison to the rest.²⁷

A review of the literature for applicable WRM performance indicators for States or territorial indicators was not fruitful. The closest outcome-based assessment for States or territorial entities is the United Nation’s (UN) Sustainable Development Goals (SDG) framework, with 17 SDG goals setting 169 targets based on 232 indicators.²⁸ However, these are too cumbersome to monitor, especially in the face of poor data corresponding to these indicators. India’s water data architecture is opaque, messy and chaotic. Our own efforts to put together a set of comparable data across

²⁷ Generally, Indian States directly ruled by the British are advanced compared to those indirectly ruled (princely states). These historical inequities were also created by the technical rationalities of locating irrigation structures and public irrigation systems. (For a comprehensive discussion, see D’Souza 2006, Chokkakula 2017.)

²⁸ <https://www.undp.org/content/undp/en/home/sustainable-development-goals.html>, last accessed 10 October 2019.

States (for selecting case studies as shown in Annexure 1) turned out to be a huge challenge in spite of extensive efforts. The anarchic status of water data production is best illustrated by the Composite Water Management Index (CWMI) report of 2018 done by the government's own think tank, National Institution for Transforming India's (NITI) Aayog. NITI Aayog (2018) had to outsource data collection (from the States) and its validation. The CWC's own data collection programme is limited and restricted to hydrological monitoring of major rivers. Data about water utilization is primarily with the States, and there are no uniform protocols or procedures for data collection, raising serious credibility questions. As a result, the data is not only not comparable, but also easily contested. It has been argued that the absence of institutional accountability for data production creates a critical institutional vacuum that has to be addressed for improved water governance in India.

In this report, we have followed the framework of three categories of indicators used for selecting State case studies: development (primarily supply augmentation), use efficiency (essentially aimed at improving agricultural productivity – 'more crop per drop'), and sustainability (institutional development such as regulatory or participatory institutions, or financial sustainability of irrigation systems). We developed a continuum of trajectory where governance practices move from development to sustainability, calling it pathways for progressive outcomes, and examined how the selected States are moving along these progressive pathways. But before discussing this, we present our findings about the preferred strategies of the States and their rationalities, from the States' perspective.

3.1. The state of States' WRM

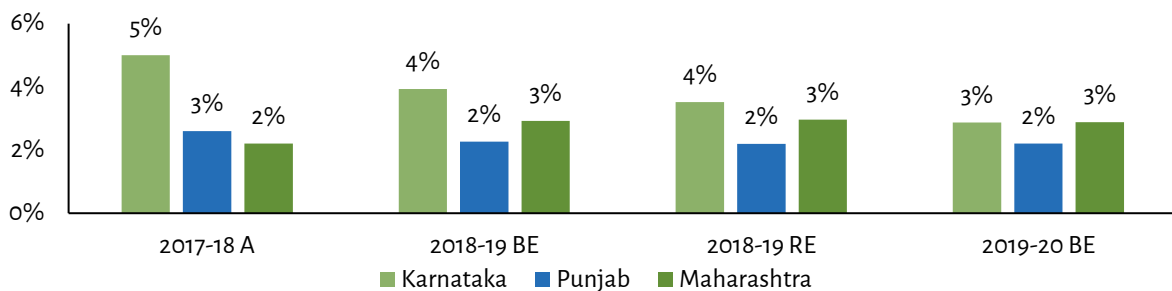
Building dams and storage structures for supply augmentation and canal networks for irrigation has been the singular paradigm that has driven both the Centre and the States historically (see Planning Commission 2011, Shah 2011). It has defined and determined the budgetary allocations, intergovernmental fiscal transfers (IGFTs), and institutional cultures – both at the Centre and the States. While there has been a slow and perceptible course-shift away from the paradigm (which we will discuss in later sections), the template is deeply entrenched in the institutional cultures driven by technocracy. For instance, one of the WRD functionaries in Punjab, in spite of the State's saturated IPC, insisted: "We are here to supply water." Capital-intensive infrastructure development has not only defined the institutional cultures, but has also led to nexuses of interests driving it for rent-seeking opportunities. In our analysis of the States' preferred strategies, we have paid particular attention to their efforts to move away from the development category.

States' WRM strategies have paid little attention to two other aspects: use efficiency and sustainability. There are trends however reflecting progressive policymaking: setting up of regulatory institutions, and enacting laws for revenue generation and collection. But these do not inspire confidence, for they are not often backed by adequate budgetary allocations, or institutional processes, projects or programmes for their implementation. For instance, in Punjab, the net irrigated area has increased from 54% in 1960-61 to 97% in 2006-07. The subsequent allocations continue to be invested in capital-intensive works of medium/minor irrigation projects,

or maintenance works such as lining of canals. The budget analysis of Punjab for 2015-16 revealed that allocations for WRM formed 3.6% of the State's total budget. Out of this, development activities continued to account for the high share of 85%; only 15% was allocated for activities that can be considered as falling in the categories of use efficiency and sustainability. There were, however, no activities or interventions suggesting regulation or financial sustainability, even in the face of alarming depletion of groundwater levels. This is even though State policy documents explicitly recognize this problem, as also the need for pricing groundwater abstraction.

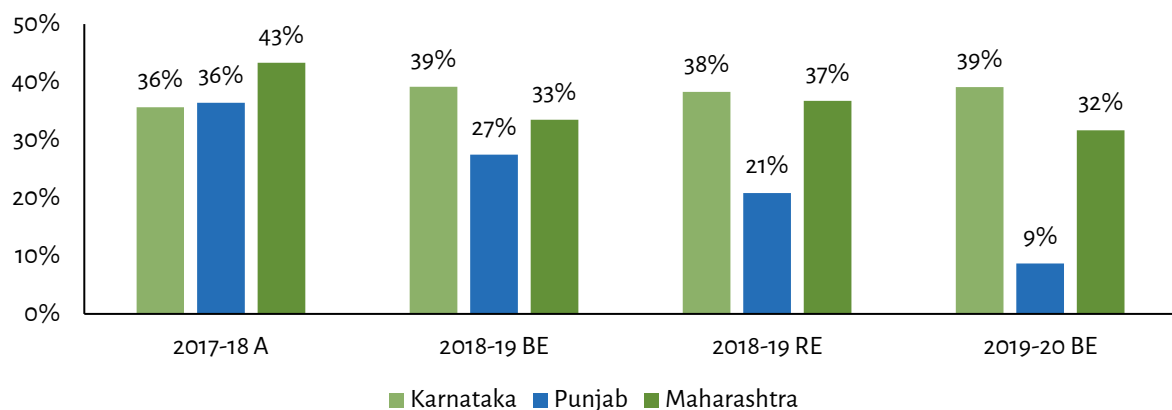
The water sector's share in the revenue expenditure varied between States, Maharashtra ranging between 2-3%, Karnataka between 3-5% and Punjab 3% or less over 2017-19 (Figure 3.1). The prioritization of strategies within this expenditure shows similar patterns as observed at the national level, though with interesting variations across the three States. An immediately striking, but not an unexpected feature is the continued dominance of capital expenditure in water sector allocations in all the three States (Figure 3.2).

Figure 3.1: WRM revenue expenditure share in total revenue expenditure



Source: State Budgets
 Note: BE: Budget Estimates; RE: Revised Estimates; A: Actuals

Figure 3.2: WRM capital expenditure share in total capital expenditure



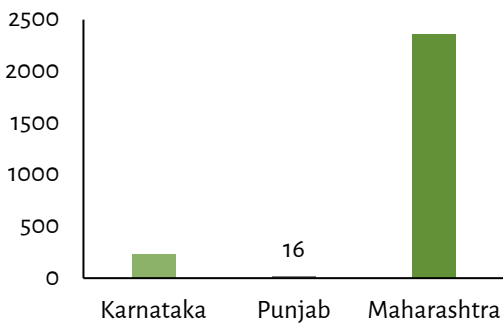
Source: State Budgets
 Note: BE: Budget Estimates; RE: Revised Estimates; A: Actuals

Trends in capital expenditure as a share of MMI and MI expenditure have also varied for the different States. The share of capital expenditure in Punjab has fallen considerably since the Eighth and Ninth FYPs, from 65-67% of the total expenditure on MMI to 16% in the 11th FYP. Karnataka and Maharashtra, on the other hand, continue to maintain a steady share of capital expenditure, with Karnataka spending about 90% of MMI expenditure on the capital account alone.

Capital expenditure as a share of MI expenditure has also been different for the different States, suggesting variations in their prioritization of MI. Karnataka has aggressively prioritized MI since the Eighth FYP. During the 11th FYP, Karnataka's MI capital expenditure went up to 82%. In contrast, the corresponding figures for Maharashtra and Punjab are 51% and 23% respectively.

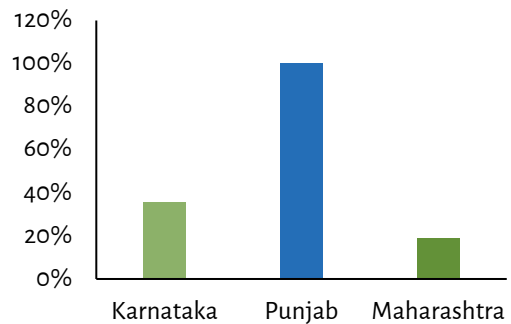
Maharashtra's lower allocations for capital expenditure can be related to an apparent course-shift after reaching its peak with aggressive dam building (Figure 3.3). Punjab, however, stands out, with its low revenue expenditure share for water and the share of capital expenditure declining over time (Figures 3.1 and 3.2). This does not necessarily indicate any shift away from supply augmentation strategies. Punjab has reached its limits of irrigation potential, with close to 100% already being created (CAG 2016, also see Figure 3.4). The other two States' capital expenditure shares remain steady, though Maharashtra's suggests a shift away from capital asset building. The IPC/IPU ratios across the three States indicate the BNR syndrome (see Figure 3.5). The reduction

Figure 3.3: Number of large dams till 2016



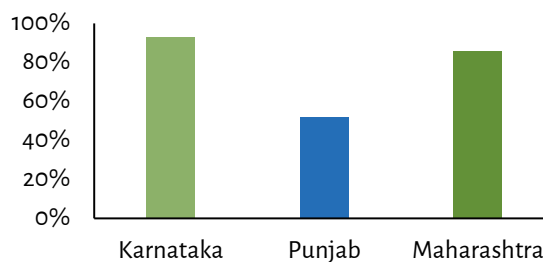
Source: CWC 2018

Figure 3.4: Net irrigated area as a share of net sown area, 2016-17



Source: GoP 2018

Figure 3.5: IPU as a share of IPC, 2017

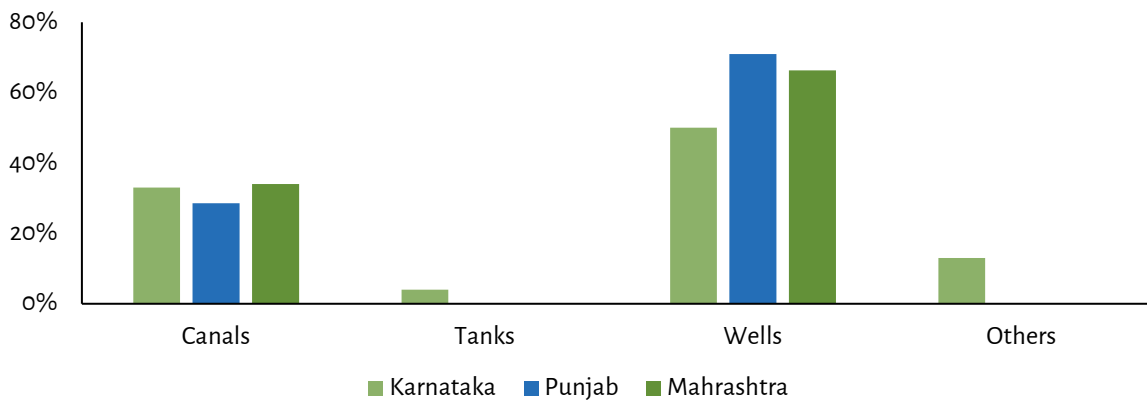


Source: NITI Aayog 2018

in the IPU/IPC ratio is an outcome of the States' continued prioritizing of capital asset creation over maintenance and repair. Punjab, the most advanced in augmenting its irrigation potential, has low IPU/IPC ratios, followed by Maharashtra and Karnataka; this is along the lines of their respective trajectories in augmenting irrigation potential. The choices and priorities of States are thus influenced by their respective histories of augmenting irrigation potential.

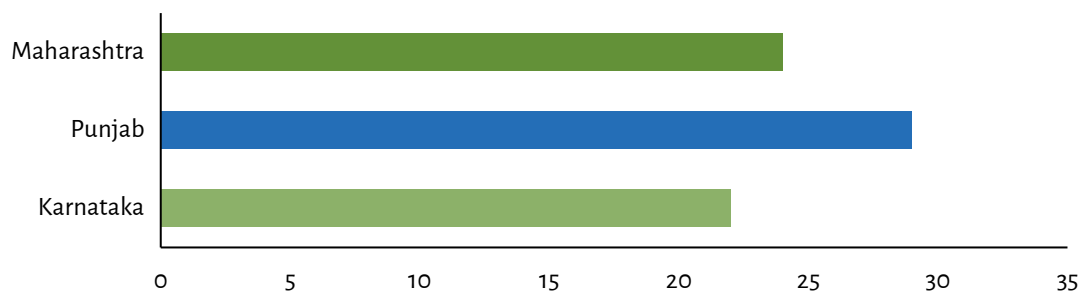
Another interesting feature is how the States rely predominantly on GWI compared to canal irrigation (see Figure 3.6). This is irrespective of their highly uneven realizations of irrigation potential through canal irrigation systems. The rapid growth of GWI does not seem to be linked to access to public systems of irrigation, but is driven by autonomous dynamics linked to improved access to pumping technologies and affordability (Shah 2010). The corresponding density of energized tube wells is also alarming, with Punjab at the top at 28 tube wells per km² of net sown area (Pandey 2014, Figure 3.7). This is overwhelming evidence of the 'atomistic growth' of GWI.

Figure 3.6: Share of irrigation sources to net sown area, 2017



Source: GoP 2018

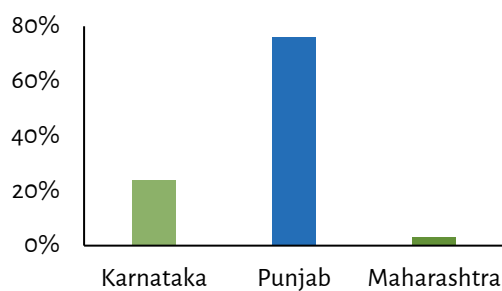
Figure 3.7: Energized tube well density (Tube wells/km² of net sown area till 2015)



Source: GoP 2018

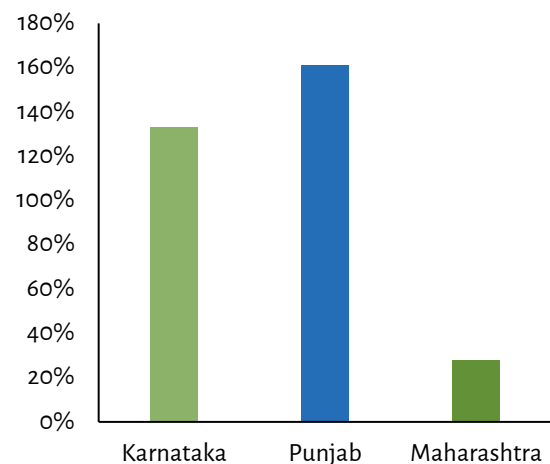
This shifting/increasing reliance on GWI has the other dynamic of perverse incentives leading to adverse outcomes on groundwater levels. All the three States provide free/subsidized electricity for farming. And, GWI with electricity connections is preferred over canal irrigation (Swain 2017). The farm electricity subsidies combined with widespread use of groundwater for irrigation is leading to depleting groundwater levels. The overexploited blocks identified by the CGWB (2017) are distributed along predictable lines: led by Punjab and then followed by Karnataka and Maharashtra (Figure 3.8). More shocking is the magnitude of the cost of the subsidies for the State governments. The cost of farming subsidies in Punjab is close to Rs 8000 crore per year, amounting to 160% of the entire water budget allocation. While it is close to 140% in Karnataka, it is much lower in Maharashtra (Figure 3.9).

Figure 3.8: Share of over-exploited blocks, 2013



Source: CGWB 2017

Figure 3.9: Agriculture pump subsidy as a percentage of State water budgets, 2015-16



Source: GoP 2018

3.2. States' strategies and rationalities

The situation with WRM in States suggests similar historical preferences for supply augmentation strategies as that of the Centre. The institutional cultures are essentially organized to pursue these strategies. The prioritization may vary in degree across the States, but these are rationalized by endogenous factors linked to their context, conditions and constituencies. Context refers to the ecological setting and physical attributes linked to water availability, and potential for augmentation. Conditions refer to the historical and geographic conditions that contribute to early and advanced levels of augmentation and irrigation development. Finally, constituencies refer to political rationalities – the States' choice of strategies rationalized by politics, such as preferences for building dams and electricity subsidies for farming. The following table depicts how the WRM strategies of the selected States are guided by these factors.

Table 3.1: States’ WRM strategies: Drivers and rationalities

	Punjab	Karnataka	Maharashtra
Character/ descriptors of water resource development	<ul style="list-style-type: none"> · With 1.54% India’s geographic area, contributes 45.4% of wheat and 25.3% of paddy to the central pool (GoP 2012) · 85% of area under agriculture; 29% area under canal irrigation; 71% area irrigated by GWI · 103 out of 137 blocks overexploited (CGWB 2017) · Groundwater depletion in the north-east, water logging and drainage problems in the south-west 	<ul style="list-style-type: none"> · Large areas under arid conditions · 64% of the total area under rainfed irrigation; high spatial and temporal variance in rainfall across the state (Raj and Chandrakanta 2015) · About 50% of the area under GWI; the rest use surface water – tanks and canals (GoK 2017) · Of the total talukas, 24.4% overexploited and 8% critical (CGWB 2017) 	<ul style="list-style-type: none"> · About 80% of area under rainfed irrigation · Has 41% of India’s large dams, with 64% of them under construction · Only 0.1% growth in irrigation potential through Rs. 70,000 crore investment over 2001-12 ; cost escalations of capital projects (CWC 2015b)
Key strategies	<ul style="list-style-type: none"> · Continuing focus on capital assets for supply augmentation – lining of canals, improving irrigation supply efficiency · Continuing promotion of tube wells, but feeble attempts at pricing of groundwater and controlling GWI growth · Power subsidy burden as a percentage of total developmental expenditure in Punjab 22% in 2013-14 –highest for any state in India (Dharmadhikary et al. 2018) 	<ul style="list-style-type: none"> · Aggressive preference for dams and storage structures · Declining tank irrigation · Irrigation Development Corporations (IDCs) to expedite implementation · Emphasis on MI and watershed development · Promoting micro-irrigation since 1991 · On the path to reforms: Groundwater Act; solar irrigation (Surya Raitha Scheme) 	<ul style="list-style-type: none"> · Aggressive dam building and IDCs for private funding mobilization · Emphasis on watershed development · Recent reforms: River Basin Organizations (RBOs); Participatory irrigation management (PIM) Act; Groundwater Act; regulatory framework; increased O&M allocations; Jal Yukta Shivar · Integrated State Water Plan to guide WRM
Rationalities			
Context	<ul style="list-style-type: none"> · Indo-Gangetic alluvial plains with three main river systems 	<ul style="list-style-type: none"> · Large arid and drought-prone areas, variable rainfall and limited irrigation 	<ul style="list-style-type: none"> · Large portion of drought-prone areas and intense rainfall areas

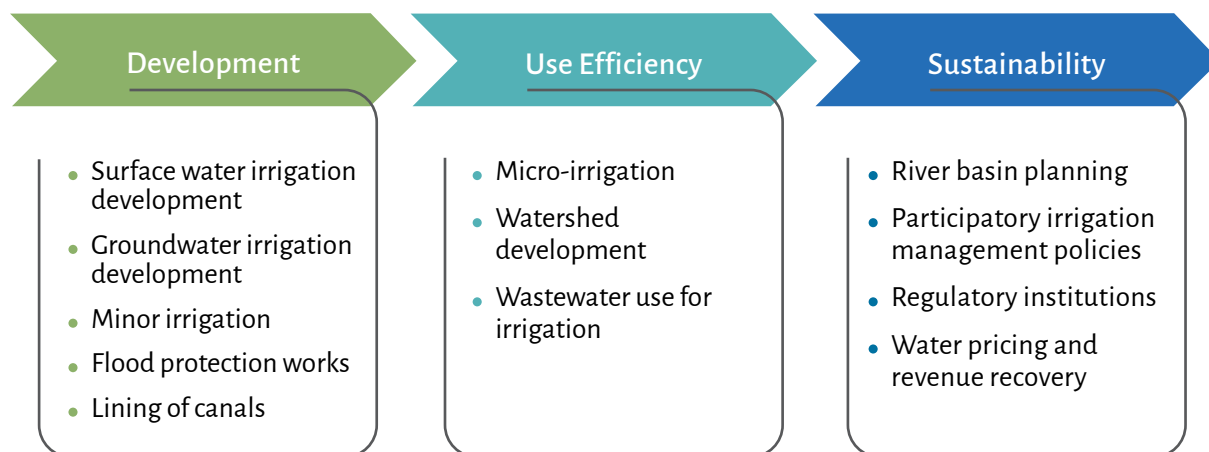
	Punjab	Karnataka	Maharashtra
Rationalities			
Conditions	<ul style="list-style-type: none"> · Green Revolution-led focus on public irrigation systems · Aggressive promotion of tube well irrigation (Punjab State Tubewells Act in 1954) · Free electricity for farming in 1996 (Swain 2017) 	<ul style="list-style-type: none"> · Historically, tanks an important source of irrigation. · Continued emphasis on storage structures – a former princely state lagging in irrigation development · Party to three major ongoing disputes: Krishna, Cauvery and Mahadayi; irrigation development impaired due to prejudiced agreements 	<ul style="list-style-type: none"> · Advanced irrigation and agriculture development and economy · Deep nexus of interests promoting dams and supply augmentation · Highly uneven development and inequalities across geographic regions. · Growing demands of urbanization and industrialization
Constituencies	<ul style="list-style-type: none"> · Continuing reliance on supply augmentation strategies, which keeps the Ravi-Beas dispute alive; unilateral resolutions by legislature to avoid complying with tribunal awards, in pursuance of political objectives · Continuing electricity subsidies for farming, even with groundwater levels depleting dangerously and a huge financial burden · Farmers organized into powerful lobbies for maintaining power subsidies; electricity for farming an important political issue (Shah et al. 2012) 	<ul style="list-style-type: none"> · Historical prejudice and inequitable distribution of irrigation benefits at the Centre of the two major disputes of Krishna and Cauvery – continued emphasis on building storage structures · Farming power subsidies continue with repeated but feeble attempts to enact pricing (Mukherji 2017) · Interstate river water disputes potent sites for political mobilization (Chokkakula 2014) 	<ul style="list-style-type: none"> · Highly uneven distribution of irrigation command area; 6% of command area for Konkan region with 64% of rainfall; powerful farmer associations driving the WRM agenda · Dam building driven by nexus of interests and appeasement politics · Review of strategies because of worsening WRM conditions · Farming subsidies continue even with bulk consumers paying for water use (industries and local bodies)

3.3. WRM performance of the States: Progressive pathways and subnational nexuses

Progressive pathways

The findings presented above show a continued focus and preference of the States for supply augmentation strategies. But they also indicate a slow, but definitive shift away from such strategies, though this varies across the States. The pools of strategies preferred and practised by the selected States are here presented in the earlier proposed continuum of progressive pathways.

Table 3.2: Progressive pathways



For a clear delineation of the progressive pathways of the three States, we analysed State budgets for the year 2015-16, organizing the expenditure along the above categories of strategies. This analysis also looked into how these strategies are funded. The analysis is presented in Annexure 2 for reference. These are the main findings.

In 2015-16, WRM budgets formed 11%, 6% and 3% of the overall budget expenditures of Karnataka, Maharashtra and Punjab respectively. These WRM budgets are funded largely by the States' own budget allocations. The Centre's fiscal transfers accounted for 9.3%, 12.5% and 15% of the WRM budgets for Karnataka, Maharashtra and Punjab respectively – not significant enough to influence States for a course-shift. Interactions with State functionaries reiterate this.

The analysis of allocations for expenditures over the three strategy pools (development, use efficiency and sustainability) shows that allocations for progressive interventions (use efficiency and sustainability) are often funded by the States' own allocations, or at other times by assistance from International Development Agencies (IDAs). The Centre's contributions to these are significantly low. In the States' own budget allocations for such spends, Maharashtra leads – reaffirming the endogenously driven course-shift observed (see Annexure 2).

Subnational water-food-energy nexuses

The particularities of the drivers and rationalities for the States' historically preferred strategies is not confined to the factors listed in the table. Our study has revealed that the nexuses of water-food-energy for the States are also particular and cannot be generalized. In fact, the perceived course-shifts are often responses to these particular nexuses—explaining the varied trajectories of progressive policy pathways of the States. We illustrate the particular water-food-energy nexuses of the States and the corresponding responses below.

In spite of Punjab's rapidly depleting groundwater levels, its energy and food policies continue to promote greater reliance on groundwater irrigation. Before the last elections, the Punjab government announced release of funds for 2.5 lakh tube wells, which has been shelved by the subsequent government.³¹ Government functionaries argue that, with the continued assurance of Minimum Support Price (MSP) for water-intense crops like paddy, it is difficult to address the issue of groundwater dependence. About 80% of all the rice produced in the State is procured at MSP (Sarkar and Das 2014). In an effort to break this nexus, the Johl Committee in 1986 recommended gradual reduction of the area under paddy and wheat by 20%. The Punjab Preservation Of Subsoil Water Act, 2009 has been brought in to discourage farmers from early sowing of paddy. Studies have shown that this has led to about 9% reduction of groundwater use (Singh 2009). Later, a Crop Diversification Scheme with the support of the Centre aimed at reducing paddy cultivation in overexploited zones. Recently, the Punjab government has undertaken a pilot project to convert electricity subsidies for farming into a Direct Benefit Transfer scheme.

In Karnataka, the increasing reliance on groundwater irrigation in extensive rainfed areas (18 out of 27 districts are drought-prone), combined with flat rates for electricity, is contributing to declining groundwater levels. To address this typical nexus leading to the problem, Karnataka attempted to install meters, but failed on account of political patronage for free electricity. Powerful farmer associations insisted dismantling the meters (Mukherji 2017). The nexus resists electricity tariff reforms in agriculture in spite of growing evidence that metering can contribute to reliable power supply and increased farm revenues (Kumar et al 2014).

Maharashtra too has a similar experience with powerful farmer lobbies resisting pricing or monitoring electricity use for farming. The State's aggressive dam building is also a result of a nexus of interests for rent-seeking combined with farmer lobbies. Our interactions reveal that these pressures led to the dilution of dam-building approval procedures. Maharashtra has responded with a comprehensive Integrated State Water Plan in 2018, which will guide water resource development in the State. One of the objectives of this plan is to address the issue of weak dam approval procedures. Maharashtra's other measures include creating a comprehensive regulatory framework through the Maharashtra Water Resources Regulatory Authority (MWRRA) Act 2005.

31 Policy to release new 2.5 lakh Tubewell power connections in Punjab Shelved, The Times of India. <https://timesofindia.indiatimes.com/city/chandigarh/policy-to-release-new-2-5l-tubewell-power-connections-in-punjab-shelved-minister/articleshow/65275227.cms>. Last retrieved on 12th July 2019.

MWRRA has made noticeable progress with its revenue collections from bulk users (local bodies and industries) reaching up to 30%. However, it has not had any success with regulating water use for farming.

This discussion reinforces the following. The States' WRM strategies respond to endogenous factors and their varying WRM trajectories have created diverse sets of nexuses particular to the States. Their progressive policymaking, though limited, targets these particular nexuses. It partly explains the varying trajectories of progressive policymaking by the States.

This may be seen as the unavoidable 'opportunistic' behaviour of federal constituents in public good provisioning – argued forcefully by Bednar (2009). However, there are two caveats to this. One, it is not entirely accurate to say that the progressive policymaking of the States is wholly a response emerging endogenously. There are exogenous factors at work. These are, broadly: one, the Centre or the federal leverage, which we will explore in the next chapter; and, two, external influences such as those of the IDAs. For instance, Maharashtra's adoption of participatory irrigation management has seen the World Bank playing an important role (Panickar 2018).

The second caveat reverts to Bednar's (2009) principles of federalism design. Specifically, the need for a robust system of safeguards – a combination of structural, popular, political and judicial instruments and processes – to minimize federal 'opportunism' and improve a federation's productivity and efficiency. With due regard to the two caveats, the next chapter explores the federal or Centre's leverage: the possibilities and potential, and the conditions necessary.

THE CENTRE'S LEVERAGE

Delving into the leverage of the Centre involves addressing three dimensions. What kind of leverage has the Centre been able to exercise over States? What kind of potential exists for enhanced leverage? What conditions enable augmenting this potential? We will engage with these questions in the next three chapters, beginning with this one. This chapter will discuss the Centre's leverage in text vis-à-vis in practice, and the opportunities of augmenting the potential leverage. We discuss this in four sections – policy, legal, institutional and financial – to make the following broad proposition. The federal leverage as practised is limited, but the potential is large. It is best augmented and realized when the range of instruments are channelled towards forging stronger Centre-State partnerships for better and sustainable WRM outcomes.

4.1. Policy leverage

India's federal arrangements with respect to water and their practice (discussed earlier) indicate that policymaking by the Centre does not guarantee States' response or compliance. While it is expected that States respond with policies of their own aligning with that of the Centre, it also depends on the Centre's will and the means it deploys to pursue the States to give effect to these policies. In order to understand the extent to which national water policy making has had influence over the States, we traced the trajectory of water policymaking for progressive outcomes both at the national level and in the three selected States. The mapping is provided in Annexure 3 for reference, and includes initiatives taken up by States in the 1960s, much before the first National Water Policy in 1987.

It is important to note that policymaking alone is not an indicator of a progressive path. It is often the case that the policies remain only intents articulated, and do not necessarily translate into action. Policymaking needs to be followed by legal instruments, budgetary allocations, programmes, projects and institutional processes for their implementation. The mapping thus involves an analysis of not just progressive policies but the follow-up interventions as well.

The following findings emerge from this mapping. (i) There is no evidence to make an argument that policymaking by States is influenced by that of the Centre. (ii) The feeble links between the Centre's and States' interventions is leveraged by financial transfers. (iii) The Centre's own policymaking does not translate into its programmes. (iv) The Centre's leverage suffers from contradictory and self-defeating interventions. We discuss the findings below with some empirical evidence.

There is no discernible case for the Centre's leverage in policymaking. The Centre itself has been equivocal in national policymaking for progressive outcomes and in its efforts to persuade the States to follow the policies. The First National Water Policy (NWP) in 1987 focused on the development of both surface water and groundwater to raise food grain production, though it

made note of potential social and environmental impacts. The Second NWP came out in 2002, and the latest one in 2012. None of these policy statements, however, follow comprehensive action plans to influence States to align their respective strategies with these policies.³²

Incidentally, the first few progressive initiatives have come from the States, without any apparent cue or stimulus from the Centre. Maharashtra passed its Maharashtra Cooperative Societies Act in 1960 to enable the creation of cooperatives to manage irrigations systems. Similarly, the recent rather radical legislation to set up the much-discussed MWRRA by Maharashtra came about without any push from the Centre. Further, Maharashtra and Karnataka set up Pollution Control Boards before the CPCB was set up. Karnataka too passed its Command Area Development Act in 1980 to enable setting up command area authorities for optimal utilization of water resources in three major irrigation projects. These instances reiterate the argument made earlier: that the States' progressive policymaking is usually in response to endogenous factors and demands, rather than in response to the Centre's policies.

This is not to entirely discount the influence of Centre or external forces such as the IDAs. This leverage often involves financial assistance. It can also materialize through technological or other inputs when there is a latent intent or inclination for progressive action. For instance, the Maharashtra Management of Irrigation Systems by the Farmers Act 2005 has benefitted from the Centre's model PIM Bill as well as the World Bank's (WB) support for the reforms (Panickar 2018).

An instance when financial assistance enabled some leverage is the following. The CWC had set up a Central Dam Safety Organization in 1979 and a National Committee on Dam Safety in 1989 to pursue dam safety with States. This had no impact until financial assistance was made available through the WB-supported Dam Rehabilitation and Improvement Project. This too did not lead to the necessary institutionalization of the dam safety agenda by the States. Limited success was seen only with a couple of States (Maharashtra and Odisha), which began to allocate budgets for dam safety. This was possible through sustained funding and engagement over a decade. A Dam Safety Bill has now been passed by the Lok Sabha. Yet to be passed by the Rajya Sabha, it remains to be seen if a legal instrument can make States institutionalize this important agenda.

This leverage by financial assistance, limited as it is, fails to deliver enduring outcomes for a variety of reasons. Consider the examples of the Centre's efforts to influence States for progressive action through CS/CSS funding. The Ministry of Agriculture and Farmers Welfare's (MoAFW)³³ flagship programme, the Pradhan Mantri Kisan Sinchai Yojana (PMKSY), explicitly refers to pursuing IWRM. We will, however, learn (under fiscal instruments) that it has failed to translate this intent into actual content of the CSS, and continues to largely extend support to capital works and supply augmentation – though in the guise of improving irrigation efficiency of existing structures. Generally this appears to be the Centre's track record in progressive policymaking. Programmes such as the Ganga Action Plan (GAP – extended to National River Conservation

32 There is a Ministry of Water Resources (2013) set committee's report on roadmap for implementing the NWP 2012. But there is no evidence of following the roadmap.

33 Some components monitored by the Central Water Commission, Ministry of Jal Shakti.

Plan to include other rivers) and the recent National Mission for Clean Ganga (NMCG) too are structured primarily as capital expenditure projects, and contribute little to forging links between the Centre and States to produce sustainable outcomes.

This failure to translate policy intent into programme design is at the core of the Centre's inability to realize the potential leverage in policymaking. Further, it is not just about poor designing, but also the positioning that matters in producing enduring outcomes – either in achieving the programme objectives or their institutionalization by the States. The design does not appear to recognize that the Centre's assistance is not significant enough to change the States' choice of strategies. It is for this reason that the positioning is crucial, and needs to be strategically located to consolidate structural relations between the Centre and the States. From this perspective, the trends of the Centre's engagement do not inspire confidence. The Centre's engagement is increasingly in a 'campaign' mode. Whether it is the Swachh Bharat Mission or the proposed Jal Jeevan Mission, the programmes do not appear to invest in strengthening the structural and institutional relationships between the Centre and the States. These tendencies pose the danger of undermining States and weakening federal governance, as Mozoomdar (1994) warned.

The Centre's leverage over States' progressive policymaking also suffers from credibility perceptions. Often, cross-sectoral contradictions raise questions about the Centre's own commitment to the professed course-shift through its policies. Consider this question, discussed earlier in the context of Punjab: how can States persuade farmers to shift to less water-intensive crops, when the Centre continues to offer MSP for paddy? Punjab stands out with its 37% contribution to the central pool procurement of rice at MSP (Sarkar and Das 2014). This contradiction applies to other States as well. Another example is the proposed Pradhan Mantri Kisan Urja Suraksha Evam Utthan Mahabhiyan (PM KUSUM) scheme by the Ministry of New and Renewable Energy. The scheme aims at installation of 17.5 lakh stand-alone solar power agriculture pumps, and solarization of 10 lakh existing grid-connected pumps with an outlay of about Rs 34,000 crore. The stated goal is to meet India's Intended Nationally Determined Contributions (INDCs) to increase the share of solar power.³⁴ The implications of this for already depleting groundwater levels can be imagined. Though the scheme guidelines envisage encouraging farmers to sell surplus power generated, it does not appear mandatory that the solarized pumps are connected to the grid to enable this. Such prioritizing INDCs' objectives may adversely impact groundwater conditions. Instead, the scheme may extend its scope to embed multiple objectives of INDCs, groundwater conservation and increased revenues for farmers. There are instances of successful working models of solar irrigation cooperatives from Gujarat that may offer useful lessons for reconsidering the scheme to address multiple goals.³⁵

States' own policymaking too suffers from similar problems and contradictions in translating policies into instruments and action programmes. The experiences are varied, along their varying trajectories of WRM. In Punjab, in spite of two State Water Policies (SWPs) in 1997 and

34 <https://mnre.gov.in/sites/default/files/webform/notices/KUSUMguidelines.pdf>, last accessed 30 August 2019.

35 See for example, a successfully working solar irrigation cooperative here: <https://economictimes.indiatimes.com/news/politics-and-nation/gujarats-solar-irrigation-cooperative-has-a-solution-for-groundwater-crisis/articleshow/58998274.cms?from=mdr>, last accessed 15 December 2019.

2008 – which echo the intent and sentiments of the NWP – there is little evidence of steps taken to implement them. For instance, while the SWP documents recognize alarming depletion of groundwater levels, no concrete efforts have been made to create a regulatory framework or for pricing groundwater abstraction. In contrast, Maharashtra’s SWP in 2003 was followed up by two milestone legislations – PIM (Participatory Irrigation Management) and MWRRA – 2005. MWRRA is now cited as a model for rest of the States. As required by the MWRRA Act 2005, the State prepared an Integrated State Water Plan for Maharashtra in 2018, and set up a State Water Board and a State Water Council for its implementation. Maharashtra has also increased its budget allocations for O&M in 2019-20 to 10% of its total water budget. About 20% of this O&M is allocated for dam safety, making Maharashtra one of only two States with a budget line item for dam safety. Karnataka prepared its first SWP in 2002, and a revised policy is under preparation. As a follow-up of its first SWP, Karnataka has created a Groundwater Directorate for regulating groundwater. However, it is in its initial stages and yet to take shape. The directorate has been carved out of the Department of Mines and Geology, and suffers in terms of both quantity and quality of personnel for pursuing its mandate. On the other hand, Karnataka’s emphasis on MI is progressive; the State has created an exclusive department for promoting and developing MI and made significant allocations of resources for it from the State budget and the PMKSY resources.

4.2. Legal leverage

The legal leverage of the Centre over States’ WRM is often inferred from the law-making powers of the Union in water-related matters. But the Centre can extract leverage through several other means, beyond Entries 56 and 24 under the Union List, and Article 262. This is often done through an innovative application of a variety of other powers beyond the Union List. The extent of leverage is always subject to the limitations of the state machinery’s dysfunctional execution. But the range of the powers and their inventive application, especially for the provision of public goods such as water, reveal the possibilities of the legal leverage of the Centre. We carried out mapping of the legal and institutional interventions relevant to water governance by the Centre and the three selected States, similar to the policy and programme mapping mentioned earlier. This mapping is provided in Annexure 4 for reference. It has informed our research for legal and institutional leverage. We present our findings here and in the following section.

Articles 252 and 253 are immediate examples of how understanding of the legal leverage has to go beyond the mainstream understanding outlined earlier. Under Article 252, the Parliament can legislate on a State subject if two or more States consent to it. Article 253 enables the Parliament to legislate on any subject in order to give effect to an international treaty, agreement or obligation. The Centre has used these powers at various times to frame important legislations covering environmental resources.

The domain of environment law showcases the innovative means of extracting the Centre’s leverage to an extent much greater than that envisaged under the Constitutional scheme of Centre-States relations. The relevance of environment laws for water is obvious. Water resource development projects need environmental clearance; and water pollution, including that of

groundwater, is a critical concern. The interesting part is how the Centre's assertion of its role and influence in this domain has received traction and acceptance among States, even though it had no or limited powers over water and environment, or other subjects (such as forests and wildlife) under the Concurrent List. The Centre's legal leverage ambitions extend to laws for participatory irrigation management, groundwater regulation and overall regulatory functions for the sector. The Centre's proposed National Framework Law³⁶ too received extensive traction, primarily from civic society. This range of application reveals the potential leverage that the Centre can augment for improved federal water governance.

The following illustrates the States' acceptance of the Centre's pre-eminent role in environmental law-making. The Water (Prevention and Control of Pollution) Act 1974 (Water Act) covered a State subject. This law was enacted by Parliament using Article 252. The same was used to follow up with the much broader-ranging Environment (Protection) Act 1986 (Environment Act). Environment is not listed in the Seventh Schedule, but the Centre deployed Article 253 provisions of the obligation to protect environment under the UN Conference on the Human Environment of Stockholm in 1972.

Similarly, the Wildlife (Protection) Act 1972, the Forest (Conservation) Act 1980, and the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act 2006 to protect tribals from evictions all use the powers of the Centre under the Concurrent List and have implications for water resource development projects.³⁷ Environment law-making may have initially benefitted from a 'strong Centre', but it has expanded and become stronger even after the Centre-States relations evolved.

Central law-making has also extended to newer areas relevant to water. The National Disaster Management Act 2005 established a National Disaster Management Authority (NDMA), as well as authorities at the State and district levels. The law provides for the preparation of a national plan by the NDMA covering disaster prevention, mitigation, preparedness and capacity building. Responsibilities are, however, shared by the State and district levels.

This expanding scope of the Centre's leverage into the realms of environmental risk, disasters and protection of natural resources opens up new opportunities. The traction from the States is an additional advantage here. In the increasingly interconnected and interdependent hydro-geographies linked to India's ambitious plans and development goals, such an expansion of the Centre's leverage creates new possibilities of how Entry 56 provisions can be interpreted and deployed for better federal governance of water resources.

³⁶ http://mowr.gov.in/sites/default/files/Water_Framework_May_2016.pdf, last accessed 10 October 2019.

³⁷ The Ministry of Environment, Forests and Climate Change (MoEFCC) has used its rule-making power under the Environment Act and the Water Act to establish the Environmental Impact Assessment (EIA) framework in 1994, subsequently updated from time to time since. The EIA notification included "River Valley projects including hydel power, major irrigation and their combination, including flood control" in the category of projects requiring environmental clearance. In 2006, it was decided that river valley projects with hydroelectric power generation capacity above 50 megawatt, or more than 10,000 hectares of command area, would require Central clearance; those with power generation capacity in the range of 25-50 megawatts, or covering a command area of less than 10,000 hectares, were listed for State-level clearance.

4.3. Institutional leverage

The Centre's leverage through institutional instruments is often underestimated. To better understand this, we need to expand the contours of federal water governance beyond the institutional avenues directly linked to water. It has to include the whole range of institutions supplementing the Centre's direct instruments of engaging in water governance. This lens of supplementing the Centre's influence allows us to include technical as well as judicial institutions.

The Finance Commission and other linked institutions are often the most cited institutional leverages. Under Article 280, the Finance Commission recommends distribution of tax proceeds between States and making grants to States. Article 282 empowers the Centre to make grants to States for any public purpose, whether it relates to subjects that are not within the Centre's or the States' law-making competence. The provisions of Article 293 allow the Centre to regulate States' borrowings. For instance, the IDCs set up by States like Maharashtra and Karnataka for mobilizing resources are limited and regulated by these provisions.

The Goods and Services Tax (GST) Council shows the potential of reinforcing this leverage when it is supported by the federal consensus of the States. The States agreed to cede significant taxation powers to empower the GST Council – in which they are all represented – which eventually carried out GST reforms through the passing of the 101st Constitutional Amendment.

A similar enabling space for federal water governance is possible, but has not been augmented. Article 263 provides for setting up an Interstate Council to resolve interstate disputes, deliberating over subjects of common interest to the States and the Union, and making recommendations for better coordination of policy and action. The Interstate Council's potential to extract leverage for federal governance of water resources, especially in interstate river water disputes resolution, has not been fully realized. This is primarily because it has been established as a department of the Ministry of Home Affairs – and is thus perceived as politically subjective (Chokkakula 2019).

Besides these statutory institutional forms of leverage, another important source can arise from technical relationships between federal institutions such as the CWC and the State WRDs. These relationships involve providing advanced technical inputs and appraising States' projects. These links have weakened over time due to various reasons. One of them is certainly the growing autonomy of the States, especially their financial autonomy. However, a technical appraisal is mandatory for projects funded by the Centre, and also when the projects involve interstate rivers. Such relationships have shrunk to this technical appraisal function. States no longer rely on these institutions for advanced knowledge inputs; they tend to outsource, and in rare instances, build in-house capacities. For instance, Karnataka has set up its own Advanced Centre for Integrated Water Resource Management to support policymaking. Similarly, Maharashtra's Integrated State Water Plan is prepared entirely by the State's WRD personnel and resources.

The growing independence of State WRDs only partly explains the weakening relationship. Our interactions with functionaries at the Centre and States reveal that two neglected areas may also be behind this. One is the inability of federal institutions to adapt and rise to meet the changing and growing needs of the States. The central institutions have failed to lead from the

front in guiding the States regarding the new unknowns: climate change, environmental impacts, disaster vulnerability and preparedness, etc. Further, these institutions have stuck to the mould of a hierarchical power relationship defined by the technical appraisal function, and failed to appreciate that the nature of the relationship needs to transform into that of partnership as the Centre-States relations change. This has often led to States antagonizing and challenging the central institutions even in credible spaces of specialization such as knowledge production. This is most frequent in the instances of interstate river water disputes where the States disagree with and challenge the data presented by the CWC. However, in the case of highly specialized institutions, such as the CWPRS (Central Water & Power Research Station), the States continue to depend on their inputs and services. A similar capacity and inputs to address the complex challenge posed by climate change in reconfiguring and reshaping hydrological regimes would be greatly appreciated by States. State functionaries lament that the federal institutions offer no credible and usable knowledge inputs to address this challenge. The absence of potential reassertion of this leverage by federal technical institutions is puzzling. Climate change challenges the foundational principles of hydrological premises of water management: “Stationarity - the idea that natural systems fluctuate within an unchanging envelope of variability” is dead – as it is famously argued (Milly et al 2008). States acute needs to understand and address these challenges – as in Kerala’s floods recently yet to be explained satisfactorily – present immense opportunities broadening and consolidating federal leverage.

Two, the Centre’s interventions, either in interstate matters or through the CS/CSS funding, do not build partnerships with the States. They remain transactional and reify the broader context for the hierarchical power relationship, instead of building institutional partnerships and processes for pursuing mutually agreed goals. In the NMCC or PMKSY programmes, though State WRDs are partners, the relationship is subsidiary and geared towards execution of projects – structured as capital works. There is little institutionalization of the programmes or their intent that can potentially lead to the necessary reorientation of the State WRDs towards better performance.

The other source of the Centre’s institutional leverage is via the judicial institutional processes, often not adequately appreciated. The institutional spaces allow for public engagement to strengthen the Centre’s leverage in public good governance – more specifically in water governance – often through environmental laws. Public engagement through judicial institutions also contributes to expansion and development of environmental regulation. Social action litigation, using the writ jurisdiction of the Supreme Court and High Courts, and the recognition of the right to a clean environment as a fundamental right, has led to the development of a class of litigation referred to as environmental PIL (public interest litigation). In 2010, to manage this and other litigation relating to environmental matters more effectively, the Centre established the National Green Tribunal (NGT), via the National Green Tribunal Act 2010. To formulate this law, Gol relied on its obligation to give effect to international laws and conventions, and also the right to a healthy environment of its citizens (construed as part of the right to life under Article 21 of the Constitution).

The track record of PIL in contributing to the domain of environmental governance, more so with water, is impressive. In a series of cases relating to river pollution, the courts have directed various state agencies and private institutions to take measures to manage their effluents and wastewater. *MC Mehta v Union of India*³⁸ led to the formation of the CGWA in 1997.³⁹ The NGT's directives from time to time elaborated the scope of the CGWA. This highlights how public engagement has expanded the power and legitimacy of the Centre's interventions in unanticipated but desirable areas. Without this case law, there would have been no role for the Centre in groundwater regulation. The example of the CGWA also makes a point for closer coordination between MoJS and MoEFCC to support sustainable WRM by States.

4.4. Fiscal leverage

IGFTs are the mainstay of fiscal federalism, and federal governments rely on them to address the problems of fairness in distribution of resources and ensure equitable access of basic amenities and opportunities. These are also the primary sources of the Centre's fiscal leverage. However, the design and structuring of the IGFTs is key for the successful outcome of a policy (Bird and Smart 2002).

India's fiscal federalism is marked by its centralized architecture with the Union government having a proportionally larger share of responsibilities, including revenue raising authority. The responsibility of division and devolution of taxes and grants to States rests with an independent Finance Commission appointed by the President every five years. In the initial years, the role of the Finance Commission was curtailed by the Planning Commission – created through a Cabinet Resolution in 1950. The Planning Commission took over the power to allocate grants for plan purposes. The scope of the Finance Commission was confined to assessing the non-plan requirements of the States, and assigning tax devolutions and grants to meet these requirements.

With the recent dissolution of the Planning Commission, the Centre-States fiscal transfers can broadly be classified into general purpose transfers in the form of tax devolution, statutory grants and specific purpose transfers or conditional transfers in the form of CSSs designed and implemented by Ministry of Finance or Line Ministries. CSSs are Gol's primary vehicles to promote State expenditure and development in certain identified areas. Over time, these contributions have increased in subjects traditionally within the domain of the States. Between 2005 and 2012, the Central government's spending on State subjects increased from 14% to 20%, and its spending on Concurrent Subjects rose from 13 to 17% (Rao 2017).

These centralized and tightly controlled releases of CSS funds have provided the Centre with leverage; but they have also led to stifling state flexibility and innovation, and to the tendency to dictate how States discharge their responsibilities (Sanan n.d.).⁴⁰ Other common criticisms of the CSS model is the existence of multiple agencies responsible for implementation, including

38 (1997) 11 SCC 312

39 CGWA was established using powers under Section 3 of the Environment (Protection) Act 1986.

40 Also available at https://www.cprindia.org/sites/default/files/working_papers/Unravelling%20Rural%20India%20sanitation.pdf, last accessed 20 September 2019.

the setting up of parallel bodies – making it difficult to implement and evaluate outcomes. Most importantly, flawed incentive structures often focus on utilization and meeting of targets with no or little consideration for outcomes intended for the scheme/programme.

It has been observed that general purpose transfers are far more equitable than specific purpose transfers (Rao 2019, Gupta et al. 2011, Ministry of Finance 2017, Bergvall et al. 2006). The CSSs also suffered from design flaws. As Sanan (n.d.) argued, conditionalities placed on the receipt of funds is based on the twin goals of demonstrating the achievement of targets as well as shortfalls in finances, often resulting in the BNR syndrome of States.

There have been several attempts at streamlining and rationalizing CSSs. Yet, the major problems persist: too many schemes, rigid centralized guidelines conflicting with States' needs, inefficiencies of execution, and flawed incentive structures leading to inequities.

The CSSs in WRM are no exceptions. The launch of the CSS Accelerated Irrigation Benefits Programme (AIBP) in 1996-97 to speed up completion of MMI projects is a classic example of the Centre's continued focus on supply augmentation strategies. According to a performance audit of AIBP by CAG (2018b), the scheme suffered from several design and implementation issues. Of the sampled 118 MMI projects and 335 MI schemes, only 30 MMI projects and 213 MI schemes were completed as of March 2017 with delays ranging from one to 18 years. Cost overruns in 84 MMI projects, including 16 completed and 68 ongoing projects, were a massive Rs. 1,20,772 crore, or 295% of the original cost. IPC achieved was only 68% in MMI projects and 39% in MI schemes. The report further found that participatory irrigation management through water user associations also suffered from a number of limitations which impacted the O&M of projects (CAG 2018b).

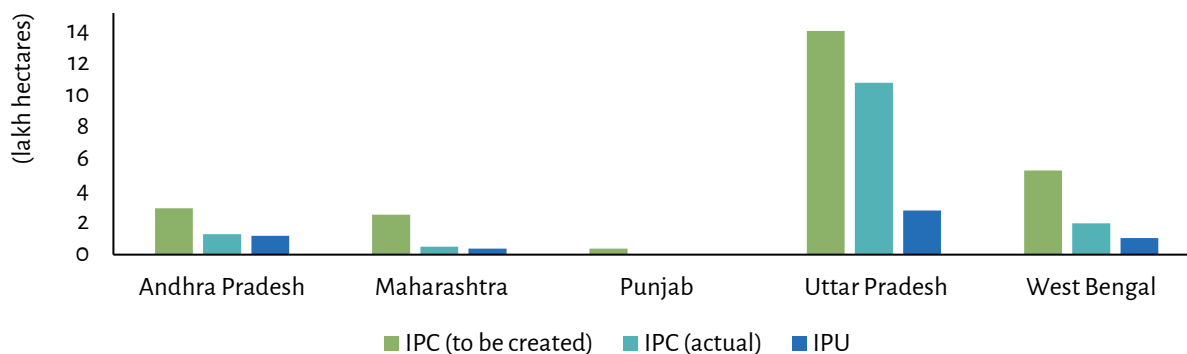
In 2015-16, AIBP was made one of the four components of PMKSY.⁴¹ A closer look at PMKSY reveals that it is not an integration to reorient towards new goals; rather, each component continues to run as a separate entity and does not provide sufficient incentives for pursuing progressive pathways of improving use efficiency. Further, the Central share offered is not adequate to influence change; 85% of MMI and MI project investment is borne by States and concentrates only on new constructions (Shah et al. 2016). New constructions starve WRDs of funding with no inflows into management and maintenance, renewing the BNR syndrome. Conversations with States underlined this issue of rigid guidelines discouraging States from pitching new projects.

The experience is similar with other water CSSs such as the National Rural Drinking Water Programme (NRDWP). It suffered from the absence of clear assessment of requirements, limited monitoring and non-existent or dysfunctional state machinery for delivery (CAG 2018c). The other form of IGFTs is the National Projects scheme. It is completely funded by the Centre – has also

41 PMKSY's launch in 2015 merged previous schemes with an overarching vision to provide protective irrigation for all agricultural farms in the country and improve agriculture productivity. PMKSY has four components: AIBP (Rs. 11,060 crore); "per drop more crop" component (Rs. 16,300 crore); micro-irrigation or watershed programme (Rs. 13,590 crore); and Har Khet Ko Pani or one water harvesting structure per village by 2020 (Rs. 9050 crore).

seen limited success, with only five of the 16 national projects even beginning implementation work by 2018. Less than half the IPC was achieved in four projects, and IPU was even lower (CAG 2018a, see Figure 4.1). Annexure 5 provides the evolution of water sector CSs/CSSs.

Figure 4.1: National Projects – IPC and IPU



Source: CAG 2018a

There have also been a few attempts by the Centre to use its financial leverage over States to push for institutional reform. For instance, the 13th Finance Commission (FC13) recommended a grant of Rs. 5000 crore for establishing independent regulatory authorities. The amount, to be distributed across the States in proportion to their share of Non Plan Revenue Expenditure, is to be made available only after the States set up the regulatory authority and have achieved a projected recovery of water charges (Finance Commission 2009). This was perhaps too little for too much; we do not find reports of any State taking up the grant. The idea is, however, interesting, incentivizing progressive action and making it conditional. It is puzzling why this has not been further explored. A similar experiment is being attempted in Himachal Pradesh with the WB's Development Policy Loan (DPL), where the loan is made available only after implementation of agreed reforms.⁴² It is an interesting experiment to look out for, and sounds appealing for the augmentation of any latent appetite of the States for progressive action. It makes sense if we consider the uptake or lack of it of the FC13's grant. Maharashtra, the lone State with a regulatory institution, established and mobilized the required resources on its own. It did not tap the FC13's grant either. But it may be willing to take it up if the amount becomes significant enough, and is appropriately designed.

42 <https://www.greengrowthknowledge.org/project/development-policy-loan-promote-inclusive-green-growth-and-sustainable-development-himachal>, last accessed 15 October 2019.

LESSONS FROM NATIONAL AND INTERNATIONAL EXPERIENCES

There are few federal contexts comparable to the Indian one, with its particularities of history and structural relations. Water too, as a sector, has a certain exceptionalism attached to it, with its particular character as a resource and a public good. The challenge we address in this chapter is to look for lessons from other contexts (international) and other sectors (national) to enhance the Centre's leverage for incentivizing and influencing States' WRM outcomes. The intent is to distil lessons from successful practices of federal governance by: (a) drawing on literature comparing Indian and other federal contexts internationally; and (b) studying the features of known successful programmes in other sectors.

There is a very small body of work (almost non-existent) comparing India and other federal contexts, especially with respect to leverages for better WRM. The limited comparative research on federal governance is not much helpful. First, the literature largely deals with leverages around social and economic policies, and rarely engages with a sector involving public good provisioning, such as water. Second, the primary interest of the literature is to address vertical and horizontal imbalances in IGFTs. This usually relates to the category of general transfers. Our interest is the category of special purpose transfers, primarily the CSs/CSSs. We focused our efforts on principles, practices and conditions that determine successful outcomes across sectors, with particular emphasis on water. Canada, Australia, Germany and the US are the federal contexts that offer useful insights about federal water governance. The programmes we studied from other sectors within India are those considered highly successful: the Rashtriya Krishi Vikas Yojana (RKVY) to promote agriculture growth; and the Pradhan Mantri Gram Sadak Yojana (PMGSY) to link rural habitations with all-weather road connectivity.⁴³ We present our findings below.

Federal spending: Conditions for successful and enduring outcomes

Examples often discussed in the context of river basin level outcomes suggest that a necessary condition for federal spending to yield enduring outcomes is for the programmes to be preceded by the right kind of deliberative and institutional foundations, especially in the case of public good provisioning (Simmons and Graefe 2013, also see Bednar 2009). The deliberative processes enable setting up the common agenda and collective responsibility, and the institutional processes ensure the implementation and outcomes of the programmes. Popular examples such as Australia's water governance reforms in the Murray-Darling basin, and the instance of Germany highlight this necessary condition. The Murray-Darling agreement was made possible through a long deliberative process under the aegis of the Council of Australian Governments (CoAG) before

⁴³ These two programmes are also among the successful CSS programmes identified by the Sub-group of Chief Ministers on Rationalizing Centrally Sponsored Schemes (2015).

federal spending of USD 10 billion was committed to make the States agree to a set of reforms that constituted the agreement (Maywald 2018).

Germany too has a Working Group on Water Issues (LAWA) – a kind of council of ministries of federal States to deliberate and decide on water governance.⁴⁴ LAWA plays a key role not only in implementing the federal water agenda, but also the European Union’s (EU) Water Framework Directive (WFD) (Huesker and Moss 2015). The WFD itself exemplifies how a group of sovereign nations enabled collective action through a consensual agreement and ceded their sovereign powers for collective good. This was possible due to the existence of the EU, which facilitates the process of consensus building. The celebrated instance of the Rhine river rejuvenation occurred because of the availability of institutional foundations provided by the EU (Chokkakula, forthcoming).

Comprehensive institutional architecture for credible data

Deliberative consensus building may be the imperative factor for federal water governance reforms. But consensus building itself is preconditioned by comprehensive and credible data to support the deliberative process. These two functions are interdependent and mutually reinforcing. Credibility of knowledge production is contingent upon an agreement around the protocols and procedures of producing data, invariably with the active participation of the States – the federal stakeholders.

Each of the above international examples of institutional processes for consensus building among federal States includes credible data production as an integral part of the consensus-building process. This is an exclusive domain of the federal government. The function goes beyond credible data production, and includes facilitating the exchange of innovative practices of water governance between the federal constituents (see Bakker and Cook 2011 for Canada, Huesker and Moss 2015 for Germany).

Addressing ambiguities over data and knowledge production is a chronic challenge in interstate river water disputes resolution in India (Chokkakula 2017, D’Souza 2006). The proposed amendment to the Interstate River Water Disputes Act 1956, a bill passed by the Lok Sabha in July 2019, incorporates an important element of maintenance of a databank of water resources.⁴⁵ A national round-table consultation of experts over constitution of the Cauvery Water Management Authority (CWMA), after the Supreme Court’s decision in February 2018⁴⁶, recommended repositioning of the Centre’s role to produce credible and accountable data and knowledge.⁴⁷ Data gathering and producing knowledge of water resources in the country used to be, and remains, an integral function of the CWC. However, as observed earlier, the CWC’s scope of work is limited,

44 <https://www.lawa.de/English-About-LAWA.html>, last accessed 30 August 2019.

45 Interstate River Water Disputes Bill 2019, Section 9A.

46 State of Karnataka vs State of Tamil Nadu, Supreme Court’s order dated 16 February 2018.

47 Report of Roundtable Consultation: CWMA, 3 April 2019, CPR, New Delhi.

and it is increasingly challenged by the States. On the other hand, it is common knowledge that deploying multiple sets of data, or deceptive strategies of presenting and producing data, is part of the States' strategies for water disputes. These tendencies of the States can only be addressed when the Centre repositions itself to embrace a functional role of knowledge production through a federal consensus, covering the procedures, protocols and practices of data collection and knowledge production by the States.

This needs to be also supported by an institutional architecture to deliver the function. An excellent model of such a federal institution for data systems is the United States Geological Survey (USGS), created by an Act of Congress in 1879. The USGS's sole function is produce and release comprehensive data about water resources in the country (State-wise, periodical water source and use information) in the public domain promptly every five years. It is an independent institution with no conflict of interest, and equipped with capacities and resources to produce the data transparently and consistently. It has been able to retain this independence and credibility as it has no other roles of developer, regulator or policymaker in the water sector.⁴⁸

Design features of successful CSs/CSSs

Federal spending alone may be a strong leverage to entice federal constituents towards desirable directions, as we learn from programmes in other sectors such as the PMGSY programme. However, the question is whether it can yield enduring results. Under PMGSY, high-quality rural roads are built efficiently with the direct supervision and monitoring of the Central institutions and executed by the States' line departments. The funding includes five-year maintenance with the hope that the States would take over the function after that. Lacking maintenance by States, many roads have deteriorated over time. In some States, there is no State institution responsible for maintaining the PMGSY roads; in others there is no institutionalization of maintenance to ensure the flow of resources for this work. The National Rural Roads Development Agency (NRRDA) – the Central institution created for implementing PMGSY – is now insisting on the formulation of rural road maintenance policies and their institutionalization by the States.

Experiences across sectors reprise similar learnings. Despite a significant push towards toilet construction under the Swachh Bharat Mission, a rush to meet targets has meant insufficient focus on fecal sludge management or the consequent long-term of impacts. In health and education sectors too, societies created for implementing schemes functioned in parallel to the line departments, leading to blurred accountabilities. Further, in education, focus on building schools and increasing enrolments led to neglecting learning outcomes (Annual Status of Education Report 2018). These experiences underscore the necessity for building partnerships with States towards institutional processes for enduring outcomes of federal spending.

RKVY, launched to promote agriculture growth, is considered another success story of special purpose fiscal transfers. The scheme has been lauded by States for being objective, formula driven and flexible, allowing States to determine their priorities based on their contexts. The specific design features of RKVY are provided in Annexure 6.

The complexities involved in WRM performance assessment make designing a model CSS for the water sector a challenging endeavour. The design is, however, crucial for the IGFTs' success in ensuring equitable and fair distribution of resources among the States. At the same time, it should produce long-lasting outcomes along progressive pathways. Further, the instance of PM KUSUM discussed earlier illustrates the multiplicity of dimensions and goals that need to be factored in designing water related CSSs. It makes it challenging to draw specific lessons from CSSs in other sectors. A frequent recommendation coming from expert consultations is that it should recognize and accommodate the diversity of the States' contexts. The IGFTs should have the flexibility to allow States to choose from a basket of projects and programmes that could be funded. We have put together some desirable features from these learnings and also drawing on relevant literature (Boadway and Shah 2007) below.



(i) **Clarity** in grant objective



(ii) **Flexibility** in design: to accommodate diverse contexts and their needs



(iii) **Autonomy** in implementation by State governments, ability to set their own taxes



(iv) Responsiveness to accommodate regional differences and unforeseen changes in States



(v) Equity to ensure that fiscally weak get more assistance



(vi) Consistency to avoid multiplicity and ambiguities towards ensuring long term planning



(vii) Objective and formula driven to reduce ambiguities in flow of transfers and nable predictability in subnational fiscal planning.



(viii) Transparency of the formula to achieve consensus



(ix) Accountability of the States for the level and quality of service delivery



(x) Incentivize for efficient fiscal management by States

RECOMMENDATIONS

Indian federalism has undergone radical changes since the country's founding, with profound implications for its federal water governance. In its transition from a federalism with a strong Centre to 'federalism without a Centre', the Centre-States relations in governing water resources have weakened, with States assuming exclusive powers of water governance. The Centre has restricted its role primarily to interstate river water disputes resolution and thereby 'wilfully abdicated' its role and 'lost ground'. States have pursued WRM strategies responding to their contexts, conditions and constituencies. This 'opportunism', reflecting a collective action problem, has led to adverse cumulative impacts and implications for long-term water security in the country. India is "water stressed," with serious concerns about its quality of water resources. Its groundwater levels are depleting to dangerous levels.

These are an outcome of India's national and subnational focus and continued emphasis on supply augmentation strategies, 'atomistic' proliferation of reliance on groundwater, and institutional cultures that resist transition away from supply augmentation. With diverse trajectories of WRM, States are caught in State-specific and particular assemblages of water-food-energy nexuses.

India's ambitious development goals and growing concerns for sustainability – coping with the risks of climate change and disasters, and long-term water security – call for the Centre to regain its 'lost ground'. A robust federal governance framework will allow it to exercise the necessary leverage to influence and incentivize States for better WRM performance. The study's efforts to understand the Centre's leverage in practice and in potential have led to the following findings.

- (a) While the Centre's leverage is largely persuasive in States' progressive policymaking, States' WRM strategies now show trends of subtle, yet growing alignment with the Centre's professed policies. The perceptible alignment is driven largely by endogenous factors and pressures, but often catalysed by exogenous influences of the Centre or IDAs. The Centre's ability to nudge the course-shift by States, however, suffers from its own equivocal drive in the translation of policies and failure to elevate the water agenda to avoid contradictory outcomes across sectors.
- (b) If designed well, the space for exogenous forces to play an enabling role in the States' progressive policymaking offers an opportunity to carve a strong and exclusive space for the Centre to assume leadership and anchoring role in nudging States towards better WRM.
- (c) The possibility of augmenting the Centre's leverage to influence a State to change its approach becomes evident when we take a comprehensive look at all the instruments at its disposal: policy, institutional, legal and financial. The challenge is to deploy them strategically. For instance, the Centre can invest in institutional avenues that cater to States' growing needs, such as coping with climate change risks. Further, the Centre must recognize the limitations of its fiscal instruments; these alone can make little difference, partly because the extent of transfers is insignificant in the States' allocations for WRM.

The edifice of federal governance reforms to realize this leverage can stand and sustain itself only if it is built on two key pillars: (a) a federal consensus about the Centre's role; and (b) an autonomous and independent institutional architecture for gathering data and producing knowledge on water resources. These two are preconditions for deploying the range of policy, legal, institutional and fiscal instruments to conceive and realize a robust federal governance framework. We list our specific recommendations for this below.

1 Elevate sustainable WRM agenda and build a federal consensus on the respective functional roles of the Centre and States, and their integration.

Increasing visibility of water security challenges is an opportunity to develop federal consensus on the issue and the respective roles of the Centre and States in WRM. The current campaign mode of the Centre requires moderation and has to be channelized into building partnerships with the States for enduring outcomes. On the other hand, the States' internal drivers and political rationalities do not necessarily give them the elbow room to frame responsible policy. But a shared national platform to pursue a collective agenda of long-term water security could provide the space for both the Centre and the States to address their respective limitations. As we witnessed in the case of the GST reforms, it is even possible for the States to agree to give up some of their powers, and to participate in developing a shared national approach and legislation if the envisaged subject is positioned as one of mutual and shared interest. The first step can be setting up an empowered committee for water resources – along the GST reforms - involving States' water resources ministers to initiate a deliberative process in collaboration with the Centre.

This process has to recognize sustainable WRM as a national agenda, establish collective goals, and develop transition pathways that are acceptable within the broader framework. This can include evolving a National Water Policy by the Centre in close coordination and consultation with States. Specifically, it has to address and reconcile inconsistencies and contradictions in policymaking leading to adverse outcomes for WRM..

Further, the process has to acknowledge the changing federal relations, and accept the need for greater integration of the roles of the Centre and the States towards sustainable WRM.

The following set of functional roles for the Centre from earlier dialogues on the subject and consultations organized for the study are illustrative.

- (a) Pre-eminent role in data gathering, knowledge and capacity building; setting standard protocols and procedures for data collection and knowledge production; and how Centre and States can partner in these processes
- (b) Pursue the agenda of States' commitments to course-shift towards progressive policymaking – including but not restricted to putting in place a regulatory institutional framework, pricing and financing of various services, dismantling of perverse incentive structures, etc.

- (c) Facilitate replication through dissemination of best governance practices and the experiences of policymaking among the States, e.g. the integrated planning, regulation and PIM experiences of Maharashtra.

2 Empower the Interstate Council to achieve the federal consensus through an inclusive and deliberative process.

Federal consensus building will require empowered institutional spaces to enable credible and objective deliberations. Indian as well as international experiences have shown that federal relations can be dynamic and evolving with the changing political regimes and configurations. In order to produce a new consensus for change, the institutional spaces have to be politically empowered and the processes resilient to deal with the changing dynamics. The Interstate Council under Article 263 was conceived for the precise purpose of achieving better interstate coordination through deliberative means. It is imperative to address the limitations of the Interstate Council as it is currently conceived and located. The Interstate Council needs to be elevated and empowered as an institutional space for federal deliberations and consensus building.

However, for the Interstate Council to be effective, it must focus on the sustainable WRM and national water security agenda. The Council also needs a clear mandate and a commitment on the part of the Centre to consider aligning fiscal and other instruments in line with its recommendations.

The awareness of the need for such a deliberative space already exists, and various forums have been created for the purpose: the National Development Council, the National Water Resources Council, etc. They have not been effective or enduring, for they are perceived as politically subjective. Besides, it will be a challenge to create conducive conditions for constructive deliberations among States whose relations are defined by a contentious history of interstate disputes. An empowered Interstate Council, with its constitutionally sanctioned mandate, if supported with robust and resilient institutional processes, can meet the challenge.

3 Redefine and expand the scope of Entry 56 (Union List) for locating the Centre strategically. Ensure coherent integration of this leverage with that of other instruments – policy, institutional and fiscal – to establish a concerted role of the Centre in federal water governance.

It is necessary to reconsider the current ‘legalist’ understanding of the Centre’s role under the Entry 56 provisions. GoI has so far used these provisions to enact the RBA 1956 (now proposed to be replaced with a River Basin Management Bill 2017 to create authorities instead of boards). The use of these provisions cannot be restricted to this legislative instrument alone. Their scope can be expanded to serve other federal governance functions.

- (a) The expanded scope of the provisions can be translated into creating avenues for Centre-States partnerships for better WRM outcomes. Partnership building is more likely to strengthen federal governance in comparison to the current preferred practice of locating the Centre's role as an authority under the proposed bills for river basin management, dam safety, etc. The possibilities of enabling partnership building with an expanded scope of Entry 56 provisions need to be explored.
- (b) The Entry 56 provisions can also be used to enable interstate partnerships with active role for the Centre. The rather detached or indifferent role envisaged under RBA 1956 is clearly has not worked; it is also unlikely that authorities will yield effective participation or compliance by States. The apparent solution is the middle ground where Centre's role is empowered by the federal consensus and creative deployment instruments and incentives towards an ecosystem conducive for interstate collaboration and cooperation. India does have a remarkable track record of interstate river water cooperation, reflected by the 160 interstate river water agreements compiled by the CWC (2015c). But these interstate agreements are often bilaterally driven, fragmented or project-oriented and miss national perspective. The ecosystem has to build on this national perspective and towards coherent interstate river water governance.
- (c) The Centre's role should be located to support and strengthen the States' regulatory frameworks in addressing their constraints with respect to externalities in the interstate domain.

4 Reorient State WRDs and their cultures towards progressive pathways, beyond supply augmentation.

The Centre's potential leverage through a variety of instruments must be channelized to reorient the State WRDs. The cultures of the WRDs are deeply entrenched in the paradigm of supply augmentation, not countered or resisted by the Central policies, programmes or institutions. Unless these are reoriented towards progressive paradigms, the efforts to achieve a course-shift in the States will be futile. The WRDs' institutional cultures – personnel, skills, knowledge, practices – have been built around supply augmentation paradigm of the States. There must be sustained efforts to disrupt and reset the agendas of WRDs towards the goals of conservation, demand management and regulation. The leverage of the Centre in this respect needs to link with the States' own emerging preferences for a course-shift.

5 Invest, strengthen and reorient the capacities of Central institutions to address the new challenges of interstate dependencies and risks beyond the conventional moulds of supply augmentation, appraisal and monitoring.

The federal technological institutions have to break out of their conventional moulds of supply augmentation, appraisal and monitoring to be relevant to State WRDs in the changing times. They have to pursue excellence in new challenges and risks such as climate change, groundwater pollution, dam safety, disaster prevention, etc. Institutional relationships have to build on interdependencies. This requires Central institutions such as the CWC to move away from the

notions of hierarchical power relations to a reciprocal relationship drawing leverage through partnerships and interdependencies. For instance, with its advantage of quality personnel and infrastructure, CWC may offer the right protocols, procedures and practices for collecting data by State WRDs towards collaborative relationship to cope with the new risks and challenges.

6 Reconsider deployment of fiscal transfers strategically with other instruments. Fiscal transfers are insignificant, and may not always fit with States' context. Fiscal instruments alone cannot effect a course-shift to better WRM.

Special purpose IGFTs have to build on other instruments to achieve the desirable leverage. Part of the challenge may lie with their design. The principles of a well-designed fiscal transfer system have been described in Chapter 5. But it is also important to remember that fiscal transfers alone are unlikely to have the desired impact. From the States' point of view, the size of transfers is not significant enough, especially large States with advanced water resources development, to effect any change in their WRM approaches. Some suggestions for effective fiscal transfers are the following: (a) target State-specific challenges linked to their particular water-food-energy nexus, e.g. Punjab's fix with paddy vs MSP; (b) support innovative schemes that are relevant to the State's context, where the risks involved makes it difficult to mobilize State resources; (c) support progressive schemes in a State that are vulnerable to political regime changes. Generally, the IGFT design needs to address State-specific interests. This can be addressed by providing block grants which allow States the flexibility to determine strategies that suit their context. These grants, however, should also have some clearly identifiable goals. A genuine performance-oriented reform, however, will need to acknowledge the State as the decision-making authority and can only be built through federal consensus.

7 Consider locating specific purpose IGFTs as grants or loans, but conditional upon agreed progressive reforms and achieving of targets.

FC13's step of making available the grant of Rs. 5000 crore to set up regulatory authorities may have failed. But it offers a potent design for IGFTs that can lead to progressive outcomes. This may have to address the challenge of maintaining vertical and horizontal balances expected in IGFTs. But it is likely to work when there is a latent appetite among the States for a course-shift and taking the reform path, especially with water. WB's DPL is a model along these lines and currently has an arrangement with Himachal Pradesh. It may offer useful lessons for revisiting FC13's innovative experiment.

8 Address contradictory policymaking across sectors and scales which defeat the sustainable WRM agenda.

The contradictions across scales and sectors leading to suboptimal needs must be addressed as part of the federal governance agenda. The MSP policies have to be reviewed to consider ways of enabling the States' progressive policies to break the water-food-energy nexus, say in Punjab. Similarly, schemes like PM KUSUM need to consider larger implications beyond their immediate agenda of meeting INDCs. Instead, as pointed earlier, the scheme could address the multiple goals of power generation, groundwater protection and increase revenues for farmers, if the schemes can build on models such as solar irrigation cooperatives in Gujarat. The design challenges can best be addressed through sustained deliberations between the Centre and States, and inter-ministerial integration in reviewing schemes.

9 Embed fiscal instruments linked to federal consensus-based policy and institutional instruments. Consider reorienting the goals towards greater federal integration.

The relatively insignificant size and leverage of fiscal transfers (compared to State WRM budgets) accentuate the need to strategically target the transfers. Fiscal transfers can serve the strategic goal of promoting greater federal integration and consolidation. For instance, fiscal transfers may support proposals from States where (a) Centre-States and interstate partnerships are created and nurtured; and (b) technical collaborations between institutions at the Centre and the States help promotion of progressive policies, technologies and institutional practices.

10 Invest in an institutional architecture for credible data gathering and knowledge production.

This is a vital precondition for improving and strengthening federal water governance. The institutional architecture must be statutory, independent and autonomous with an exclusive mandate of data gathering and knowledge production, and without any conflict of interest in development/project appraisal/regulation. An existing institution may be reoriented to become one such, or a new institutional architecture may have to be created. USGS and National Sample Survey Office (NSSO) in India can be possible models. The various existing efforts of setting up the National Water Informatics Centre (NWIC) or the ongoing National Hydrology Project (NHP) kind of projects could be channelized towards an overarching institutional architecture for the purpose of credible data gathering and knowledge production.

REFERENCES

- Arora, Balveer and K.K. Kailash. 2018. "Beyond Quasi-Federalism: Change and Continuity in Indian Federalism." *Studies in Indian Politics* 6, no. 02: 297-302.
- Ayoob, S. and A.K. Gupta. 2006. "Fluoride in Drinking Water: A Review on the Status and Stress Effects." *Critical Reviews in Environmental Science and Technology* 36, no. 06: 433-87.
- Bagchi, Amaresh. 2003. "Rethinking Federalism: Changing Power Relations Between the Centre and the States." *The Journal of Federalism* 33, no. 04: 21-42.
- Bakker, Karen and Christina Cook. 2011. "Water Governance in Canada: Innovation and Fragmentation." *Water Resources Development* 27, no. 02 (1 June): 275-89.
- Bednar, Jenna. 2009. *The Robust Federation: Principles of Design*. New York: Cambridge University Press.
- Bergvall, Daniel, Claire Charbit, Dirk-Jan Kraan, and Olaf Merk. 2006. "Intergovernmental Transfers and Decentralized Public Spending." *OECD Journal on Budgeting* 5, no. 4: 111-58.
- Bird, Richard and Michael Smart. 2002. "Intergovernmental Fiscal Transfers: International Lessons for Developing Countries." *World Development* 30, no. 6: 899-912.
- Boadway, Robin and Anwar Shah, eds. 2007. *Intergovernmental Fiscal Transfers: Principles and Practice*. Washington DC: The World Bank.
- Central Ground Water Board. 2016. "Central Ground Water Board, Annual Report 2014-2015." Faridabad: Central Groundwater Board, Ministry of Water Resources, River Development & Ganga Rejuvenation.
- Central Ground Water Board. 2017. "Dynamic Groundwater Resources of India (As on 31st March 2013)." Faridabad: Central Groundwater Board, Ministry of Water Resources, River Development & Ganga Rejuvenation.
- Central Ground Water Board. 2018. "Groundwater Quality in Shallow Aquifers in India." Faridabad: Central Groundwater Board, Ministry of Water Resources, River Development & Ganga Rejuvenation.
- Central Ground Water Board. n.d. "Groundwater Yearbook India 2017-18." Faridabad: Central Groundwater Board, Ministry of Water Resources, River Development & Ganga Rejuvenation.
- Central Pollution Control Board. 2018. "River Stretches for Restoration of Water Quality." Delhi: Central Pollution Control Board.
- Central Water Commission. 2015. "Financial Aspects of Irrigation Projects in India." New Delhi: Information Systems Organization Water Planning & Projects Wing, Central Water Commission. (CWC 2015a)
- Central Water Commission, Water Resources Information System Directorate. 2015. "Water and Related Statistics." New Delhi: Water Resources Information System Directorate, Central Water Commission. (CWC 2015b)
- Central Water Commission. 2015. "Legal Instruments on Rivers in India Vol III: Agreements on Inter State Rivers," New Delhi: Inter State Matters Directorate, Central Water Commission. (CWC 2015c)
- Central Water Commission. 2018. "National Register of Large Dams." Central Water Commission. <http://cwc.gov.in/publication/nrld>.
- Central Water Commission. 2019. "Reassessment of Water Availability in Basins Using Space Inputs." New Delhi: Basin Planning & Management Organization, Central Water Commission.
- Chakraborti, Dipankar et al. 2003. "Arsenic Groundwater Contamination in Middle Ganga Plain, Bihar, India: A Future Danger?" *Environmental Health Perspectives* 11, no. 09: 1194-1201.
- Chokkakula, Srinivas. Forthcoming. "Inter-State Cooperation for Ecosystem Services." In *Proceedings of the India Rivers Week 2018*.
- Chokkakula, Srinivas. 2014. "Interstate Water Disputes: Perils and Prospects of Democratization." *Economic and Political Weekly* 49, no. 09 (1 March): 75-81.
- Chokkakula, Srinivas. 2017. *Why Do Interstate Water Disputes Emerge and Recur?* CESS Monograph Series, CESS Monograph 45. Hyderabad: Centre for Economic and Social Studies, Hyderabad.

- Chokkakula, Srinivas. 2019. "Interstate River Water Governance: Shifting the Focus from Conflict Resolution to Enabling Cooperation." *In Policy Challenges 2019-2020: Charting a New Course for India and Navigating Policy Challenges in the 21st Century*. New Delhi: Centre for Policy Research.
- Comptroller and Auditor General of India. 2018. "Report of the Comptroller and Auditor General of India on National Projects." Ministry of Water Resources, River Development and Ganga Rejuvenation. (CAG 2018a)
- Comptroller and Auditor General of India. 2018. "Report of the Comptroller and Auditor General of India on Accelerated Irrigation Benefits Programme." Ministry of Water Resources, River Development and Ganga Rejuvenation. (CAG 2018b)
- Comptroller and Auditor General of India. 2018. "Report of the Comptroller and Auditor General of India on Performance Audit of National Rural Drinking Water Programme." Ministry of Drinking Water and Sanitation. (CAG 2018c)
- Comptroller and Auditor General of India. 2016. "Report of the Comptroller Auditor-General of India on Public Sector Undertakings (Social, General and Economic Sectors)." Government of Punjab.
- D'Souza, Radha. 2006. *Interstate Disputes Over Krishna Waters: Law, Science and Imperialism*. New Delhi: Orient Longman.
- Damania, Richard, Sébastien Desbureaux, Aude-Sophie Rodella, Jason Russ, and Esha Zaveri. 2019. "Quality Unknown: The Invisible Water Crisis." Washington DC: World Bank.
- Datta, Samar K., Milindo Chakrabarti, Sakti P. Pal, and S.K. Das. 2008. "Studying Gap Between Irrigation Potential Created and Utilized in India: Final Report." Ahmedabad: Indian Institute of Management, Ahmedabad.
- Dharmadhikary, Shripad, Rutuja Bhalerao, Ashwini Dabadge, and Sreekumar N. 2018. "Understanding the Electricity, Water and Agriculture Linkages." Prayas (Energy Group).
- Doabia, T.S. 2012. "Report of the Committee to Study the Activities that are required for Optimal Development of a River Basin and Changes Required in Existing River Boards Act, 1956 for Achievement of the Same." New Delhi: Ministry of Water Resources.
- Falkenmark, Malin, Jan Lundqvist, and Carl Widstrand. 1989. "Macro-Scale Water Scarcity Requires Micro-Scale Approaches: Aspects of Vulnerability in Semi-Arid Development." *Natural Resources Form 13*, no. 4.
- Famiglietti, J.S. 2014. "The global groundwater crisis." *Nature Climate Change* 4, November: 945-948.
- Government of Karnataka. 2017. "Tariff Order 2017 (BESCOM): New Directives and Review of Compliance of Previous Directives Issued by the Commission." Karnataka Electricity Regulatory Commission, Government of Karnataka.
- Government of Maharashtra. 2012. "Economic Survey of Maharashtra 2011-12." Directorate of Economics and Statistics, Government of Maharashtra.
- Government of Maharashtra. 2018. "Economic Survey of Maharashtra 2017-18." Directorate of Economics and Statistics, Government of Maharashtra.
- Government of Punjab. 2012. "Statistical Abstract of Punjab 2012." Economic and Statistical Organisation, Government of Punjab.
- Government of Punjab. 2018. "Statistical Abstract of Punjab 2018." Economic and Statistical Organisation, Government of Punjab.
- Graefe, Peter and Julie M. Simmons. 2013. "Assessing the Collaboration That Was "Collaborative Federalism 1996-2006." *Canadian Policy Science Review* 7, no. 1: 25-36.
- Gupta, Manish, Anit Mukherjee, Tapas K. Sen, and R. Srinivas. 2011. "Improving Effectiveness and Utilisation of Funds for Selected Schemes through Suitable Changes in Timing and Pattern of Releases by the Centre." Planning Commission.
- "Houselisting and Housing Census Data- 2011." Office of the Registrar General and Census Commissioner India, Ministry of Home Affairs. http://www.censusindia.gov.in/2011census/hlo/HLO_Tables.html.
- Huesker, Frank and Timothy Moss. 2015. "The Politics of Multi-Scalar Action in River Basin Management: Implementing the EU Water Framework Directive." *Land Use Policy* 42: 38-47.
- Iyer, Ramaswamy R. 1994. "Federalism and Water Resources." *Economic and Political Weekly* 29, no. 13 (26 March): 733-36.

- Iyer, Ramaswamy R. 2002. "Inter-State Water Disputes Act 1956: Difficulties and Solutions." *Economic and Political Weekly* 37, no. 28 (13 July): 2907-10.
- Kale, Sunila S. 2014. *Electrifying India: Regional Political Economies of Development*. Stanford: Stanford University Press.
- Kohli, Atul, ed. 2001. *The Success of India's Democracy*. Cambridge: Cambridge University Press.
- Kumar, D.M., Christopher A. Scott, O.P. Singh. 2013. "Can India raise agriculture productivity while reducing groundwater and energy use?" *International Journal of Water Resources Development* 29, no 4: 557-573.
- M.C. Mehta v Union of India (1997) 11 SCC 312.
- Mawdsley, Emma. 2002. "Redrawing the Body Politic: Federalism, Regionalism and the Creation of New States in India." *Commonwealth and Comparative Politics* 40, no. 3: 34-54.
- Maywald, Karlene. 2018. "Negotiations for Resolution of Transboundary Water Conflicts, in ICID News, 2018, Third Quarter." International Commission on Irrigation and Drainage.
- McKenzie, David and Isha Ray. 2009. "Urban Water Supply in India: Status, Reform Options and Possible Lessons." *Water Policy* 11, no. 04: 442-60.
- Milly, P.C.D., Julio B., Falkenmark, M., Robert M.H., Zbigniew W.K., Dennis P.L., and Ronald J.S. 2008. "Stationarity is Dead: Whither Water Management?" *Science* 319, 1 February: 573-574.
- Ministry of Finance, Press Information Bureau, Government of India. February 24, 2015. "14th Finance Commission (FFC) Report Tabled in Parliament; FFC Recommends by Majority Decision that the States' Share in the Net Proceeds of the Union Tax Revenues be Raised to 42% Which is a Huge Jump from the 32% Recommended by the 13th Finance Commission."
- Ministry of Finance. 2017. "Economic Survey 2016-17." Ministry of Finance.
- Ministry of Finance. 2018. "Indian Public Finance Statistics 2017-2017." Ministry of Finance.
- Ministry of New and Renewable Energy. 2019. "Guidelines for Implementation of Pradhan Mantri Kisan Urja Suraksha Evam Utthan Mahabhiyan (PM KUSUM) Scheme." 22 July.
- Ministry of Water Resources. 2013. "Report of the Committee for Preparing Roadmap for Implementation of National Water Policy 2012." New Delhi: Ministry of Water Resources.
- Ministry of Water Resources, River Development and Ganga Rejuvenation. 2014. "4th Census of Minor Irrigation Schemes Report." New Delhi: Ministry of Water Resources, River Development and Ganga Rejuvenation.
- Ministry of Water Resources, River Development and Ganga Rejuvenation. 2017. "5th Census of Minor Irrigation Schemes Report." New Delhi: Ministry of Water Resources, River Development and Ganga Rejuvenation.
- Mozoomdar, Ajit. 1994. "The Rise and Decline of Development Planning in India." In *The State and Development Planning in India*, 73-108. New York: Oxford University Press.
- Mukherji, A. 2017. "Managing Energy-Irrigation Nexus: Insights from Karnataka and Punjab States in India." In *Advances in Groundwater Governance*, 289-305. London: CRC Press.
- Nariman, Fali S. 2009. "Inter-State Water Disputes: A Nightmare!" In *Water and the Laws in India*. New Delhi: Sage Publications.
- NITI Aayog. 2018. "Composite Water Management Index." NITI Aayog.
- Pandey, Rita. 2014. "Groundwater Irrigation in Punjab: Some Issues and Way Forward." Working Paper No. 2014-140. National Institute of Public Finance and Policy, New Delhi.
- Panicker, Varun. 2018. "More Than Just Water." *Economic and Political Weekly* 53, no. 37: 59-66.
- Planning Commission, Steering Committee on Irrigation. 2002. "Report of the Steering Committee on Irrigation." Planning Commission.
- Planning Commission, Working Group on Major and Medium Irrigation and Command Area Development. 2011. "Report of the Working Group on Major and Medium Irrigation and Command Area Development for the XII Five Year Plan (2012-2017)." New Delhi: Ministry of Water Resources.
- Pratham Education Foundation. 2019. "Annual Status of Education Report (Rural) 2018." ASER Centre, 15 January.

- Punchhi Commission. 2010. "Report of the Commission on Centre-State Relations - Constitutional Governance and the Management of Centre-State Relations." Inter-State Council Secretariat, Ministry of Home Affairs, Government of India, March 2010.
- Raj, K. and M.G. Chandrakanta. 2015. "Water Resources and Irrigation." In *State of the Environment Report for Karnataka 2015*. Karnataka: Environmental Management & Policy Research Institute.
- Rao, M. Govinda and Nirvikar Singh. 2004. "Asymmetric Federalism in India." Working Papers 05/6. National Institute of Public Finance and Policy.
- Rao, M. Govinda. 2017. "Central Transfers to States in India Rewarding Performance While Ensuring Equity." National Institute of Public Finance and Policy for NITI Aayog.
- Rao, M. Govinda. 2019. "Redesigning the Fiscal Transfer System in India." Madras School of Economics, Chennai.
- Reddy, G.B. 2013. "Effective Resolution of Inter-State Water Disputes in India: Lessons to Be Learnt and Unlearnt." In *Inter-State and International Water Disputes*, 1st ed., 59-80. New Delhi: Eastern Book Company.
- Saez, Lawrence. 2002. *Federalism Without a Centre: The Impact of Political and Economic Reform on India's Federal System*. 1st ed. New Delhi: Sage Publications.
- Sanan, D. n.d. "Unravelling Rural India's Enduring Water Indigence: Framing the Questions, Issues, Options and Opportunities." Working Paper. Centre for Policy Research, New Delhi.
- Sarkar, Anindita and Arijit Das. 2014. "Groundwater Irrigation–Electricity–Crop Diversification Nexus in Punjab: Trends, Turning Points and Policy Initiatives." *Economic and Political Weekly* 49, no. 52 (27 December): 64-73.
- Sarkaria Commission. 1988. "Commission on Centre-State Relations: Report." Technical Report. New Delhi, Ministry of Home Affairs.
- Shah, Tushaar, Mark Giordano, and Aditi Mukherji. 2012. "Political Economy of the Energy-Groundwater Nexus in India: Exploring Issues and Assessing Policy Options." *Hydrogeology Journal* 20, no. 5: 995-1006.
- Shah, Tushaar. 2011. *The Past, Present and Future of Canal Irrigation in India*. India Infrastructure Report 2011. New Delhi: Oxford University Press.
- Shah, Tushaar, Shilp Verma, Neha Durga, Abhishek Rajan, Alankrita Goswami, and Alka Palrecha. 2016. "Har Khet Ko Paani (Water to Every Farm): Rethinking Pradhan Mantri Krishi Sinchai Yojana (PMKSY)" International Water Management Institute.
- Shah, Tushaar. 2010. *Taming the Anarchy: Groundwater Governance in South Asia*. Washington, DC: Resources for the Future, International Water Management Institute.
- Sharma, Bharat R., Ashok Gulati, Gayathri Mohan, Stuti Manchanda, Indro Roy, and Upali Amarasinghe. 2018. "Water Productivity Mapping of Major Indian Crops." NABARD and ICRIER.
- Siebert, S., J. Burke, J.M. Faures, K. Frenken, J. Hoogeveen, P. Doll and F.T. Portman. 2010. Groundwater use for irrigation – a global inventory. *Hydrology and Earth System Sciences*, 14: 1863-1880.
- Singh, Karan. 2009. "Act to Save Groundwater in Punjab: Its Impact on Water Table, Electricity Subsidy and Environment." *Agricultural Economics Research Review* 22, no. Conference Number: 365-86.
- Standing Committee on Water Resources, 16th Lok Sabha. 2015. "Sixth Report (2015-2016)." Lok Sabha Secretariat.
- Swain, Ashwini. 2017. "Protecting Power: The Politics of Partial Reforms in Punjab's Electricity Sector." Working Paper Mapping Power Project. Centre for Policy Research, New Delhi.
- Swenden, Wilfried and Rekha Saxena. 2017. "Rethinking Central Planning: A Federal Critique of the Planning Commission." *India Review* 16, no. 01: 42-65.
- Thirteenth Finance Commission. 2009. "Thirteenth Finance Commission 2010-2015: Volume I: Report".
- Water Aid India. 2005. "Drinking Water Status and Sanitation in India." Water Aid India.
- World Resources Institute. "Aqueduct Water Risk Atlas." <https://www.wri.org/aqueduct>, accessed October 10, 2019.



ANNEXURES

ANNEXURE 1:

WRM PERFORMANCE INDICATORS AND SELECTION OF CASE STUDY STATES

Informed by the literature on territorial-based indicators for WRM performance outcomes, we attempted putting together data sets for selection of case study States. The exercise turned out to be a challenging one due to uniform availability of data for all the States. There are no such efforts to we could draw upon with such an intent of comparing States based on outcome indicators. The only comprehensive data set we found was that of the NITI's CWMI report. We relied on the report's data for 9 out of the 14 indicators we used here. For other indicators, we drew on various other sources. We could put together comparable data for 14 indicators for 24 States. For other States or indicators, data could not be put together uniformly. To select case study States, we used median values for the data on each indicator to categorize the 24 States into quartiles to map performance of the States as in the table below. The States performing poorly in most indicators were short listed and then in combination with other criteria for selection, the three case study States were identified.

LIST OF INDICATORS MAPPED

Code	Indicators	Link to IWRM Dimensions	Unit of Measurement	Sources
I 1	Ground Water Exploitation/Stress Index	Development (Resource)	Draft/Availability (2011)	CGWB (2016) - [Annual Report]
I 2	Proportion of Urban population being provided drinking water services	Development (Resource)	Population having access to 'improved' water source that is free from prior contamination and available for use/ Total Population	NITI Aayog (2017) - [CWMI]; Census (2011)
I 3	Proportion of Rural habitation covered with drinking water services	Development (Resource)	Population having access to 'improved' water source that is free from priority contamination and available for use/ Total Population	NITI Aayog (2017) - [CWMI]; Census (2011)
I 4	Percentage area under Rainfed agriculture (of total net cultivable area)	Development (Resource)	area under rainfed agriculture/total cultivable area	NITI Aayog (2017) - [CWMI]
I 5	Hydroelectricity Potential Developed	Development (Resource)	Potential Developed/ total potential (in MW)	CWC (2015) - [Water Resources Information System]

Code	Indicators	Link to IWRM Dimensions	Unit of Measurement	Sources
I 6	Crop Water Productivity (Rice)	Efficiency (Resource)	Kg/meter cube	NABARD and ICRIER (2018)
I 7	Legal Provisions for facilitating PIM	Efficiency	Laws/Policies	NITI Aayog (2017) - [CWMI]
I 8	% share of Irrigated Command Area under WUA for retaining portion of fee collected; maintenance of Irrigation systems; and allocation of water	Efficiency	ICA with WUA/Total ICA	NITI Aayog (2017) - [CWMI]
I 9	Irrigation potential Utilized against potential created	Efficiency (Resource)	IPU/IPC	NITI Aayog (2017) - [CWMI]; CWC (2013) - [Water Resources Information System]
I 10	Information Management: Data centre established and data packaged and processed in formats accessible for use and updation by decision makers	Sustainability (Policy)	Online Data portals/ Departments/ Government Orders (Red if data is updated)	NITI Aayog (2017) - [CWMI]
I 11	Laws for protection of surface and Ground Water Bodies	Sustainability (Resource)	Legal letters and/ or policies in place for protection and rejuvenation of water resources (both surface and ground water sources)	NITI Aayog (2017) - [CWMI]; Lok Sabha Standing Committee on Water Resources (2015-16)
I 12	WW Treatment Efficiency	Sustainability (Resource)	Amount Treated against capacity installed	NITI Aayog (2017) - [CWMI]
I 13	Groundwater Depletion Rate: % of monitoring stations/basins with declining water level	Sustainability (Resource)	Proportion of observation wells reporting fall in water table (Annual Fluctuation - November)	CGWB (2017) - [Ground Water Year Book]
I 14	Share of Over exploited Aquifers	Sustainability	Total units declared overexploited/total assessed units	CGWB (2017) - [Dynamic Ground Water Resources]



State of States' WRM

Code	Indian States														
	Andhra Pradesh	Tamil Nadu	Jharkhand	Telangana	Bihar	Kerala	Chhattisgarh	Karnataka	Odisha	Uttarakhand	Goa	Madhya Pradesh	Uttar Pradesh	Punjab	Gujarat
I1	0.45	0.77	0.32		0.44	0.47	0.35	0.64	0.28	0.57	0.28	0.57	0.74	1.72	0.67
I2	0.83	0.7	0.45	0.77	0.2	0.53	0.66	0.86	0.62			0.98	0.92	0.94	1
I3	0.68	0.92	0.97	0.55	0.61	0.22	0.94	0.33	0.88	0.56	0.99	1	0.99	0.67	1
I4	0.43	0.44	0.83	0.64	0.43	0.8	0.68	0.83	0.61	0.31	0.69	0.33	0.13	0.08	0.46
I5	0.059	1	0.29			0.59	0.054	0.056	0.68	0.027	0	1	0.076	1	0.093
I6	0.44	0.3	0.32	0.46	0.28		0.3	0.24	0.37			0.25	0.37	0.57	0.29
I7	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	N	Y
I8	0.71	0.73	0	0.59	0.08	0	0.73	0.57	0.67	0	0.31	0.82	0.02	0.16	0.15
I9	0.82	0.36	0.49	0.53	0.9	0.69	0.72	0.94	0.96	0.71	0.43	0.96		0.51	0.62
I10	Y	Y	N	N	N	N	Y	Y	N	N	Y	Y	N	Y	Y
I11	Y	Y	Y	Y	Y	Y	Y	Y	N		Y	Y	Y	Y	Y
I12	0.26	0.31	0	0.38	0.18	0.08	0.03	0.62	0.04	0.27		0.34	0.45	0.61	0.62
I13	0.23		0.25	0.14	0.23	0.85	0.54	0.7	0.43	0.48	0.48	0.28		0.81	0.42
I14	0.09	0.31	0.02	0.1	0	0.01	0.01	0.24	0	0	0	0.088	0.14	0.76	0.1



Indian States														
Sr. No.	Maharashtra	Rajasthan	West Bengal	Haryana	Manipur	Sikkim	Arunachal Pradesh	Jammu & Kashmir	Meghalaya	Assam	Mizoram	Nagaland	Tripura	Himachal
I1	0.53	1.37	0.4	1.33	0.01	0.26	0.0008	0.21	0.008	0.14	0.04	0.06	0.07	0.71
I2	0.72	0.38		0.9		0.62			0.81	0.2		0.23	0.99	1
I3	0.87	0.44		0.96		0.35			0.17	0.6		0.46	0.52	0.98
I4	0.86	0.91				0.86			0.63	0.74		0.74	0.55	0.51
I5	0.75	0.85	0.15	0	0.06	0.7	0.062	0.32	0.14	0.58	0.03	0.05	0	0.62
I6	0.33		0.52	0.4						0.51				
I7	Y	Y				Y			N	Y		Y	N	Y
I8	0.26	0.75		0.7		0			0.44	0		0	0	0.15
I9	0.88	0.66		0.77						0.28			0.65	0.45
I10	Y	N		N		N			N	N		N	Y	Y
I11	Y	Y				Y			N	Y		N	N	Y
I12	0.58	0.71		0.95		0.81			0	0		0	0.25	0.47
I13	0.32	0.43	0.39	0.64			0.48	0.74	0.61	0.5			0.66	0.71
I14	0.03	0.66	0	0.54	0	NA	0	0	0	0	0	0	0	0.13

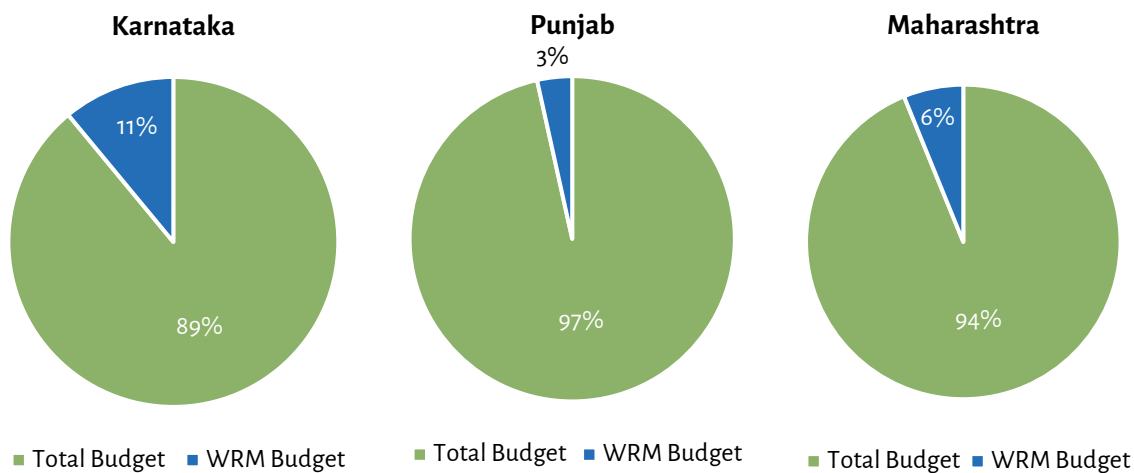
ANNEXURE 2:

STATES' BUDGETARY ALLOCATIONS ACROSS STRATEGY POOLS (2015-16)

1. STATES' WRM BUDGETARY ALLOCATIONS

WRM budgets do not include expenditure on power subsidy given to farmers. These are actual budget expenditure figures for the year 2015-16.

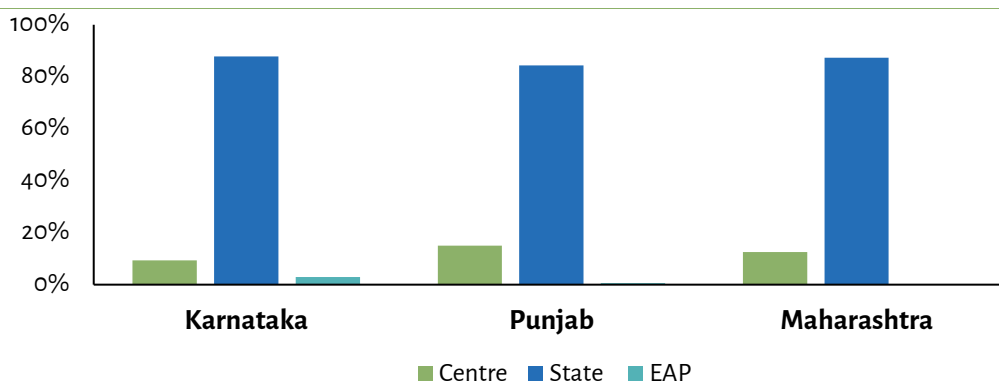
Figure 1 WRM share in total State budgets (2015-16)



2. SOURCES OF STATES' WRM EXPENDITURE

Expenditure on WRM activities is largely sourced from the State's own financial resources – capital and revenue receipts (see Figure 2). Through grants-in-aid and centrally sponsored schemes, the Centre contributed to select WRM activities, primarily through the PMKSY. Externally-aided projects constituted a very small proportion of total expenditure.

Figure 2 Sources of WRM budgets: Centre, State, IDAs



2. STATES' WRM EXPENDITURES ACROSS STRATEGY POOLS

Development	Use-efficiency	Sustainability
<ul style="list-style-type: none"> ▶ Capital Outlay on Major, Medium, and Minor Irrigation ▶ Capital Outlay on Command Area Development ▶ Hydro-electricity generation projects ▶ Capital Outlay on Lift Irrigation ▶ Capital Outlay on Drought and Natural Calamities ▶ Water Supply Provisioning ▶ Capital Outlay on Flood Control & Drainage 	<ul style="list-style-type: none"> ▶ Watershed Development Projects ▶ Soil and Water Conservation ▶ Capital Outlay on Crop Husbandry ▶ Capital Outlay on Micro Irrigation 	<ul style="list-style-type: none"> ▶ Pollution Management ▶ Lake/Tank Conservation ▶ Coastal Management ▶ Anti-Sea Erosion Projects ▶ Cooperative (Institution building) ▶ Research and Development (GIS and data collection)

Figure 3 Shares in total WRM expenditure

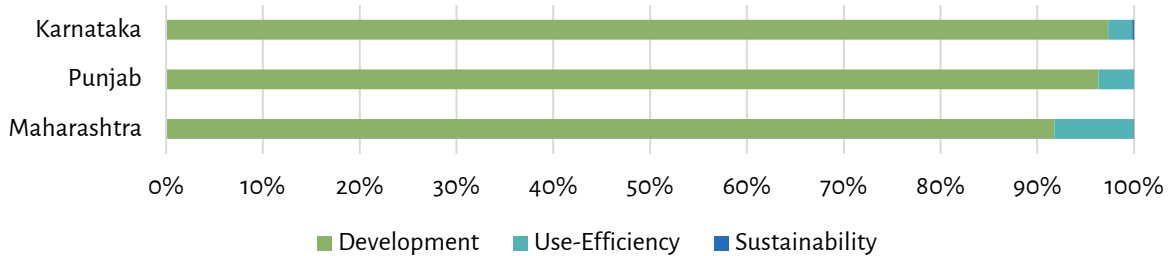


Figure 4 Shares in expenditure sourced from States' own financial resources

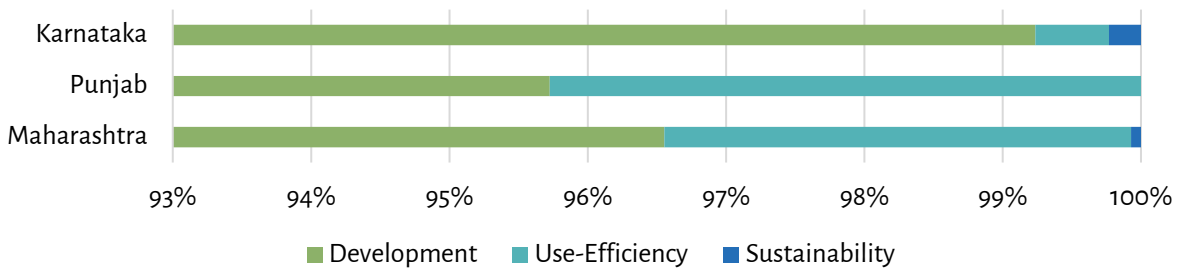


Figure 5 Shares in expenditure sourced from from the Centre

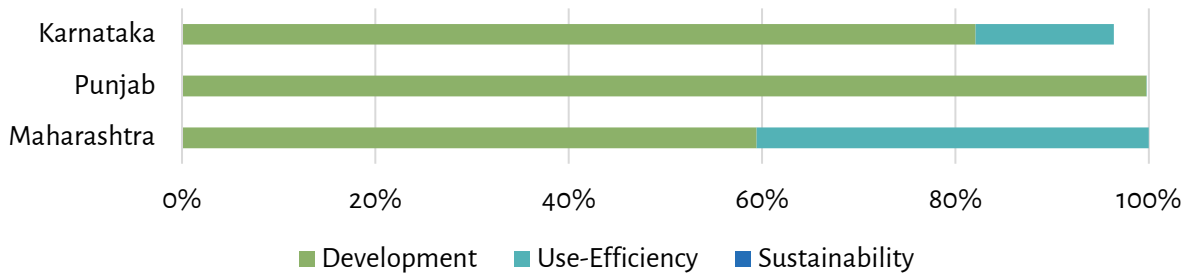
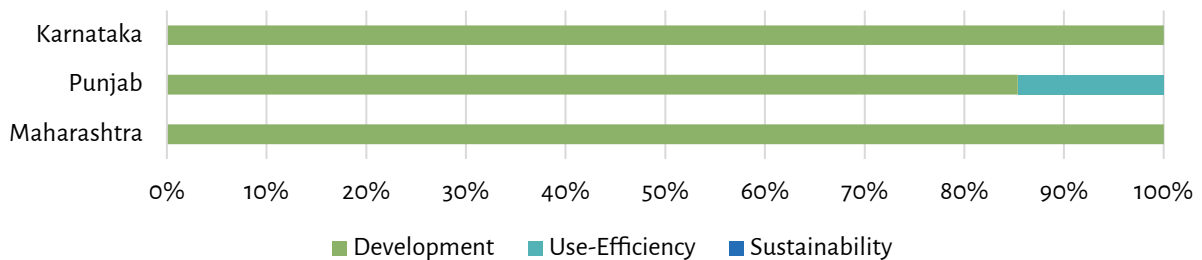


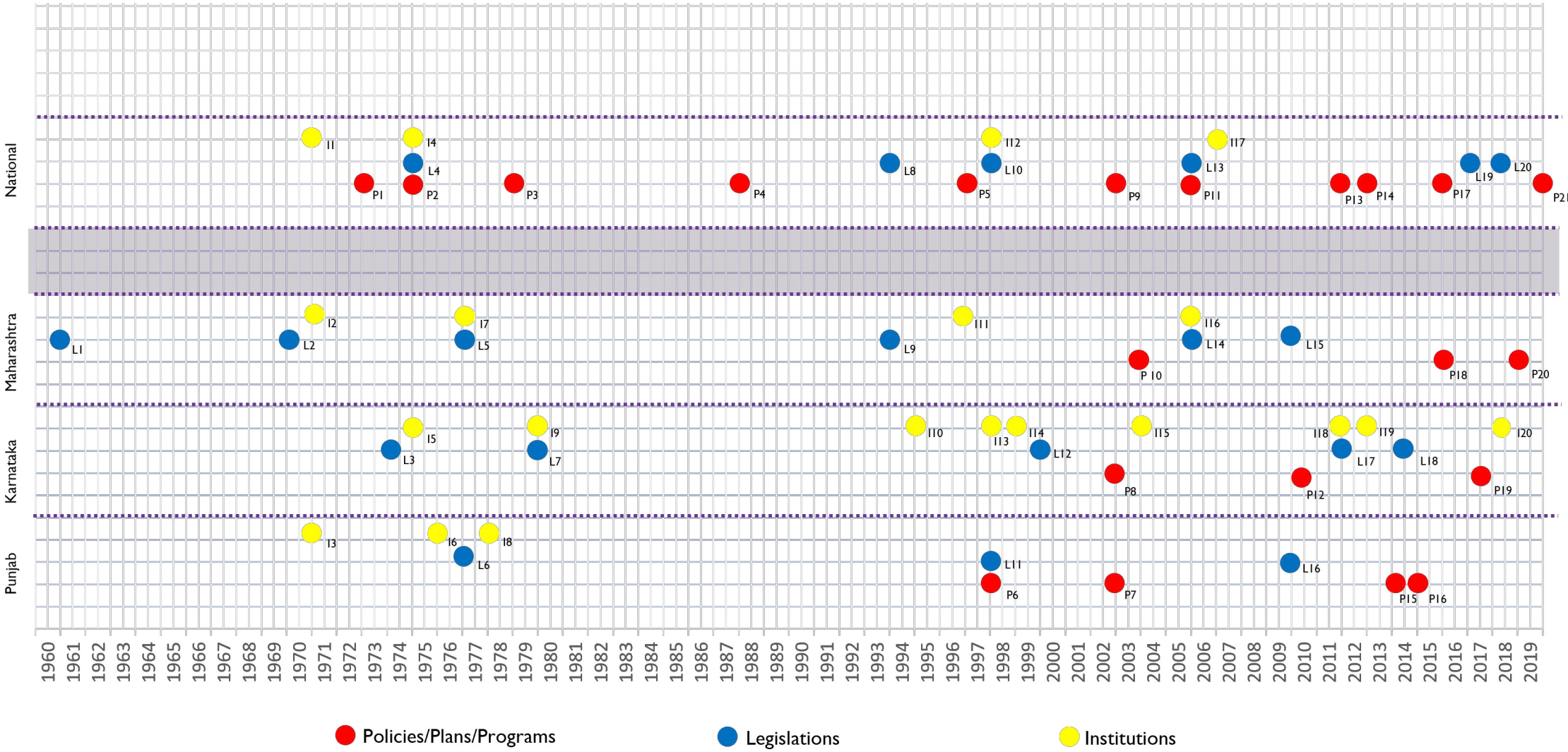
Figure 6 Shares in expenditure sourced from IDAs' assistance



Centre's contribution is also skewed towards developmental activities within WRM, with negligible funding for activities targeting enhancement of water use-efficiency and sustainability. IDAs, almost entirely, supported development category expenditure. Karnataka's watershed development activities funded by WB were an exception.

Data for this analysis has been sourced from respective budget documents i.e. Demands for Grants 2017-18, Governments of Karnataka, Maharashtra and Punjab.

ANNEXURE 3: PROGRESSIVE POLICYMAKING

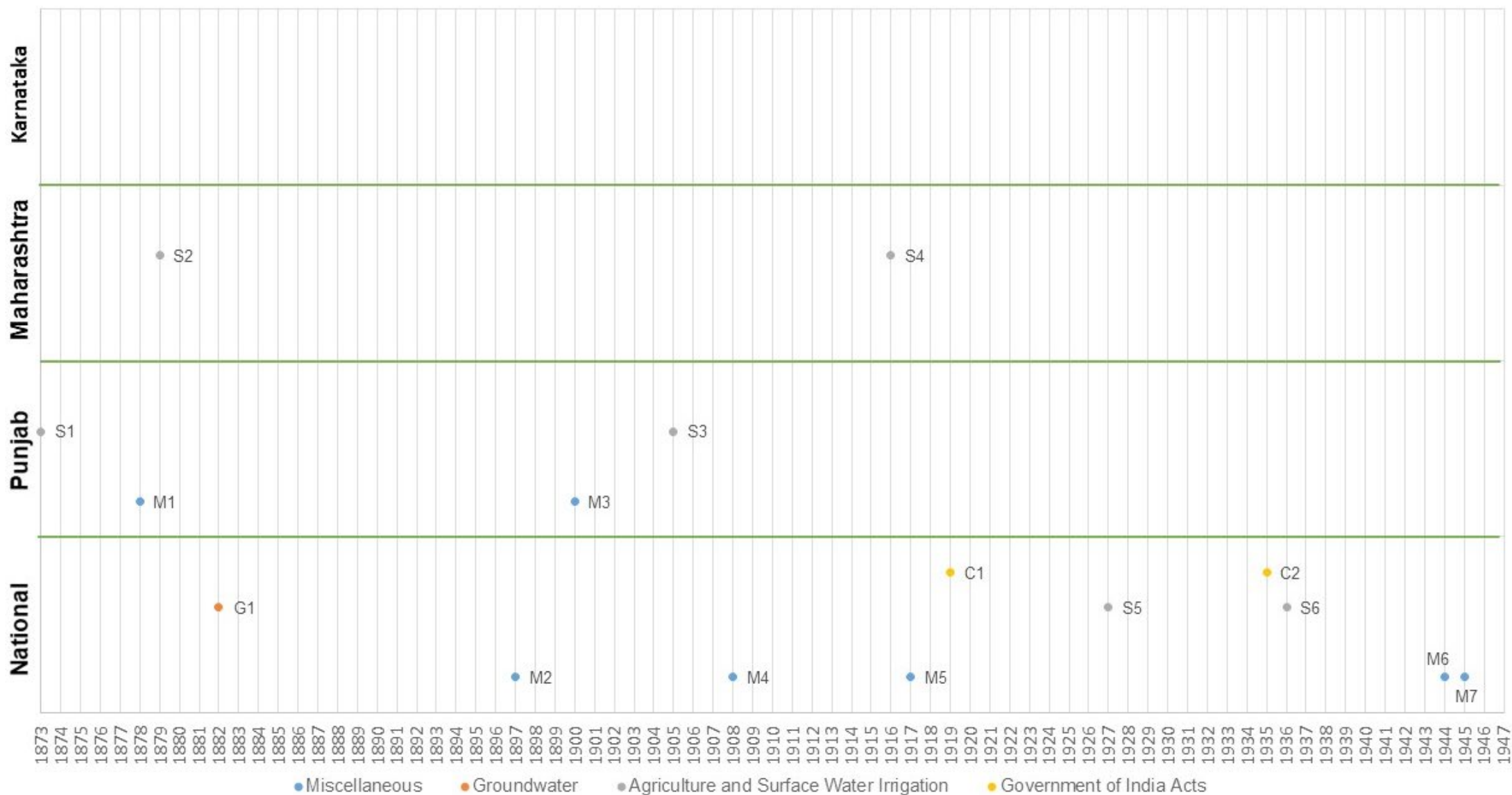


Policies/Programs/Plans		Legislations		Institutions	
P1	Accelerated Rural Water Supply Programme	L1	Maharashtra Cooperative Society Act, 1961	I1	Central Ground Water Board
P2	Drought Prone Area Programme & Command Area Development Programme	L2	Maharashtra Prevention of Water Pollution Act, 1969	I2	Maharashtra State Water Pollution Board
P3	Desert Development Programme	L3	Karnataka Urban Water Supply and Drainage Board Act, 1973	I3	Punjab State Tube Well Corporation
P4	1 st National Water Policy	L4	Water (Prevention and Control) Pollution Act, 1974	I4	Central Pollution Control Board
P5	Accelerated Irrigation Benefit Programme	L5	Maharashtra Water Supply & Sewerage Boards Act (Maharashtra Jeevan Pradhikaran Ac), 1976	I5	Karnataka State Water Pollution Board
P6	1 st State Water Policy of Punjab	L6	Punjab Water Supply and Sewerage Board Act, 1976	I6	Punjab State Water Pollution Board
P7	2 nd State Water Policy of Punjab	L7	Karnataka Command Area Development Authority Act, 1980	I7	Maharashtra Jeevan Pradhikaran
P8	1 st State Water Policy of Karnataka & Karnataka Urban Drainage and Water Supply Policy	L8	Model Ground Water (Regulation and Control for Drinking Purposes) Bill, 1994	I8	Punjab Water Supply & Sewerage Boards
P9	2 nd National Water Policy	L9	Maharashtra Ground Water (Regulation and Control for Drinking Purposes) Act, 1994	I9	Karnataka Command Area Development Authority
P10	1 st State Water Policy of Maharashtra	L10	Model Participatory Irrigation Management Bill, 1997	I10	Krishna Bhagya Jal Nigam Limited
P11	National Mission on Micro Irrigation	L11	Punjab Irrigation Development Authority Act, 1997	I11	Irrigation Development Corporations
P12	Karnataka Vision 2020	L12	Karnataka Ground Water (Regulation and Control for Drinking Purposes) Act, 1999	I12	Central Ground Water Authority
P13	Flood Management Programme	L13	Model Ground Water (Regulation and Control) Bill, 2005	I13	Karnataka Minor Irrigation Department
P14	3 rd National Water Policy	L14	Maharashtra Water Resources Regulatory Authority Act & Maharashtra Management of Irrigation Systems by Farmers, 2005	I14	Karnataka Neeravari Nigam Limited
P15	Crop Diversification Programme	L15	Maharashtra Ground Water (Development and Management) Bill, 2009	I15	Cauvery Neeravari Nigam Limited
P16	Punjab Rural Water Supply and Sanitation Programme	L16	Punjab Preservation of Sub-Soil Water Act, 2009	I16	Maharashtra Water Resources Regulatory Authority
P17	Pradhan Mantri Krishi Sinchayi Yojna	L17	Karnataka Ground Water (Development and Management) Act,	I17	National Rainfed Area Authority
P18	Maharashtra Water Resources Department Vision 2020	L18	& Karnataka Tank Conservation & Development Act, 2014	I18	Advance Centre for Integrated Water Resources Management
P19	Karnataka Urban Waste Water Reuse Policy	L19	National Water Framework Bill, 2015	I19	Karnataka Ground Water Authority
P20	Maharashtra Integrated State Water Plan	L20	Model Ground Water (Sustainable Management) Bill, 2017	I20	Karnataka Antargange Micro Irrigation Corporation
P21	Atal Bhujal Yojna				

ANNEXURE 4:

TIMELINE OF LAWS AND INSTITUTIONS

Laws and Institutions (Before Independence)



- C1 Government of India Act, 1919. Irrigation, water supply, etc. became Provincial subjects and the Government of India was responsible for advice, co-ordination and settlement of disputes over right on the water of Inter-Provincial Rivers.
- C2 Government of India Act, 1935. Empowered the provinces to take decisions on water supply, irrigation, canals, drainage and embankments, water storage and hydropower. Conflicts between provinces and/or princely states were subjected to the jurisdiction of the Governor General who could appoint a commission to investigate the sufficiently important conflicts).



Groundwater

G1 Indian Easements Act, 1882

Agriculture and Surface Water Irrigation

S1 Northern India Canal and Drainage Act, 1873

S2 Bombay Irrigation Act, 1879

S3 Punjab Minor Canals Act, 1905

S4 Special Irrigation Cell in Maharashtra

S5 Central Board of Irrigation and Power

S6 Special Irrigation Cell taken over by the Central Government (presently Central Water and Power Research Station)

Miscellaneous

M1 Northern India Ferries Act, 1878

M2 Indian Fisheries Act, 1897

M3 Punjab Land Preservation Act, 1900

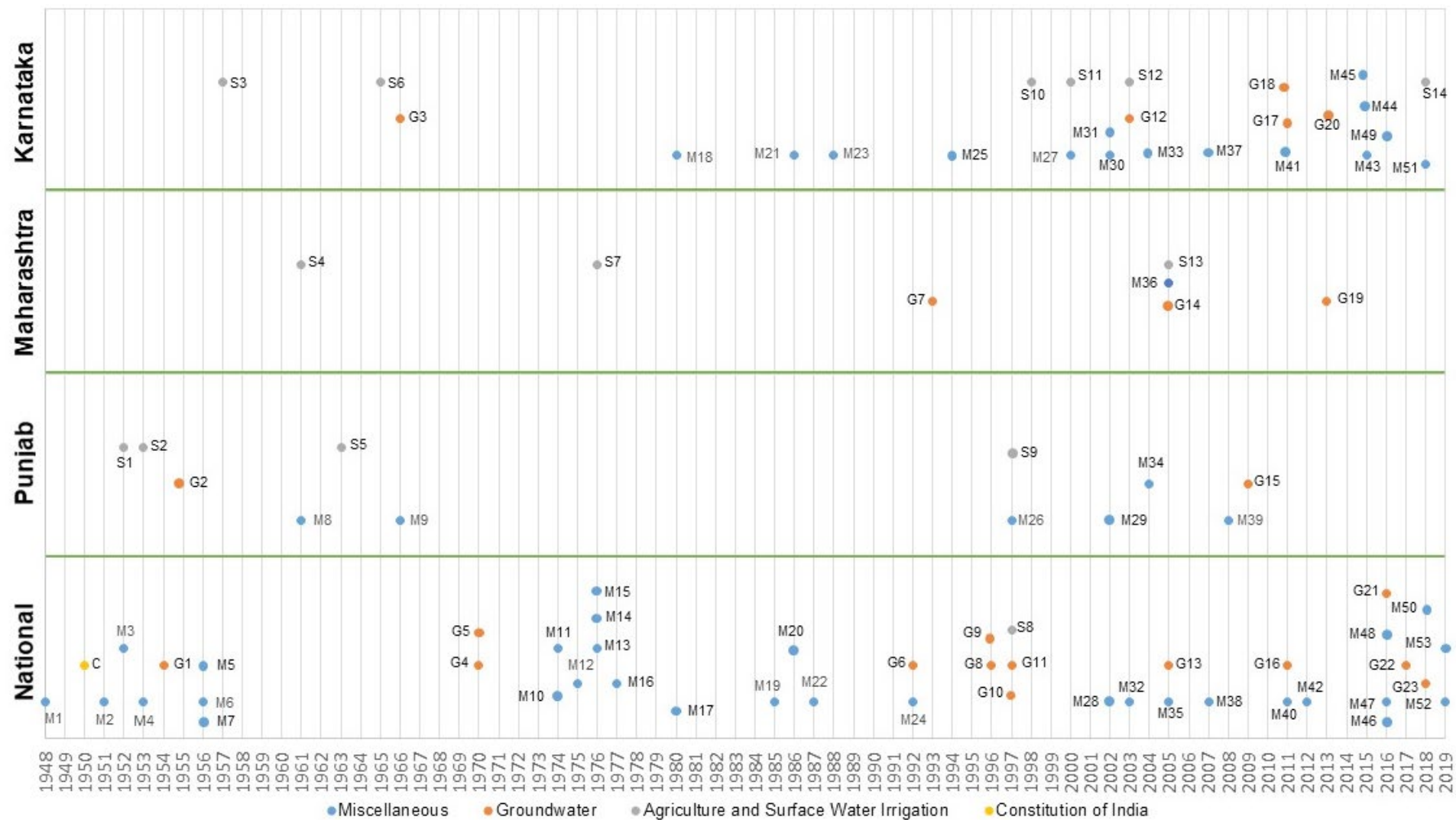
M4 Indian Ports Act, 1908

M5 Inland Vessels Act, 1917

M6 Central Technical Power Board (CTPB)

M7 Central Waterways, Irrigation and Navigation Commission (CWINC)

Laws and Institutions (After Independence)



● C Constitution of India. Water was declared a State subject. States have the exclusive power to regulate water supplies, irrigation and canals, drainage and embankments, water storage, water power and fisheries (Schedule 7, List II, Entries 17 and 21). However, the Centre has been given power over the regulation and development of inter-State rivers and river valleys (Schedule 7, List 1, Entry 56). The Centre is also entitled to legislate on shipping and navigation on national waterways, on tidal and territorial waters (Schedule 7, List 1, Entries 24, 25, 57), and on the adjudication of inter-State river water disputes (Article 262).

Groundwater

- G1 Exploratory Tubewells Organization
- G2 The Punjab State Tubewell Act, 1954
- G3 Groundwater wing in the Department of Mines and Geology in Karnataka
- G4 Model Bill to Regulate and Control the Development of Groundwater
- G5 ETO renamed as Central Groundwater Board
- G6 Model Bill to Regulate and Control the Development of Groundwater
- G7 Maharashtra Groundwater (Regulation for Drinking Water Purposes) Act, 1993
- G8 Model Bill to Regulate and Control the Development of Groundwater
- G9 MC Mehta v Union of India
- G10 Central Groundwater Authority pursuant to M.C. Mehta
- G11 National Groundwater Training and Research Institute
- G12 Karnataka Ground Water (Regulation for Protection of Sources of Drinking Water) Act, 1999
- G13 Model Bill to Regulate and Control the Management of Groundwater
- G14 MWRRRA to act as Karnataka Groundwater Authority
- G15 Punjab Preservation of Subsoil Water Act, 2009
- G16 Model Bill for the Conservation, Protection and Regulation of Groundwater

Agriculture and Surface Water

- S1 Punjab Soil Reclamation Act, 1952
- S2 Punjab Betterment Charges and Acreage Rates Act, 1952
- S3 The Karnataka Irrigation (Levy of Betterment Contribution and Water Rate) Act, 1957
- S4 Maharashtra Cooperative Societies Act, 1960
- S5 The Punjab Thur and Sem Lands (Reclamation) Act, 1963
- S6 Karnataka Irrigation Act, 1965
- S7 Maharashtra Irrigation Act, 1976
- S8 Model Act on Participatory Irrigation Management
- S9 Punjab Irrigation and Drainage Authority Act, 1997
- S10 Karnataka Neeravari Nigam Ltd.
- S11 Ordinance promulgated for amendment of the existing Karnataka Irrigation Act, 1965
- S12 Cauvery Neeravari Nigam Ltd. in Karnataka
- S13 Management of Irrigation Systems by Farmers Act
- S14 Karnataka Antaraganga Micro Irrigation Corporation

Miscellaneous

- M1 The Central Electricity Commission & the Central Water-Power, Irrigation & Navigation Commission
- M2 Central Water & Power Commission
- M3 Flood Control Board
- M4 Tungabhadra Board
- M5 Inter-State River Water Disputes Act, 1956
- M6 River Boards Act, 1956
- M7 States Reorganisation Act, 1956
- M8 The Punjab Fisheries Ordinance, 1961-1970
- M9 Punjab Reorganisation Act, 1966
- M10 Water (Prevention & Control of Pollution) Act, 1974
- M11 The Central Electricity Authority & the Central Water Commission
- M12 Model Bill for Flood Plain Zoning
- M13 Betwa River Board Act, 1976
- M14 Bansagar Control Board
- M15 Rashtriya Barh Ayog
- M16 The Water (Prevention & Control of Pollution) Cess Act, 1977

Groundwater

- G17 Karnataka Ground Water (Regulation and Control of Development and Management) Act, 2011
- G18 Karnataka Groundwater Authority
- G19 Maharashtra Groundwater (Development and Management) Act, 2009
- G20 Ground Water Directorate in Karnataka
- G21 Model Bill for the Conservation, Protection, Regulation and Management of Groundwater
- G22 Groundwater (Sustainable Management) Bill
- G23 Groundwater (Sustainable Management) Bill

Miscellaneous

- M17 The Brahmaputra Board Act, 1980
- M18 Karnataka Command Areas Development Act, 1980
- M19 Inland Waterways Authority of India Act, 1985
- M20 Environment Protection Act, 1986
- M21 Water and Land Management Institute in Karnataka
- M22 National Water Policy I
- M23 Drought Monitoring Cell in Karnataka
- M24 National Afforestation and Eco-Development Board
- M25 Krishna Bhagya Jala Nigam Ltd. in Karnataka
- M26 Punjab's State Water Policy
- M27 Watershed Development Department in Karnataka
- M28 National Water Policy II
- M29 Punjab Infrastructure (Development and Regulation) Act, 2002
- M30 Karnataka Water Policy
- M31 Lake Development Authority in Karnataka
- M32 National Rainfed Area Authority
- M33 The Karnataka Inland Fisheries (Conservation, Development and Regulation) Act, 1996
- M34 Punjab Termination of Agreements Act, 2004
- M35 Disaster Management Act, 2005

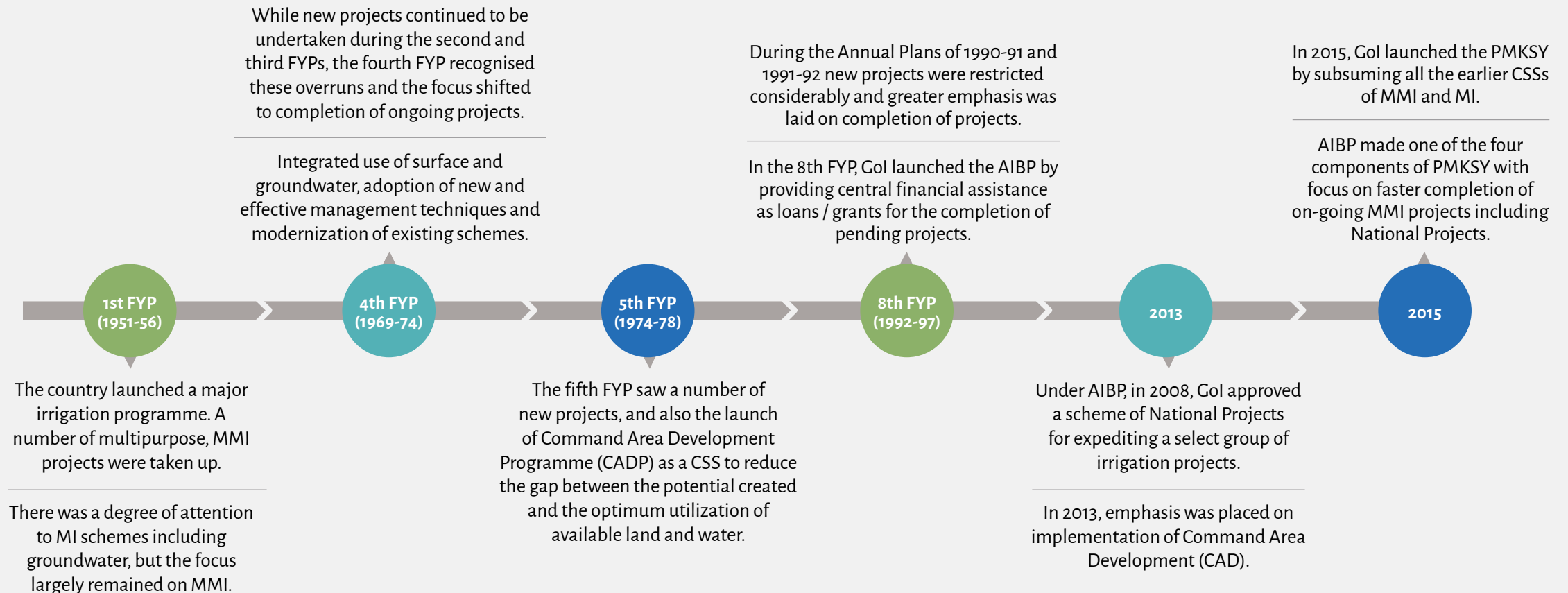


Miscellaneous

- M36 Maharashtra Water Resources Regulatory Authority Act
- M37 Drought Monitoring Cell renamed as Karnataka State Natural Disaster Monitoring Centre
- M38 Draft Guidelines for Preparation of Legislation for Framing Drinking Water Regulations
- M39 Punjab's State Water Policy
- M40 Draft Model Bill for State Water Regulatory System
- M41 Advanced Centre for Integrated Water Resources Management in Karnataka
- M42 National Water Policy III
- M43 Karnataka Lake Conservation and Development Authority Act, 2014
- M44 Karnataka Tank Conservation and Development Authority
- M45 Karnataka Lake Conservation and Development Authority (KCDA)
- M46 National Waterways Act, 2016
- M47 Draft National Water Framework Bill
- M48 MoJS Notification constituting Central, State and District authorities Ganga pollution control
- M49 Visvesvaraya Jala Nigam Ltd. in Karnataka
- M50 National Water Informatics Centre
- M51 Custody of the State's lakes given to Minor Irrigation Department (MID) in place of KCDA
- M52 ISRWD Amendment Bill passed by the Lok Sabha
- M53 Dam Safety Bill passed by the Lok Sabha

ANNEXURE 5:

EVOLUTION OF CENTRAL GOVERNMENT'S FOCUS ON WATER



ANNEXURE 6:

FEATURES OF RKVY

The RKVY was established in 2007 in the backdrop of falling agricultural growth rates to rejuvenate the sector. The scheme was conceptualised as an Additional Central Assistance programme, and converted to a CSS in 2014-15, albeit with a 100% central share. The revision of CSSs in 2015 led to curtailing central contribution in line with other CSS. Allocation of resources to a State in RKVY is formula driven, based on objective and predefined criteria.

SALIENT FEATURES OF RKVY AND POSSIBLE TAKEAWAYS FOR WATER SECTOR

S No	Unique Feature	Takeaway for the water Sector
1	Major components are divided into growth in production and growth in infrastructural facilities. Both are measurable metrics by which to gauge the performance of the schemes. They are also a mix of output (added infrastructural facilities) and outcome (productivity growth) oriented.	One of the challenges for water schemes is that even though they have a physical output component and a financial outlay component it is difficult to use outcome metrics such as a measurable rise in the water level or the treatment of sewage water for drinking purposes.
2	RKVY funding augments and supplements various ongoing agricultural schemes at the state level that come under the broad objectives of productivity increase and infrastructural growth. Therefore, a wide range of projects get funded by RKVY without having to streamline projects.	
3	In-built flexibility in RKVY i) States are given complete flexibility for formulation of project, scrutiny, plan and approval ii) Projects are prepared on the basis of the gaps identified by District Agriculture Plans and State Agriculture Plans iii) Approval for projects is done by State Level Sanctioning Committee	This feature is essential for states to be able to plan and design projects that are suited to local needs. This also prevents disincentives in completing projects that many of these water projects suffer from.
4	The design encourages setting state specific targets	State specific targets are imperative for water sector governance considering the role of endogenous factors in driving the WRM strategies of States. Local requirements often differ from national development agenda.

ACKNOWLEDGEMENT

We would like to thank Mr Deepak Sanan, Visiting Senior Fellow at CPR and Mr Ashwin Pandya, Secretary General, International Commission on Irrigation and Drainage for their advice and inputs during the course of the study. We are also grateful to the key informants from the States and the participants of two workshops organized as part of the study.