

**Report  
of  
The Steering Committee  
on Water Resources  
and Sanitation  
for  
Twelfth Five Year Plan  
(2012-2017)**



**Government of India  
Planning Commission  
New Delhi**

**January, 2012**

# CONTENTS

<b><u>Chapter</u></b>		<b><u>Page</u></b>
	Overview	
1.	Major and Medium Irrigation and Command Area Development	1
2.	Sustainable Groundwater Management	9
3.	Minor Irrigation and Watershed Management	26
4.	Rural Domestic Water and Sanitation	37
5.	Water Database Development and Management	50
6.	Urban and Industrial Water Supply and Sanitation	63
7.	Flood Management and Region-Specific Issues	90
8.	Water Governance	101
<b>Annexure</b>		
1(A)	Minutes of First meeting of the Steering Committee on Water Resources and Sanitation for the formulation of the Twelfth Five Year Plan held on 25.11.2010	119
1(B)	Minutes of Second meeting of the Steering Committee on Water Resources and Sanitation for the formulation of the Twelfth Five Year Plan held on 27.09.2011	127
1(C)	Minutes of Third meeting of the Steering Committee on Water Resources and Sanitation for the formulation of the Twelfth Five Year Plan held on 20.10.2011	137
1(D)	Minutes of Fourth meeting of the Steering Committee on Water Resources and Sanitation for the formulation of the Twelfth Five Year Plan held on 15.11.2011	143
2	Draft Model Bill for The Conservation, Protection and Regulation of Groundwater	154
3	Draft National Water Framework Bill	190
4	Draft Model Bill for State Water Regulatory System	207

# **REPORT OF THE STEERING COMMITTEE ON WATER RESOURCES AND SANITATION FOR THE TWELFTH FIVE YEAR PLAN**

## **OVERVIEW**

The Planning Commission had set up one Steering Committee on Water Resources and Sanitation and the following eight Working Groups for addressing the issues related to the Water Resources and Sanitation for the formulation of the Twelfth Five Year Plan (2012-2017). During the first meeting of the Steering Committee, the Terms of Reference and issues to be addressed by the eight Working Groups were discussed.

1. Working Group on Major and Medium Irrigation and Command Area Development
2. Working Group on Sustainable Groundwater Management
3. Working Group on Minor Irrigation and Watershed Management
4. Working Group on Flood Management and Region-Specific Issues
5. Working Group on Water Database Development and Management
6. Working Group on Urban and Industrial Water Supply and Sanitation
7. Working Group on Rural Domestic Water and Sanitation
8. Working Group on Water Governance

The composition and terms of reference of the Steering Committee are as under:

### **Composition:**

- |  |             |
|--|-------------|
| 1. Dr. Mihir Shah, Member (Water Resources), Planning Commission   | Chairperson |
| 2. Prof. A. Vaidyanathan, Former Member, Planning Commission   | Member      |
| 3. Shri Ramaswamy R. Iyer, Former Secretary, Ministry of Water Resources & Hon. Professor, Centre for Policy Research, New Delhi | Member      |
| 4. Dr. Tushaar Shah, Senior Fellow, IWMI, India  | Member      |
| 5. Shri Deep Joshi, Co-founder, PRADAN and Member, National Advisory Council, New Delhi  | Member      |
| 6. Dr. Himanshu Kulkarni, ACWADAM, Pune  | Member      |
| 7. Ms. Sunita Narain, Director, Centre for Science and Environment, New Delhi  | Member      |
| 8. Dr. Nirmal Sengupta, Retd. Professor, Indira Gandhi Institute of Development Research, Mumbai                                 | Member      |
| 9. Shri Joe Mediath, Executive Director, Gram Vikas, Berhampur, Orissa   | Member      |

10.	Shri Dhruv Vijay Singh, Secretary, Ministry of Water Resources, Government of India, New Delhi	Member
11.	Shri Prabeer Kumar Basu, Secretary, Ministry of Agriculture, Government of India, New Delhi	Member
12.	Smt. Vilasini Ramachandran, Secretary, Ministry of Drinking Water and Sanitation, Government of India, New Delhi	Member
13.	Ms. Anita Chaudhary, Secretary, Department of Land Resources, Ministry of Rural Development, Government of India, New Delhi	Member
14.	Dr. Sudhir Krishna, Secretary, Ministry of Urban Development, Government of India, New Delhi	Member
15.	Shri R.C. Jha, Chairman, Central Water Commission, New Delhi	Member
16.	Dr. S.C. Dhiman, Chairman, Central Ground Water Board, Ministry of Water Resources, Faridabad	Member
17.	Prof. S.P. Gautam, Chairman, Central Pollution Control Board, Ministry of Environment and Forests, New Delhi	Member
18.	Shri M.S. Agrawal, Adviser (Water Resources), Planning Commission, New Delhi	Member Secretary

**Terms of Reference:**

- To Guide the functioning of eight Working Groups set up by the Planning Commission on:
  1. Sustainable Groundwater Management
  2. Major & Medium Irrigation and Command Area Development
  3. Rural Domestic Water and Sanitation
  4. Urban and Industrial Water Supply and Sanitation
  5. Flood Management and Region-specific Issues
  6. Water Database Development and Management
  7. Minor Irrigation and Watershed Management
  8. Water Governance
- On the basis of Working Group Reports, provide a clear guidance to the formulation of strategies, priorities and allocations for Water and Sanitation in the 12<sup>th</sup> Plan that enables
  - legal, institutional and regulatory reform to improve governance
  - Going beyond the silo-based approach that has characterized the water sector thus far
  - plans that reflect the unity and integrity of the hydrologic cycle
  - greater emphasis on better utilization of existing water infrastructure and resources

- reduced dependence on fresh water through greater water use efficiency, recourse to recycling, improved utilisation of existing capacities etc
- greater emphasis on demand management
- greater and more informed stakeholder participation
- Any other issue considered relevant by the group

Four meetings of the Steering Committee were convened on 25.11.2010, 27.9.2011, 20.10.2011 and 15.11.2011 respectively. The Minutes of these meetings are given at Annexure 1(A) to 1(D).

This report is based on the findings and recommendations of the eight Working Groups.

As we move into the 12th Plan period, Indian economy and society face daunting challenges in the water sector. With traditional supply augmentation options running the course, the time for complacency is long over. The demands of a rapidly industrialising economy and urbanizing society come at a time when water tables are falling and water quality issues have increasingly come to the fore. As we drill deeper for water, our groundwater gets contaminated with fluoride and arsenic. Open defecation by around 600 million people is our biggest national shame. Since drinking water and sanitation continue to be treated in separate silos, both the quality of drinking water and that of sanitation gets compromised. In urban areas, this makes a large difference to the cost of provisioning clean water to users. As untreated effluents and sewage continue to be dumped into our rivers, they get increasingly polluted. Intensity of floods is reportedly increasing in recent years. Climate change poses fresh challenges with its impacts on the hydrologic cycle. It is no wonder then that conflicts across competing uses and users of water are growing by the day. Meanwhile, water use efficiency in agriculture, which consumes around 80% of our water resources, continues to be among the lowest in the world.

This is why the 12th Five Year Plan requires a paradigm shift in the management of water resources in India. This shift comprises the following elements:

- A move away from a narrowly engineering-construction-centric approach to a more multi-disciplinary, participatory management approach to our major and medium irrigation projects in order to
  - a. narrow growing gap between irrigation capacities created and those utilised
  - b. overcome neglect of command area development in our irrigation projects
  - c. move towards transparent, participatory mechanisms of pricing of water by primary stakeholders themselves
  - d. promote use of water-saving techniques of farming
  - e. improve water-use efficiency in irrigation
- Map the aquifers of India, separate the electricity feeders for agriculture from those for other uses and promote a participatory management of groundwater resources by stakeholders themselves in order to
  - a. impart greater sustainability and equity in the use of groundwater

- b. break down silos between drinking water and irrigation
- c. arrest the alarming decline in water tables
- d. effectively address issues of groundwater quality
- e. move towards transparent, participatory mechanisms of pricing of water by the primary stakeholders themselves
- f. move towards cropping patterns better aligned with the natural resource endowments of each region, with a focus on aquifers as the fundamental base for planning and management of groundwater.
- A massive programme for watershed development and groundwater recharge by
  - a. reforms in MGNREGA to transform it into our largest watershed and productivity enhancing programme
  - b. giving renewed energy to the reformed Integrated Watershed Management Programme launched in the 11th Five Year Plan
  - c. launching a completely revamped programme on Repair, Renovation and Restoration (RRR) of Water Bodies
- Major reform in drinking water and sanitation programmes by
  - a. creating a single rural drinking water and sanitation programme
  - b. moving towards piped water supply in rural areas
  - c. incentivising States to hand over operation and management of rural drinking water supply systems to PRIs
  - d. targeting habitations rather than households in rural sanitation
  - e. zeroing in on households rather than merely habitations in drinking water coverage
  - f. placing central emphasis on resource sustainability
  - g. adopting a community-led approach to both rural drinking water and sanitation to ensure participatory and transparent systems of pricing and better operation and maintenance
  - h. all urban water supply projects to necessarily integrate sewage systems within them
  - i. place central emphasis on capacity building of PRIs, ULBs and water utility personnel
- Definite targets for recycling and reuse of water by Indian industry to move in conformity with international standards

- Vastly improved systems of water-related data collection and management as also transparency in availability of data
- Renewed focus on non-structural mechanisms for flood management
- A new legal and institutional framework for water<sup>1</sup>:
  - a. Draft National Water Framework Law
  - b. Draft Model Bill for Conservation, Protection and Regulation of Groundwater
  - c. Draft Model Bill for State Water Regulatory System
  - d. National Water Commission to monitor compliance with conditionalities of investment and environmental clearance

This report provides a detailed elaboration of this reform agenda that has the potential to transform the water resources and sanitation sector in India.

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<sup>1</sup> The Drafts of the proposed new Bills, as prepared by the concerned Sub-Groups of the Working Group on Water Governance, are presented in this report. They will, of course, be finalized only after deliberations with the States in the National Development Council.

# **CHAPTER 1 - MAJOR AND MEDIUM IRRIGATION AND COMMAND AREA DEVELOPMENT**

## **1.1 INTRODUCTION**

Major and medium irrigation (MMI) projects have made considerable contribution in creation of irrigation potential<sup>2</sup>. However, many issues related to MMI projects have cropped up over the time. These issues relate to both the existing projects and the ongoing. The two serious problems which are required to be addressed on priority basis are:

- i. The gap between irrigation potential created (IPC) and irrigation potential utilized (IPU) is increasing year after year and as per the most updated information, the gap is about 18%.
- ii. Poor operation and maintenance not only adversely affects the efficiency of MMI projects but also leads to relatively higher cost of deferred maintenance.

In addition to the above, the ongoing major and medium irrigation projects suffer from serious problems related to non availability of adequate financial resources resulting in time and cost overruns. There is also a serious problem of availability of adequate data and information related to the projects for proper evaluation of the performance of the water resources projects. Available data and information from various sources are very often at variance with each other leading to a state of confusion. Ministry of Water Resources has initiated process of development of Water Resources Information System (WRIS). This is required to be completed at the earliest and made fully operational in public domain. Another serious concern related to major and medium irrigation project is about the inadequacy of fully trained professionals. It is observed that the instances of depletion of the cadre strength in most of the States and also in related central agencies are very common. Further, systematic arrangement for capacity building including career development plan does not exist.

Keeping in view the present state of water resources development and management, importance of assured irrigation in addressing the serious challenge of “Food Security”, and the complexities of the irrigation development and management, the Working Group recommends the following priorities and measures for the XII Plan.

## **1.2 KEY RECOMMENDATIONS**

### ***1.2.1 FOCUS OF THE XII PLAN***

The Working Group recommends that in respect of major and medium irrigation projects, the focus should be on (a) full utilization of created facilities, (b) improving water use efficiency, and (c) completing as many ongoing projects as possible for which the ongoing projects should be

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<sup>2</sup> The irrigation potential through MMI projects has increased from about 9.7 million hectares (mha) in 1951 (pre-Plan stage) to about 45.6 mha by March 2010 which definitely is an impressive progress.

prioritized. In order to achieve these objectives, the central assistance should be used to incentivize and encourage States to adopt and implement an aggressive MMI management reform agenda and action plan. In view of focus of the MMI sector during XII Plan on reducing the gap between IPC and IPU and completion of ongoing projects, new MMI projects should be provided central assistance either on completion of ongoing projects or to address specific important regional challenges.

With a view to achieve the objective of full utilization of created facilities, the works related to (a) command area development and water management (CAD&WM), and (b) extension, renovation and modernization (ERM) of old major and medium irrigation projects are proposed to be given top most priority. Since, these works would increase the efficiency of water use, it is also recommended that liberalized central funding at enhanced rate should be considered and that there should not be any restriction in respect of one to one criteria (as presently applicable for central assistance under Accelerated Irrigation Benefits Programme) for central assistance in respect of CAD&WM and ERM projects. This is more so in view of the fact that one of the targets of National Water Mission is to enhance the water use efficiency.

Since CAD&WM has to play very important role in bridging the gap between IPC and IPU, it is proposed to enhance the rate of central assistance under CAD&WM to 75% from the present level of 50%. Simultaneously, effective measures are recommended for promotion of PIM, active involvement of WUAs in water management and adoption of better management practices.

The efficacy of PIM Acts from the viewpoint of their applicability and achievements in shaping approaches on the ground need to be critically examined. The Working Group recommends that the PIM Acts may be revisited to identify legal spaces and constraints that that may be of use both for the States that are in the process or are likely to come up with PIM laws and for the States that have PIM acts but may like to push in for some progressive amendments to the existing laws.

### ***1.2.2 IMPROVEMENT IN MANAGEMENT PRACTICE AND REFORM MEASURES***

- (i) As indicated above, the central assistance should be used to incentivize and encourage States to adopt and implement an aggressive MMI management reform agenda and action plan. The reform measures should inter-alia include: (a) rationalization of water charges; (b) establishment of regulatory mechanism; (c) comprehensive capacity building programme for project management personnel including the field level workers/farmers; (d) enactment of Participatory Irrigation Management (PIM) Act and authorization of Water Users' Associations (WUAs) to collect and retain water charges; (e) formation and registration of WUAs at the initial inception (planning) stage; (f) exclusive set up consisting multi-disciplinary team like Command Area Development Authority (CADA) etc. in the State for implementation of CADWM projects; (g) move towards water distribution on the basis of volumetric measurements; and (h) adoption of modern management tools etc.

In this regard, adequate outlays have been proposed for irrigation management, data acquisition, specialized studies, research and training etc. to incentivize and support States. It is strongly recommended that central assistance should be subject to the condition that better management practices would be adopted by the State Governments. The management practices should, inter-alia, include:

- i. establishment of minimum Irrigation Service Fee (ISF) at a reasonable level, as prescribed by the Thirteenth Finance Commission;
- ii. promotion of Participatory Irrigation Management through WUAs at outlet and distributary level;
- iii. maximization of the collection of ISF from users through WUAs, among other things, by allowing WUAs to retain at least 50 percent of ISF collected for maintenance of the distribution system;
- iv. undertaking, in a campaign mode, a program to close the gap between IPC and IPU through farmer-participatory CAD works;
- v. enhancing the resources available to the MMI departments for improving O&M of irrigation systems through technological improvements such as automation and use of ITES;
- vi. broadening the disciplinary skill-set available with irrigation departments to include social science and agriculture extension skills; and
- vii. substantially improving the amount and quality of training and capacity building opportunities for MMI staff at all levels.

### ***1.2.3 DATA COLLECTION AND INFORMATION SYSTEM***

The Working Group very strongly recommends for observation and collection of all relevant data and information from various sources and making them available for users through water resources information system in public domain. The data should inter-alia include generation of real time information on areas served and level of irrigation service received by users. The analyses of available data and information should be encouraged with a view to evaluate the performance of the existing system and also for identifying better and improved options for efficient management. The evaluation and benchmarking studies should include creation of performance benchmarks to monitor and improve the performance of MMI systems as a whole as well as at branch and distributary levels. The “Water Resources Information System (WRIS)” being developed by the Ministry of Water Resources with assistance from National Remote Sensing Centre should be made fully operational. One of the important targets should be to ensure reporting of data in respect of project wise irrigated area, irrigation potential utilized and such other information which are essential for performance evaluation. An outlay of Rs 5,800 crores has been proposed during XII Plan for additional data collection and making WRIS fully operational.

### ***1.2.4 HIGHER STUDIES, RESEARCH, CAPACITY BUILDING AND MASS AWARENESS PROGRAMME***

Working Group very strongly recommends for higher studies and research covering all aspects of water resources management. Similarly capacity building and career development programmes for water resources professional including those associated with water management at the field level are strongly recommended. It is suggested that various academic and professional institutions and research organizations should be actively associated. Mass awareness programme is equally important. The Working Group recommends the following.

- i. Core grant up to Rs 20 crore to identified national institutes of eminence – such as IITs, IIMs, NIT, ISB, etc. to establish centres of excellence in irrigation management to undertake research, education and training for senior MMI managers.
- ii. Provide each of the 14 WALMIs grant-in-aid of Rs 5 crore over the five year period to strengthen their training, research and extension work provided (a) they induct trainers in social science, extension, agriculture, environment and other disciplines, (b) undertake regular evaluation of their training programs, (c) offer a certain minimum number of training programs for farmers and irrigation staff every year, and (d) submit an independent, third party evaluation report of their work at the end of every year.
- iii. The Working Group recommends that specific provision of funds is made to involve leading ITES players to work with state governments to develop management information systems for MMI schemes with specific purpose of generating real-time information on the working and performance of these systems to enable their benchmarking.

### ***1.2.5 RE-STRUCTURING OF WATER RESOURCES ORGANIZATIONS***

With focus on adoption of better management practices, it is considered necessary to undertake the re-structuring of the Water Resources Departments in the States and the related organizations in Centre to achieve the objective. Recognizing the fact that water related issues need to be addressed through multi-disciplinary approach, involvement of professionals from various disciplines at working level is considered very much desirable. Accordingly, outlay of Rs 500 crores for State government Departments and Rs 200 crores for central organizations is recommended for the purpose.

### ***1.2.6 CHANGES IN ACCELERATED IRRIGATION BENEFITS PROGRAMME (AIBP)***

In order to ensure that the targets for XII Plan, particularly those related to adoption of better management practices are fully achieved, it is necessary that the Central Government should, on one hand, provide necessary incentive to States and on the other hand strictly adhere to the strategies identified for achieving the targets. AIBP being the most important scheme, the following incentives and conditions are proposed to be linked with the central assistance under this programme.

- i. The central assistance at the rate of 90% should continue for the projects in special category States, projects in KBK (undivided Kalhandi, Bolangir and Koraput) districts of Orissa and projects benefitting tribal areas, drought prone and flood prone areas. It is also proposed that sustainable irrigation projects in areas included under Desert Development Programme should also be eligible for 90% central assistance under Accelerated Irrigation Benefits Programme.
- ii. The rate of central assistance should be increased to 50% in place of 25% for all ongoing projects in general categories States provided the States initiate necessary actions immediately and fully implement the reform agenda within first two years of the XII Plan

- i.e., during 2012-13 and 2013-14. In case of failure to fully implement the reform agenda, the central assistance should be restricted to only 25%.
- iii. The condition of one to one should be relaxed in case of ERM projects. The condition of one to one should also be relaxed in case of command area development works in respect of projects already completed under AIBP. This is considered necessary to achieve the objective of increasing water use efficiency by 20% as envisaged under National Water Mission. This relaxation would be in addition to the existing provisions in the AIBP guidelines regarding relaxation in respect of condition of one to one.
  - iv. New MMI projects of general category States should be included for support under AIBP only in exceptional cases and such projects would be eligible for central assistance at the rate of 25% only.
  - v. Lift irrigation schemes should have a mandatory condition of implementing micro irrigation in at least 10% of the command area of the project.
  - vi. Monitoring of all schemes under central assistance should include a specific mention of the progress made in respect of implementation of the reform agenda.

### ***1.2.7 IRRIGATION MANAGEMENT FUND***

The Working Group is in agreement with the general line of argument taken by the Thirteenth Finance Commission and recommends that the central assistance should be linked to outcomes in terms of MMI performance and impacts. The Working Group is also of the view that the incentive grant of Rs 5,000 crores over 4 years provided by the Thirteenth Finance Commission is too small to nudge States in taking up an aggressive administrative, financial reform agenda. Moreover, its formula of allocating this incentive grants in proportion to Gross Receipts recovered and IPU of different States at the end of 10<sup>th</sup> Five Year Plan is not designed to reward improved outcomes. The Working Group recommends a much stronger incentive for improving MMI performance outcomes, and believes that there is a strong case for investing more in realizing the reform agenda. The investment is considered all the more important because it is very much desirable to fully renovate the systems before handing them over to the local bodies such as Water Users' Associations or the Panchayati Raj Institutions. It is also proposed that a very strict monitoring mechanism should be put in place for implementation of "Irrigation Management Fund". An outlay of Rs 10,000 crores has been proposed for the purpose. The incentive should be appropriately linked with ISF collections either by the States or the local bodies such as Panchayats or Water Users' Association.

The Working Group is of the view that one main reason why MMI systems underperform and the IPC-IPU gap keeps growing is because irrigation departments of the states are acutely under-resourced. The O&M budgets they are given offer them little freedom to undertake routine maintenance works, leading to mounting deferred maintenance which over time necessitates rehabilitation. The Working Group noted that despite massive investments in creating new potential, the annual O&M expenditure in all states remains well below 1 percent of the capital cost. Another contributing factor to this condition is the low level at which Irrigation Service Fees (ISF) are fixed and progressive decline in the ratio of actual collection to ISF demand.

The Working Group is strongly of the view that management reform needs to begin with three measures: [a] increasing the O&M funds available to MMI managers on an annual basis; [b]

rationalizing ISF levels; and [c] incentivizing ISF rationalization and improving collection ratio (ISF collected as % of ISF demand).

To this end, the Working Group recommends that the Central Government reimburses to state irrigation departments a matching contribution to its ISF collection from irrigators on a 1:1 ratio, provided: [a] States desiring to avail of this matching grant maintain their own non-plan allocations to Irrigation Departments at the normal rate of growth of the aggregate non-plan budget of the state; this is to ensure that central governments matching support is additional to state's non-plan budget for MMI systems; [b] states allocate central grant to MMI systems in proportion to their ISF collection; [c] an Independent Water Regulatory Agency / Authority is established to claim central incentive grant on behalf of the state government.

At the end of the financial year, States desiring to avail of this matching grant will – through their regulator – present a certified, audited statement depicting the actual ISF collected from irrigators from different MMI systems. The Central Government will have an independent verification undertaken of the claims on ISF collection (including a scrutiny of a sample of vouchers) based on which central grant will be released each year.

To give strong encouragement to PIM, the Central Government will provide a 30 percent bonus on that portion of each state's ISF collection which has been collected through Water User Associations (WUAs), as certified by the state's water regulator and verified by an independent agency designated by the Central Government. This bonus will be allowable only if WUAs are allowed to keep 50% of the ISF collected by them and their federations at the distributary level are allowed to keep 20% of the ISF paid by irrigators. It is observed that majority of the States have not constituted Water Regulatory Authorities in their States and such constitution is likely to take some more time. Therefore, certificate by the State Water Regulators for provision of 30% bonus on State's ISF collection should also include certification from relevant CAD Authorities.

Similarly, to encourage volumetric water deliveries and ISF collection, the Central Government will provide an additional 20 percent bonus on that portion of a state's ISF collection which accrues through volumetric water supply to WUAs at the outlet level under an irrigation service contract with each WUA.

The Working Group expects that such a scheme of incentivizing ISF collection, with proper implementation, will produce myriad beneficial impacts. In particular, it will: [a] improve the ISF collection ratio; [b] generate more accurate data on irrigation potential utilized; [c] give strong fillip to PIM; [d] speed up CAD; [e] encourage rationalization of ISF levels; [f] encourage volumetric water supply and pricing; [g] foster partnership between irrigation agencies and WUAs; and [h] in general help reduce the gap between IPC and IPU.

## **1.3 OUTLAYS AND TARGETS FOR XII PLAN**

### ***1.3.1 OUTLAY PROPOSED FOR MMI SECTOR***

The outlays proposed for various activities namely (a) full utilization of created facilities and improving water use efficiency, (b) completion of on-going projects, (c) taking up new projects, (d) research, education, capacity building and mass awareness, and (e) strengthening of data acquisition, planning and monitoring mechanism are as under.

Sl. No.	Description of Planned Activities	Proposed Outlay (Rs in crores)		
		State Plan	Central Plan	Total
<b>A. Full Utilization of Created Facilities and Improving Water Use Efficiency</b>				
a.	Command area development and water management	30,000	0	30,000
b.	Extension, renovation and modernization of major and medium irrigation projects	17,000	0	17,000
c.	Irrigation management fund	0	10,000	10,000
d.	Dam safety and DRIP	2,000	200	2,200
e.	Better management practices	900	0	900
f.	Implementation of pilot scheme with fully automated distribution system for Benchmarking	1,000	0	1,000
g.	National Water Mission	0	10,900	10,900
	Sub-total	50,900	21,100	72,000
<b>B. Completion of On-going Projects</b>				
a.	Major irrigation projects	201,000	0	201,000
b.	Medium irrigation projects	16,500	0	16,500
	Sub-total	217,500	0	217,500
<b>C. Taking up New Projects</b>				
a.	Major irrigation projects	37,500	0	37,500
b.	Medium irrigation projects	4,700	0	4,700
	Sub-total	42,200	0	42,200
<b>D. Research, Education, Capacity Building and Mass Awareness</b>				
a.	Promotion of research	300	400	700
b.	Promotion of higher studies	0	200	200
c.	Capacity building programme	200	100	300
d.	Mass awareness	300	200	500
	Sub-total	800	900	1,700
<b>E. Strengthening of Data Acquisition, Planning and Monitoring Mechanism</b>				
a.	River Basin Management	700	1,300	2,000
b.	Data acquisition and analysis, information system and monitoring	1,700	4,100	5,800
c.	Restructuring of Water Resources Deptts. in States and related central organization	500	200	700
	Sub-total	2,900	5,600	8,500
Total		314,300	27,600	341,900

Note: The outlay of Rs.3,14,300 crore under the State Plan includes Rs.1,05,700 crore as additional central assistance to States through AIBP.

### ***1.3.2 TARGETS TO BE ACHIEVED***

As mentioned above, focus of XII Plan should be on (a) full utilization of created facilities, (b) improving water use efficiency, and (c) completing as many ongoing projects as possible for which the ongoing projects should be prioritized. In order to achieve these objectives, the central assistance should be used to incentivize and encourage States to adopt and implement an aggressive MMI management reform agenda and action plan. Since the implementation of various activities is linked to reform agenda, considerable improvement in management practices is expected. Specific monitorable targets are as under.

- i. Reducing the gap between IPC and IPU by 10 million hectare (mha) through CAD and micro irrigation systems etc.
- ii. Increasing the ISF collection of MMI to the lever recommended by the 13<sup>th</sup> Finance Commission;
- iii. Increasing ISF collection through WUAs to 50 percent of the total for the MMI sector of the country
- iv. Increasing the MMI irrigated area served by volumetric water delivery and irrigation service contracts with WUAs to 1 million ha
- v. Restoration of about 2.2 mha of lost irrigation potential through ERM of MMI projects
- vi. Creation of additional irrigation potential of about 7.9 mha
- vii. Improving water use efficiency from current level of about 30% to about 36%.

# CHAPTER 2 – SUSTAINABLE GROUNDWATER MANAGEMENT

## 2.1 INTRODUCTION

The report of the Working Group on Sustainable Groundwater Management is essentially India's vision and mission statement on managing groundwater resources, keeping in mind the factor of sustainability and a longer time-frame which could extend beyond the scope of the 12th Plan itself. The nature of groundwater and the relative ease of its decentralised access has meant that groundwater is the backbone of India's agriculture and drinking water security. It is a common-pool resource, used by millions of farmers across the country. It remains the only drinking water source in most of India's rural households, while many industries depend upon groundwater. With an estimated 30 million groundwater structures, India is fast hurtling towards a serious crisis of groundwater overuse and groundwater quality deterioration.

The report of the Expert Group on Groundwater Management and Ownership of the Planning Commission (2007), states that, in 2004, 28% of India's blocks were showing alarmingly high levels of groundwater use. A recent assessment by NASA showed that during 2002 to 2008, India lost about 109 km<sup>3</sup> of water leading to a decline in water table to the extent of 0.33 metres per annum (Tiwari et al, 2009). In addition to depletion, many parts of India report severe water quality problems, causing drinking water vulnerability. At the national level, therefore, the Mid-Term Appraisal of the 11th Plan notes that nearly 60% of all districts in India have problems related to either the quantitative availability or quality of groundwater or both. This is a serious situation warranting immediate attention.

The desired shift from **“groundwater development”** to **“groundwater management”** needs to be embodied in a National Groundwater Management Programme integrating such a shift. There is no dedicated national programme on groundwater management today. While groundwater resources are perceived as a part of a specific cadastre – watersheds, landscapes, river basins, villages, blocks, districts, states - aquifers<sup>3</sup> are seldom considered. The current approach tends to ignore the common pool nature of groundwater. The delinking of groundwater from land ownership and a change in property rights regime from an ownership to a trusteeship paradigm must begin with a new, aquifer-based national programme on groundwater.

Despite efforts by CGWB, the country's premier agency working on groundwater (and work by some State Departments and Civil Society Organisations), aquifers as groundwater bearing units never found a place in mainstream thinking on management of groundwater resources. Comprehensive mapping of India's aquifers, on a priority, must become the cornerstone of developing any groundwater management programme at scale.

Programmes such as drinking water and sanitation still seem to be bound to sources rather than resources. This approach is restrictive and concludes at understanding groundwater prospects

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<sup>3</sup>Aquifers are rock formations capable of storing and transmitting groundwater. A complete understanding of groundwater resources is possible only through a proper understanding of such aquifers.

with a special reference to locating drinking water sources. It is imperative to design an aquifer mapping programme with a clear-cut groundwater management purpose. This will ensure that aquifer mapping does not remain an academic exercise but seamlessly flows into a participatory groundwater management programme including the effective implementation of policy instruments that include a robust legislative framework (including a detailed Central Groundwater Model Bill). Implementation of an integrated aquifer mapping and groundwater management programme is possible only through strong partnerships between government departments, research institutes, gram panchayats/urban local bodies, industrial units, civil society organizations and the local community. Groundwater management will also require improved participation by all, especially women and particularly the land-less.

Institutional reorganization, reorientation and collaboration are necessary. CGWB will lead this effort and State Agencies for groundwater will be constituted or reformed, to bring about organisational parity across the country. Most importantly, the interface of civil society and research institutes with government will be encouraged across all aspects of the programme, ranging from mapping India's aquifers, large-scale capacity building of professionals at different levels, action-research interface with implementation programmes and development of social-regulation norms around groundwater, norms that can hold forward linkages to the overarching legislative and governance frameworks.

### ***Goal Statement of National Groundwater Management Programme***

India needs a National Groundwater Management Programme. The goal of such a programme will be *equitable, safe and sustainable management of India's groundwater resources through improved systems of resource mapping, utilization and governance, including improvements in energy use and pricing and legislative instruments of regulating groundwater overuse.*

The programme has several steps outlined below.

- It begins with the detailed mapping India's aquifers. This would be done at an appropriate scale (1:50000 or larger).
- With aquifer maps in place, there will be a comprehensive assessment of the groundwater available in the country, leading to strategies of participatory groundwater management.
- Quantitative assessment of groundwater will be complemented by an equally comprehensive assessment of the quality of groundwater in different aquifers and the potential threats of groundwater contamination.
- The programme envisages capacity building at all levels for mapping, quantitative and qualitative assessment and sustainable management of groundwater resources across different hydrogeological settings in the country.
- Building strong partnerships and collaborations between various institutions dealing with groundwater resources such as CGWB, state agencies, technical research institutions, civil society organizations and PRIs is clearly desired. The Ministry of Drinking Water and Sanitation has initiated pilot projects for preparing Water Security Plans through a participative process in 14 over-exploited blocks in the country. A crucial interface with the Ministries of Water Resources (MoWR) and Drinking Water & Sanitation (MoDWS) will also be established through the programme.

- A strategic National Programme Groundwater Management should centrally address the challenge of groundwater legislation. The focus of groundwater legislation should be on protection and sustainable use of groundwater.
- The programme also realizes that groundwater management and use cannot be discussed in isolation from the patterns of energy consumption and pricing policies. Hence, a key aspect of the programme is the co-management of groundwater and energy use, with indirect instruments like pricing of electricity, subsidies etc., playing a crucial role.

## **2.2 NATIONAL AQUIFER MAPPING PROGRAMME AND PARTICIPATORY GROUNDWATER MANAGEMENT**

### ***2.2.1 CONCEPT OF AQUIFER MAPPING***

Aquifer mapping will have to go beyond the production of specific aquifer maps at appropriate scales. Each aquifer map will, in many ways, bear similarity to District Resource Maps (Geological Survey of India) and Groundwater Prospects Maps (Rajiv Gandhi National Drinking Water Mission). Aquifer maps (apart from thematic maps) will include:

- A narrative description of the maps themselves.
- Statement of the “sustainable yield management goal” for the aquifers, stating that the average withdrawals should not exceed long-term recharge, at least as a guiding principle.
- Inputs / guidance for implementing artificial recharge programmes effectively, indicating plans for implementing artificial recharge for the aquifers concerned.
- Since the fundamental binding constraint on resource availability is on the demand side, aquifer mapping must lead to a groundwater management strategy, which includes appropriate demand-management norms in addition to water use and recharge.
- Once the aquifer is mapped and its storage, transmission and quality characteristics determined, a broad set of priorities of water use can be decided. Aquifer mapping should lead to location-specific protocols and agreements within the user community as well help arrive at a robust regulatory framework through legislation. Aquifer mapping will lead to carefully oriented strategies of using indirect regulatory instruments like electricity rationing or metering as a means of groundwater regulation.

### ***2.2.2 AQUIFER MAPPING: DESIGN AND CONVERGENCE***

A national typology of groundwater can become more fruitful, if and when the question of scale is tackled strategically. It will also be difficult to evolve a balanced system of groundwater management and governance unless efforts of aquifer mapping and groundwater management do not converge (discussed in the next section). Moreover, unless groundwater managers (including State Officers, Scientists and Practitioners) and the system of groundwater governance and regulation see eye-to-eye, the debate on how to handle groundwater crises in India, will continue.

Scale: Given the diversity of scale on which aquifers exist, not only in India, but across the globe, aquifer mapping should be conducted at the scale of 1:50000 (and possibly at higher scales – 1:25000 or 1:10000 or even higher, depending upon the hydrogeological setting). Whether actual

mapping of aquifers takes place at a fixed scale of 1:50000 or at a flexible scale, depending upon the hydrogeological setting, some practical considerations may be kept in mind while deciding the scale of such mapping. Tools such as geophysical surveys and remote sensing can help facilitate such mapping.

Measurement and monitoring: Each of such aquifer units would have a dedicated system of wells for periodic water level monitoring and for monitoring of groundwater quality parameters. The appropriate density of the monitoring wells will depend on the characteristics of the aquifer systems being monitored, but even crude estimation indicates that the current density will have to be increased sufficiently, to match assessment scales at aquifer levels. Moreover, hydrogeological settings will determine monitoring densities.

Information and database: All data and information can be ported to a centralized, real-time (or close to real-time) data-management system with as short a lag as possible between data capture and data visibility. We also need to build a comprehensive database on the characteristics of groundwater stocks, flows and quality in each hydrogeological setting. In addition to water level monitoring, periodic measurement of base flows, aquifer characteristics and groundwater quality measurements will be conducted on an aquifer-basis, to develop an aquifer-wise database. Such a database could be dovetailed to the Development of Water Resources Information System scheme (implemented by the CWC and ISRO) or the data management system being evolved through deliberations of the Planning Commission's Working Group on Data and Data Management – for the 12<sup>th</sup> Plan (Chapter 5 of this report).

The process of institutional collaboration is important in integrating aquifer mapping with strategic groundwater management. There is need to identify key institutions who can map aquifers, develop the human resource to take up this large exercise, and build their capacities; there is also need to develop capacities of the village communities to take informed decisions in groundwater management a responsibility that they can take only if they are deeply involved in a participatory aquifer mapping exercise. An allied component would be the sensitization of policy makers and State Electricity Boards to come on board with respective policy-level reforms in agriculture, industry and other such sectors that are likely to indirectly leverage aquifer management plans. Strong partnerships between government agencies, research institutes, PRIs, civil society organizations and the institutions of local communities can break the scale barrier that constrains effective management of a resource for which information and management tools are available on a centralized, aggregated scale while utilization takes place at a highly decentralized, disaggregated scale.

### **2.2.3 GROUNDWATER MANAGEMENT**

Aquifer mapping outputs should lead to a groundwater management plan in any hydrogeological setting. The output from an aquifer mapping plan would vary from setting to setting but should attempt to capture the following aspects as a groundwater management protocol, across all settings:

- Relationship between surface hydrologic units (watersheds and river basins) and hydrogeologic units, i.e. aquifers.
- The broad lithological setup constituting the aquifer with some idea about the geometry of the aquifer – extent and thickness
- Identification of groundwater recharge areas – with specific reference to 'recharge area' protection and artificial recharge strategies.

- Groundwater balance and water budgeting at the scale of a village or watershed. Groundwater assessment at the level of each individual aquifer should be attempted in terms of groundwater storage and transmission characteristics, including the aquifer storage capacity.
- Regulatory options at community level, including the nature of gram-sabha resolutions that will enable appropriate regulatory mechanisms at the panchayat level. These may include (only an indicative list given here):
  - Drilling depth (or whether to drill tube wells or bore wells at all)
  - Distances between wells (especially with regard to drinking water sources)
  - Cropping pattern
- Inputs to overarching State or Central Legislation, during periods of scarcity, floods and other such natural disasters.
- Comprehensive plan for participatory groundwater management based on aquifer understanding – domestic water security, food and livelihood security and eco-system security, bearing in mind principles of equitable distribution of groundwater across all stakeholders.
- Inputs to the use of indirect instruments of regulation, mainly power rationing and/or metering, based on aquifer characteristics and degree of exploitation.

The groundwater management component of this programme will need to be somewhat flexible and can take off only after the aquifer mapping exercise results in a clear output on the components of groundwater management with regard to the concerned aquifer(s). Aquifer mapping will need to be a dedicated exercise whereas groundwater management could become part of implementation programmes such as Watershed Management, MGNREGS, Rashtriya Krishi Vikas Yojana (RKVY), National Rural Livelihoods Mission, IWMP etc. It is too early to state how groundwater management can be integrated into such programmes but separate thinking on how this will happen, either immediately after aquifer mapping efforts or subsequently as a separate “programme” in the next plan, should be explored as aquifer mapping proceeds.

#### ***2.2.4 INDICATIVE METHODOLOGY***

It is worthwhile mentioning upfront that aquifer mapping is NOT simply a creation of aquifer maps. The purpose of aquifer mapping is to develop strategic plans for ensuring sustainable, equitable and efficient use of India’s groundwater resources for many years to come. It will not only help understand aquifers but will use aquifers as units of measuring, monitoring, legislating and governing India’s groundwater resources.

The primary target for aquifer mapping should be all aquifers in the country, whether phreatic or confined. The 30 million irrigation wells in India are an important means of water supply, including an integral element of livelihood support systems. If we add another million points representing springs, we have a fair representation of potential monitoring points in the country. These wells and springs also represent part of India’s groundwater crises. Wells and springs are not only points of groundwater access, but they are part and parcel of livelihood assets of communities. Hence, they present an opportunity to ride the process of aquifer mapping on. The methodology will include five broad sets of activities:

- Geological mapping at an appropriate scale, using primary and secondary information.
- Inventory of at least a representative sample say, one million of the 30-40 million odd wells and springs present in the country, along with information and data from the dedicated monitoring points that hold longer-term data.
- Water level data at each individual location.
- Aquifer properties, including groundwater quality
- Development of aquifer maps including strategies of management.

These five layers of information are viewed here as constituting the basic information in mapping aquifers. In addition, the expert organization or collaborating agencies are encouraged to use tools such as remote sensing, geophysics, pumping tests etc. to supplement the basic approach of mapping aquifers and developing strategic aquifer plans for an area. Such institutions should also be given access to all data and information available with the CWC, CGWB and State Groundwater Departments, particularly water level data collected under India's groundwater monitoring programmes, including the "Hydrology Project". The output from an aquifer mapping exercise should essentially be in the form of an "aquifer map" which will include the following:

1. An aquifer outcrop map on a geological map of appropriate scale (Geological Survey of India is currently taking up mapping exercises on the scale of 1:10000; such maps can also be used as the basis for creating aquifer projection onto the surface.
2. Vertical configuration of the aquifer(s) should be depicted through appropriate 3-D depiction models that can depict vertical boundaries.
3. Water level information (preferably a water table contour map for at least the pre and post monsoon seasons) which can be layered on top of the geological map.
4. Narrative on aquifer properties, mainly transmission, storage and groundwater quality. The narrative will explain, in simple terms, the map, cross sections and groundwater resources.
5. A supplementary map indicating natural recharge and discharge areas. This map will also indicate locations for carrying out recharge measures, best locations for siting public drinking water sources, best locations for community irrigation wells etc.
6. Narrative on groundwater availability in the aquifer(s), possibly under different scenarios – normal recharge, droughts, groundwater exploitation etc.
7. Protocol for aquifer management – supply and demand side – including the possibility of imposing more centralized systems of legislation (in a worse-case scenario).

### ***2.2.5 GETTING STARTED***

Aquifer mapping will be initiated at the scale of a Survey of India toposheet (1:50000) keeping in mind the following points:

- All administrative boundaries, down to village level can be overlaid onto toposheets.
- Watershed, Command areas, Catchments boundaries can be overlaid.
- Geo-referencing for uniform "coding" is best possible on toposheets

- Secondary data with other Government Agencies are currently being brought to scale of 1:50,000, making it a convenient scale to interface with different kinds of such secondary information, e.g. GSI, NRSC, Survey of India and CGWB databases are available at toposheet scale.

However, the actual execution of aquifer mapping (note, not maps) can be at a larger scale, say 1:20000 or even 1:10000. This is especially important in settings such as mountain systems like the Himalayan region, where the scale of 1:50000 may be too regional to capture local aquifers and local conditions that would be required to develop groundwater management protocols. Aquifer mapping will be taken up in three broad phases:

PHASE 1: PILOTING: The first phase of aquifer mapping will involve piloting in 100 locations representing different hydrogeological settings. These 100 locations will be dovetailed with different programmes, including those implemented under grants from FAO, World Bank, MoWR, MoRD and other such initiatives, where groundwater resources management forms a significant component of the programme. This would ensure a piloting effort under about 1 million hectares.

Phase 2: Upscaling to Overexploited Blocks: Piloting should lead to upscaling, beginning with overexploited blocks and some blocks with serious groundwater quality challenges. The upscaling phase will therefore involve about 30% of the total area or roughly 100 million hectares.

PHASE 3: COMPLETE NATIONAL COVERAGE: This phase will include expanding the expertise on aquifer mapping to a larger set of agencies to attempt completion of aquifer mapping in the stipulated course of the remaining part of the 12th Plan or spill over into the 13<sup>th</sup> Plan. The last two years will include entire coverage under the aquifer mapping exercise.

CGWB would lead the effort in partnership with other agencies. All organizations involved should possess strong capabilities in working on aquifer mapping and / or groundwater management. They should also possess capacities to demystify information, data and knowledge on groundwater so that such a base will feed into improved implementation and specific actions on the ground. Micro-level assessments, decentralised data gathering and a participatory approach to data collection, analyses and compilation are therefore desired. Information on groundwater must eventually be brought down to the baseline of “aquifers” rather than the conventional approach of including it as part of river basins. Once this common baseline is achieved, integration at the river basin level will gain value. All information collected should be fed into the centralised database and should be maintained in public domain.

### ***2.2.6 SPECIAL FOCUS: GROUNDWATER SALINITY AND URBAN AQUIFERS***

As an integral part of the aquifer mapping effort, it is necessary to look at two specific aspects of aquifer mapping and groundwater, in the 6 hydrogeological settings identified under the national groundwater typology. Firstly, the context of groundwater salinity, which will include:

- Aquifers and their differential behaviour to inland salinity as well as sea-water incursion;
- Causes for salinity and sea-water ingress in light of aquifer characteristics;
- Other associated water quality problems, if any;
- Groundwater recharge measures for mitigation;
- Groundwater management alternatives on different scales in context to aquifer salinity.

Aquifer mapping, especially in the case of coastal aquifers will include aquifer maps depicting the physical state and characteristics of coastal aquifers; improved perspectives of recharge processes in such aquifers; inputs to scaled solutions on recharge for mitigating aquifer salinity and aquifer based protection of sources of drinking water.

Secondly, urban aquifers require a different perspective, over and above the hydrogeological setting in which an aquifer mapping and groundwater management effort is embedded. The urban groundwater perspective would need to look into specifics of aquifer-user profiles and the nature of the constantly changing groundwater usage patterns in and around growing urban centres. A reformed Groundwater Model Bill has also been drafted under the Working Group on Water Governance and the Bill has specific reference to urban groundwater, currently not under the purview of any regulatory framework. The overall perspective in looking at groundwater would require specific attention to questions of protecting recharge areas in and around growing townships (including the question of peri-urban transitions on different aquifer settings), strategies of augmenting recharge and potential impacts on groundwater quality, mainly anthropogenic contamination. The outputs from such studies could include strategies of multi-aquifer groundwater management, including protection and conservation strategies.

## **2.3 INFORMATION AND DATABASE**

### ***2.3.1 AQUIFER RELATED DATA AND GROUNDWATER INFORMATION***

The current initiative for collating all water related data into one platform at the central level in the form of the proposed NWR-IC – National Water Resources Information Centre by the Central Water Commission can be used to draw various strings of water-related data into a centralised water database. This has been discussed at length within the Working Group on Data and Data Management, constituted by Planning Commission, and hence, this report discusses aspects that bear relevance to this report.

Three aspects are expected to form the reforms in data and data management of water – representativeness, transparency and data availability in public domain. As mentioned in the deliberations of the WG on Data and Data management, NWR-IC needs to anchor the use of data for wider dissemination. In this light, all groundwater data collected for different aquifers, under the aquifer mapping effort should be maintained at five levels:

1. District level groundwater database housed with the district office under each State, drawn together from the aquifer mapping effort at the Panchayat and Block levels.
2. State level groundwater database, which collates and maintains information from all districts in the State, with some analyses especially regarding a district-level aggregation of aquifer-based information.
3. Central Ground Water Board (CGWB) regional offices (ROs) will maintain data from different States under the purview of each RO.
4. Centralised groundwater database with the CGWB HQ, with a public-access mandate, also shared with RGI for training purposes.
5. The groundwater database will also be maintained by NWR-IC as part of the larger national database on water resources.
6. Web-based Groundwater Estimation and Monitoring System (eGEMS) and Aquifer Information and Management System (AIMS) are together envisaged to be the repository

of aquifer-wise ground water data on block/district/state/national level. This information could be made available to different level officers.

Such database structure will ensure 3 levels of backup for the entire data on groundwater (RGI, CGWB and NWR-IC). The primary level of groundwater data must include the following elements (indicative):

- One time-water level and water quality data from a representative sample of wells and springs – about 1 million - pre and post monsoon levels and discharges respectively – collected as part of the aquifer mapping effort.
- Dedicated observation wells and piezometers for long-term continuous monitoring – frequencies can be decided in a customized manner (in continuation with Central and State efforts under projects like Hydrology Project) – at least 100000 dedicated points for groundwater monitoring.
- Representative values of specific yield and transmissivity – from wells under the aquifer mapping effort.
- Aquifer depths, well-yields and other qualitative information.

### ***2.3.2 GROUNDWATER QUALITY***

The preponderance of water-borne diseases due to pathogenic contamination of groundwater and the ever emerging evidence of the large-scale impacts on health from geogenic contamination of groundwater resources warrants a serious focus on the groundwater – public health linkage. A notification of standards at the national level is needed to ensure enforceability of the standards for drinking water. Looking at the practicality of enforcement by water supply service providers, a timeline can be associated with the standards to accord priority to adherence of different water quality parameters on an incremental basis. Groundwater Quality Data Management is a crucial task to be undertaken at various levels. Due to the wide variation in groundwater quality with space and time, there is a need for a dynamic, open access database which is a repository for all groundwater data collected across the country. At the primary level, only indicative measurement of water quality needs to be conducted in co-operation with the community and through water supply staff and/or health workers. At the next secondary level laboratories, basic parameters required by the BIS standards (or enforceable standards as proposed here) need to be measured. The tertiary level laboratories would assure quality control and measure parameters which require higher levels of instrumentation and analysis. Data management of water quality data arriving from these primary, secondary and tertiary laboratories is important so that the data is accessible to relevant stakeholders when required. In order that this should happen, we propose the following:

- Reviving District laboratories and transforming them into District Water Quality Data Centres (DWQDC) for wider dissemination; data collection and testing through certified referral labs; personnel for awareness and communication; periodic publishing of data in local newspapers
- The 3-tier structure of laboratory – primary, secondary and tertiary (referral) – can be constituted. In this, the primary level of testing on an indicative level could be assigned to capable and interested Gram Panchayats or Schools

- There needs to be District to Village Panchayat participation for some components of participatory surveillance and qualitative aspects – periodic qualitative testing, highlighting data needs and participating in implementation of mitigation programmes. The primary level laboratories will be at the level of several Gram Panchayats and operate in a participatory manner to flag key local water quality problems in an indicative manner.
- The data generated within a district from such laboratories should be synthesized by the DWQDC as inputs into the aquifer mapping programme. This will provide for integration of the aquifer mapping data with water quality sampling at different levels.
- At the national level, all such water quality data generated by the DWQDCs should be properly organized and continuously updated into a national water data portal such as the NWR-IC.

Efforts shall be made to integrate the proposed system with the District and Sub-District level laboratories network set up by the rural drinking water supply departments of the States under the National Rural Drinking Water Programme (NRDWP) of the Ministry of Drinking Water and Sanitation. The protocols for water quality data collection and analysis have been laid down under Hydrology Project and Multi-tier water quality laboratories were also defined. These protocols and laboratory criteria should also be made use of while setting up the water data quality centers.

## **2.4 INSTITUTIONAL STRENGTHENING AND CAPACITY BUILDING**

### ***2.4.1 GROUNDWATER GOVERNANCE***

It is suggested that Planning Commission develop a system at the apex level to bring about coherence among different ministries dealing with groundwater. Such an effort at improved co-ordination is thought to, ensure improved groundwater governance. The institutional mandate of CGWB should be strengthened to enable it to perform its role as the manager of groundwater resources, including hiring from the fields of community institutions, participatory management of resource, political economy and economics, water markets, regulatory systems, alternative uses, opportunity cost of groundwater extraction, energy management, etc). The mandate of a) management of groundwater resource and b) enabling sustainability of groundwater resource must be translated into achievable and measurable results for the CGWB. This mandate requires changes in the nature of coordination among the government ministries related to groundwater (water resources/irrigation, drinking water, rural development, agriculture, urban development, pollution control and industries). These agencies must be required to assess the impact of their decisions on groundwater and report to CGWB. The Environmental Impact Appraisal conducted by the Ministry of Environment and Forests needs to include the important aspect of groundwater. MoEF must be required to seek the opinion of CGWB in all ground-water stressed regions as well as in cases where a negative impact on water quality is anticipated. CGWB may develop protocols for conducting assessment of impact on groundwater of major (industrial/urban/hydrological) interventions.

### ***2.4.2 CAPACITY BUILDING IN A CASCADING FRAMEWORK***

The overarching need is to set up a system of aquifer mapping and assessment leading to the National Groundwater Management Programme. The objective of the present section is to

propose a process of institutional strengthening and capacity building of institutions and their human resources to undertake these tasks. The Working Group feels that we could make a good beginning to this in the 12<sup>th</sup> Five Year Plan. Capacity building is a cascading process through which the science of hydrogeology is progressively demystified and brought closer to the community, with a view to partake aquifer mapping in close co-ordination with expert agencies. Such a process will lead to informed decisions around the use of groundwater and to possibly initiate collective action regarding the conservation, augmentation, usage and overall management of groundwater. In other words, capacity building is visualised as a process of creating a knowledgebase accessible to the community as a crucial decision support to foster many sustainable groundwater management initiatives. Hence, Civil Society Organisations (CSOs) who hold experience in natural resource management and sustainable development must play a critical role in the capacity building exercise, in close co-ordination with CGWB, State Agencies and Research-Academia. Redesigning some of the curricula on groundwater in Academia will also help create a different level of sensitivity, knowledge and skill building in equipping appropriate human resources to engage with groundwater challenges in a professional manner.

A crucial aspect of the capacity building process is the development of human resource capabilities both within and outside government. The human resources available in the government (Central and State) is grossly inadequate to address the challenge of assessment of groundwater resources and sustainable groundwater management. More specifically, the pool of trained hydrogeologists will need to be increased at the district and block levels, which are at the cutting edge of implementation. In view of this, it becomes imperative for every State in the country to have a separate department or agency dealing with groundwater. Some States like Maharashtra and Andhra Pradesh have such structures in place but this is either weak or missing altogether in other States.

While States gear up to establishing/strengthening groundwater departments, an interim process could begin with every district employing a team of at least two groundwater geologists who are placed with the appropriate State Groundwater Department in the District. This should become a standardized norm, irrespective of how the bureaucracies in individual States function. They, in turn, will support 'barefoot groundwater geologists', at least three for every selected block. The state can increase staff capacities in the relevant departments dealing with groundwater issues like, state water resource departments, irrigation, drinking water, agriculture etc. Central support agencies or regional resource centres (similar to Support Voluntary Organisations under the erstwhile watershed programmes) will need to be developed and nurtured to provide the link between the Government structure and other Government and Civil Society Organisations working as implementers in the field.

### ***2.4.3 CAPACITY BUILDING FOR AQUIFER MAPPING***

The way forward will involve two sets of actions. First, capacity building will need to be undertaken at different levels; second, mechanisms for bringing about significant institutional or organizational integration and collaboration needs to be established. Capacities will need to be built or strengthened at three levels:

1. **Aquifer Level:** Grass-root facilitation to a cadre of geo-hydrology workers or parahydrogeologists, capable of providing information on the status of groundwater at the aquifer level to strengthen Panchayat Planning, thus improving deployment of development programmes inclusive of groundwater equitability and sustainability.

2. State Level: Training at State Government level to be in a position to assess the status of aquifers and groundwater for developing policy and programmes.
3. National Level: National and regional organisations to provide standards for aquifer mapping, aquifer, groundwater assessment and capacity building.

Cadres will be required to assist Panchayats and development programs in management of groundwater. The same cadres can be brought forward to help map aquifers and continue as facilitators during the groundwater management phase. State level capacities will need to address the ability to collate information, analyze its implications to develop policies and inform development programs. Therefore groundwater geologists with qualifications and experience in resource management and policy formulation will lead these efforts.

Towards this RGI will:

- Make a consortium of Capacity Building Institutions to train District and Block cadres of groundwater geologists for each State/Hydrological Setting drawn from State Groundwater Survey Office, State Water Resource Departments, Technical Institutions/Universities/IITs/IIMs and Civil Society Organisations with the required expertise and experience.
- Develop strong partnerships for training State and Central organisations for the programme. These partner institutions will include NWA, Pune; NIRD, IIRS, NRSA, NGRI, IITs, IIMs, NRAA & ICAR.
- Create a core group of faculty drawn from private and public institutions to develop curricula and oversee delivery of training programmes.
- Identify inspired leadership that can provide sustainability to the training institute in order to oversee and ensure that the core objective of the programme is not diluted.
- Develop an Electronic Resource Centre at RGI, Raipur on groundwater system policies and management.
- Bring relevant experiences and knowledge already developed on mapping, monitoring and management of aquifers and training methodologies from within and outside the country. Linkages will be developed with centers of excellence like Hydrogeology Division - British Geological Survey (BGS), USGS – Groundwater Division, ITC & TNO (Delft) – Netherlands; National River Water Authority (UK); Royal Institute of Technology (RIT) – Sweden; International Groundwater Modeling Centre – Denver; International Foundation for Sciences (IFS); USAID & USEAP; and International Groundwater Resources Assessment Centre (IGRAC), Water Technology Centre (WTC), Central Research Institute for Dryland Agriculture (CRIDA) to name a few.
- Coordinate with University Geology Departments and other such organisations, to ensure training and specialization in groundwater geology. Curricula need to be brought up-to-date regarding perspectives of aquifers and groundwater management, appropriately tailored to the Indian context.

#### ***2.4.4 CAPACITY BUILDING FOR PARTICIPATORY GROUNDWATER MANAGEMENT***

Aquifer mapping can only be successful if it is appropriately followed up with participatory groundwater management. The idea behind any capacity building exercise on groundwater

management, therefore, should ensure that groundwater resources are documented, monitored and local stakeholders facilitated to manage this resource sustainably. RGI will be the Nodal Agency for this capacity building venture as well. A target of 2000 blocks (more than one thirds of the total in the country) with critical groundwater situations will be prioritized in the 12<sup>th</sup> five year plan, beginning 2013. While various capacity building programmes are being designed for higher cadres, this note defines the trainings for parahydrogeologists<sup>4</sup> who will work in villages across India. It is expected that approximately 18000 to 20000 parahydrogeologists will be required to help map, monitor and facilitate management of the local groundwater, considering the atomistic nature of groundwater use in India. Table 1 is an indicative framework for a national-level capacity building exercise that will integrate aquifer mapping and groundwater management attempts by converging bottom-up and top-down approaches to break down the institutional silos in groundwater management and governance.

TABLE 1  
INDICATIVE FRAMEWORK FOR CAPACITY BUILDING

Level	Target Organisations / Individuals	Training	Who Will Train/ Coordinate
Centre (at RGI)	CGWB, State officials, Senior staff from Civil Society organizations	<ul style="list-style-type: none"> <li>• Training of trainers – mostly in aquifer mapping and management</li> <li>• Development of guidelines for aquifer mapping</li> <li>• Managed aquifer recharge</li> <li>• Advocacy</li> <li>• Model Bill and legislation</li> <li>• Research design and collaboration with potential partner organisations</li> </ul>	<ul style="list-style-type: none"> <li>• RGI will anchor, develop training and propose joint research projects</li> </ul>
State	State Groundwater Departments	<ul style="list-style-type: none"> <li>• Aquifer mapping at 1:50000 scale</li> <li>• Participatory Groundwater Management</li> <li>• Data gathering and compilation</li> <li>• Compilation of State level aquifer data and characterization</li> </ul>	<ul style="list-style-type: none"> <li>• CGWB and State GW Dept will identify a Consortium of Capacity Building Institutions at the state level.</li> </ul>

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<sup>4</sup> Many decentralized efforts on information gathering, facilitation and actual implementation (including work on aquifer mapping, decentralized groundwater assessments, facilitation of aquifer-management plans for drinking water & sanitation, planning and implementation minor irrigation & watershed development etc.) will require multifaceted para-professionals. Thus groundwater-related work may be handled by such paraprofessionals with multiple skills. For the benefit of this section, these paraprofessionals are called *parahydrogeologists*. Parahydrogeologists will be para-professionals helping systematically collect groundwater-related data and facilitate groundwater management on the ground.

Level	Target Organisations / Individuals	Training	Who Will Train/ Coordinate
	Civil Society, Academic and Research Institutions	<ul style="list-style-type: none"> <li>• Training of Trainers at the District and Block Levels</li> <li>• Aquifer mapping at disaggregated scales (1:25000 and above)</li> <li>• Development of hydrogeological information and database</li> <li>• Identification of key problems</li> <li>• Hydrogeological Surveys</li> <li>• Development of approaches of mitigation or problem and overall groundwater management strategies</li> </ul>	<ul style="list-style-type: none"> <li>• This consortium will evolve a capacity building strategy in co-ordination with experienced CSO partners and Technical Research Institutions</li> </ul>
District	Geo-hydrologists (2 per district)	<ul style="list-style-type: none"> <li>• Coordination monitoring and village level mapping</li> <li>• Collaboration with other Govt. Program</li> </ul>	<ul style="list-style-type: none"> <li>• District GW department with CSO Partners, Universities and Colleges</li> </ul>
Block	Barefoot Geo-hydrologist (3 per Block)	<ul style="list-style-type: none"> <li>• Village level Hydrogeological mapping</li> <li>• Well Monitoring and Monitoring of Groundwater Use</li> <li>• A module has attached as annexure 4</li> </ul>	<ul style="list-style-type: none"> <li>• State and District GW departments in collaboration with experienced CSO partners</li> <li>• Advice from technical research institutions to be incorporated.</li> </ul>

It is recognized that there is a shortfall of qualified geologists and very few accept living and working in remote blocks in the country. On the flip side, youth from these remote regions have shown the ability to grasp the requirements of this programme in a years' focused training and have the commitment to live and work in these remote areas (ACT, pers. comm. 2011). When chosen and trained with appropriate orientations, they have demonstrated abilities of communication and participation rarely seen amongst qualified technical professionals. Therefore, the programme has chosen to identify matriculate youth with the enthusiasm to be useful to their regions, as the sole criterion for the job.

RGI will identify civil society organisations capable of conducting hydrogeological investigations including aquifer mapping and of building capacities of such potential barefoot hydrogeologists. They, in turn will identify and train a team of trainers in different States, who will execute these trainings. RGI will identify a regional training institute to coordinate all trainings. The local State and District groundwater geologists, universities and others with legal/social/technical knowledge on groundwater will be brought into the trainings as resource persons so as to develop, strengthen and build a pool of hydrogeological capacities at different levels and within multiple institutions.

At the district level two cadres will be required:

1. Groundwater geologists at district headquarters – a team of a qualified geologist with groundwater training with an assistant;

2. Barefoot groundwater geologists or parahydrogeologists, at the block level – these should be local youth with a minimum qualification of having cleared their matriculation. They will undergo two modules of trainings, the General Module (module 1) will equip them with capacities to help in the generation of aquifer maps and monitor quantity/quality. The Advanced Module (module 2) will equip them with abilities to facilitate management of groundwater based on policy with local stakeholders.

## **2.5 SUMMARY OF RECOMMENDATIONS**

### **2.5.1 GROUND WATER RESOURCES ASSESSMENT**

Groundwater resources assessment should be an iterative process involving evaluation and refinement by incorporating new techniques and giving due consideration to climate change.

Validation through alternative techniques: The existing methodology of groundwater resources assessment is appropriate and suitable for country-wide groundwater resources estimation, considering the present status of database available with the Central and State agencies. However, the following corrective / additional measures are suggested.

1. Alternative techniques of recharge estimation should be taken up in areas where assessments derived through GEC do not match with the field situations.
2. Micro-watershed (hard rock areas) and doab (alluvial areas) - wise assessment based on actual field estimation of recharge and discharge parameters (GEC-1997) to be taken up in few identified areas.
3. Utilize regional scale assessment methods like space-based measurements for validation.

Parameter Refinement: All data elements need strengthening and refinements. In this context:

1. R&D support in the form of Project based studies (Regional and local scale) should be dovetailed with the National assessment for refinement of parameters used in resources estimation, e.g. estimation of baseflow, recharge from streams, inflow-outflow across assessment boundary on Pilot basis in select areas.
2. Continuous strengthening of database managed by the Central/ State Governments for groundwater resources estimation is required. Benchmarking of the data elements needs to be established in this regard.
3. To develop prognostic models of resource estimates in changing climate.
4. There must be a convergence of assessment of groundwater in terms of quantity and quality for accurate estimation.

### **2.5.2 AQUIFER MAPPING**

Approach: Toposheets will form the platform while initiating the mapping of aquifers.

Scale: Aquifer mapping at the scale of 1:50,000 scale to be initiated. Such mapping can be taken up at appropriate scales (higher or lower) as per specific requirements in phased manner during the 12<sup>th</sup> and 13<sup>th</sup> Plans.

Implementation Mechanism: Aquifer mapping shall be taken up as part of the 12<sup>th</sup> Plan as a co-ordinated effort. CGWB will lead this effort in close co-ordination with State Agencies, Research

Institutions and Civil Society Organisations, to arrive at a comprehensive groundwater management plan.

### ***2.5.3 PARTICIPATORY GROUNDWATER MANAGEMENT PROGRAMME***

- Comprehensive plan for participatory groundwater management based on the understanding and outcome of aquifer mapping shall be taken up.
- Stakeholders should be motivated through appropriate mechanisms and programmes, exploring the possibility of a dedicated programme on groundwater or implementation through other appropriate programmes.

### ***2.5.4 INSTITUTIONAL STRENGTHENING & CAPACITY BUILDING***

- Strengthening the mandate, manpower/professionals and design of institutions dealing with groundwater to enable them to perform their roles. Such strengthening will also draw from the fields of participatory management of resource, social science and economics.
- Creation of State-level institutions to manage groundwater, ensuring parity of design and mandate of such institutions, based on good practice from some States.
- Creation of a network of institutions to facilitate the process of groundwater management.

It is suggested that Planning Commission constitute a system at the apex level to bring about coherence among different ministries dealing with groundwater in order to ensure improved groundwater governance.

### ***2.5.5 TECHNOLOGICAL UPGRADATION***

The technological advancements being utilized worldwide should be introduced in CGWB to upgrade the institutional, infrastructural and human resource capabilities and bring CGWB to an international level, with best possible techniques and technologies for better management of ground water resources in the country.

- Upgradation and procurement of drilling rigs for CGWB
- Procurement of state-of-the-art chemical/geophysical/hydrogeological/ hydrological equipments
- Procurement of latest software for data processing and analysis.

### ***2.5.6 STRENGTHENING OF GROUND WATER MONITORING NETWORK***

- Increased density of monitoring points
- Improved frequency of measurement

The strengthening will include a combination of participatory measurement as well as automation.

## 2.6 FINANCIAL OUTLAY

The proposed Financial Outlay for Sustainable Groundwater Management requested in 12<sup>th</sup> Plan

Sr. No.	Name of the Scheme	Estimated Cost (Rs in Crore)	Proposed Outlay under Central Plan (Rs in Crore)
1.	<b>Ground Water Management and Regulation</b>		<b>4655</b>
	Aquifer mapping	4000	
	Strengthening of GW Monitoring observation wells	100	
	Participatory GW Management	100	
	Technological Upgradation of Labs, Drillings, field equipments, Softwares etc	305	
	Groundwater assessment, regulation, information dissemination etc	100	
	Spillover work of Demonstrative Artificial Recharge Project and Exploration through outsourcing	50	
2.	<b>Rajiv Gandhi Training and Research Institute</b>		<b>100</b>
	Training and capacity building	100	
3.	<b>Organisational Strengthening</b>		<b>75</b>
	Strengthening and restructuring of CGWB and RGI	75	
<b>GRAND TOTAL</b>			<b>4830 Crore</b>

## CHAPTER 3 - MINOR IRRIGATION AND WATERSHED MANAGEMENT

### 3.1 INTRODUCTION

A majority of people in India would continue to live in villages for decades to come<sup>5</sup>. Natural resources of land and water are and would remain primary rural livelihood anchors as over half the 'main workers' remain in agriculture<sup>6</sup>, there is little occupational diversity in villages and very few working age people have skills useful in cities<sup>7</sup>. Increasing natural resource productivity is thus critical to enhance livelihoods and reduce poverty in villages; it is an imperative for our food, water and ecological security.

About 55% of our agriculture is rain-fed<sup>8</sup> where delayed, deficient or erratic rains lead to severe reduction in crop output and even total crop failure and only one crop is typically cultivated in a year<sup>9</sup>. The gains of the great strides the country has taken in food production have largely been confined to irrigated plains and deltas; rain-fed regions have lagged far behind and have in fact suffered widespread resource degradation due to inappropriate resource use<sup>10</sup>, poor husbandry and low investments. Since growth in agriculture has historically been the largest driver of poverty reduction in India, rain-fed regions remain mired in poverty.

Of the 127 Agro-climatic Zones defined under the National Agricultural Research Project 73 are rain-fed. Rain-fed areas account for 60% of the Net Sown Area and 55% of the Gross Cropped Area. Almost half of our food crop area (77% for pulses, 66% for oilseeds and 45% for cereals), over two-thirds of the non-food crop area and over 50% of our horticulture is rain-fed. Rain-fed areas produce 40% cereals, 60% cotton, 75% oilseeds 85% pulses and support 40% human and 60% livestock population. All the Scheduled Tribes live in rain-fed areas. Even in the best case scenario for irrigation, rain-fed areas would have to produce 40% of our food.

Poverty is highest in regions, States and districts where a larger share of agriculture is rain-fed. For example, more than 50% of rural population in Orissa, Chhattisgarh, MP and Jharkhand is classified as BPL and the 100 poorest districts in the country are almost entirely rain-fed.

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<sup>5</sup> According to the UN State of the World Population 2007 Report India's population would be 60% rural in 2030. A 2010 report by McKinsey Global Institute, titled, 'India's urban awakening: Building inclusive cities, sustainable growth', presents a similar prognosis. Rural population would remain very large even when a majority begin to live in cities.

<sup>6</sup> Forests are a key livelihood supplement, especially for the tribes. Ironically, policy makers historically have shied from insisting that forests, the second largest land-use, occupying half as much area as agriculture must do more to strengthen rural livelihoods/economy in a predominantly rural country.

<sup>7</sup> Low level of 'skills useful for urban employment' and the poor quality of formal education among rural people in the 15 to 35 age group militate against rapid urbanization.

<sup>8</sup> According to GoI, Department of Agriculture and Cooperation, Directorate of Economics and Statistics (2007-08, Provisional) 44.22% of Net Sown Area and 44.56% of Gross Cropped Area was irrigated.

<sup>9</sup> Cultivable land is also often left fallow due to high risk and factor constraints, which means *less than half of the potential of cultivable land is used*.

<sup>10</sup> Farmers in rain-fed regions have often discarded their traditional subsistence-oriented mixed farming systems, emulating practices from irrigated areas to cultivate input-intensive commercial/high value crops, exposing themselves to indebtedness and great risk and often damaging the resource base itself.

Nationally we have lacked a coherent policy to develop natural resources as a means to enhance livelihoods, remove poverty, ensure household (as opposed to aggregate) food security and spur decentralized growth. Self-sufficiency in food grains production has been the main driver of strategies to develop natural resources. The advent of green revolution technologies during the 1960s focused attention on the “high potential” plains, beginning with the Intensive Agricultural Districts Programme during the 3<sup>rd</sup> FYP. While this strategy served the nation well in ensuring aggregate food security, it is inappropriate for rain-fed regions as it requires complete control over water that these regions lack. Such attention as rain-fed regions did receive in the decades following the green revolution has largely been oriented – by conception or in implementation – towards mitigation rather than enhancing livelihoods and spurring growth.

Rain-fed regions first received specific, though marginal attention during the 4<sup>th</sup> FYP with the launch of the Drought Prone Areas Programme (DPAP) in 70 chronically drought-prone districts. DPAP was, however, concerned with drought proofing rather than livelihoods and growth-focused development of natural resources. A collection of discrete activities by different line departments to mitigate widespread distress, especially to cattle in the event of drought, DPAP was quintessentially ameliorative. It soon degenerated into a budgetary device to allocate funds across line departments and was stretched to many more districts due to political exigencies. Programmes for desert areas, mountains and coastal areas have been even smaller and have not fared any better than DPAP.

The National Watershed Development Project for Rainfed Areas (NWDPA) launched in 1990-91, was the first significant and considered initiative to develop rain-fed areas. Watershed Development projects (WDP) took the center stage for development of these areas. It was recognized upfront during mid-nineties, that WDPs would assume the role of drought proofing in low potential dry areas, especially in arid and semi arid regions. Ever since WDPs have grown in scope and number. While these projects have made significant dent in terms of conserving soil-moisture and enhancing irrigation through harvesting rain water, it is yet to make major impact on reviving sustainable farming systems suitable for dry land farming and providing livelihood security and equity.

Overall public investments in rain-fed areas have also been very low. While cumulative public investment in major and medium irrigation schemes is estimated at Rs 5.5 lakh crore at current prices, watershed development has cumulatively received less than Rs 40,000 crore<sup>11</sup>. Private investment, the major contributor to irrigation, is perhaps even lower in rain-fed areas. Also, procurement and price support policies have favored wheat and rice, neglecting millets and other crops most suited to rain-fed areas.

The net sown area expanded considerably during the first three decades since independence in the wake of population growth, the ‘grow more food campaign’, various land distribution programmes and privatization of the commons<sup>12</sup>. Much of the expansion was outside the plains and in rain-fed areas, bringing land unsuited for field crops under the plough. Often, farmers engaged in such expansion were poorer people, relatively new to farming and unable to develop the land to make it suited for farming.

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<sup>11</sup> Of course, investment in irrigation itself is meant to develop erstwhile rain-fed areas. What is meant here is that investment to develop the potential of rain-fed areas *where irrigation is not possible* has been low.

<sup>12</sup> Data compiled by Indiatat.com from various government sources estimate an increase of about 22 mHa in NSA, which is about 30% of the current rain-fed area.

### 3.1.1 CHALLENGES IN DEVELOPING RAIN-FED AREAS

**Ecological Diversity:** Rain-fed areas are largely in undulating, hilly and mountainous (UHM) terrain with no opportunities for widespread irrigation. UHM regions represent great agro-ecological diversity – depending on quantum and variability of rainfall, temperature, geomorphology and predominant farming systems. The terrain also induces high micro-level variations – soil depth, soil quality, land degradation and water availability can vary within a single village. Thus, there cannot be “standard packages” *a la* green revolution to be “extended” or stamped around.

**Managing Ecological Commons:** Due to the nature of the terrain, rain-fed regions tend to be “ecologically connected” – since water flows downhill, how the upstream is managed affects the downstream. Also, there are competing claims on water, especially groundwater which is inherently limited in UHMs, between domestic uses, subsistence farming and commercial agriculture. Further, livelihood systems in vogue often conflict with potentially more productive alternatives—for instance, open grazing affects *rabi* and vegetable cultivation and livestock rearing under open grazing regime affects overall resource management choices. The implication of inter-connectedness is that isolated actions by individual farmers cannot succeed. Needed collective action requires social mobilization, fostering and nurturing participatory/consensual institutions and enabling legal provisions for such institutions to enforce shared perspectives. Social mobilization requires patient engagement and time.

**Limited Knowledge, Know-how & Research:** Research and knowledge building in natural resource management has been dominated by the green revolution framework of maximizing production under controlled conditions. Wheat and paddy have dominated research agenda with little attention paid to traditional rain-fed crops of millets, oilseeds and pulses. Fragmented across narrow disciplines, research remains focused on breeding and other “above the ground” issues while the “below the ground” themes, such as soil-water-microbe dynamic remain neglected.

**Absence of Know-How, “Scale Models”:** Techniques and strategies to enhance resource productivity, reduce vulnerability and stimulate regeneration have been successfully tried out on small scale by many NGOs, innovative farmers and intrepid researchers in different parts of the country. There are no mechanisms to harness this tacit knowledge and there are no scale models or success stories on large scale to guide and induce serious shifts in policy and action.

**Low Capacity for Private Investment:** Low productivity and frequent crop failures leave no investible surplus with farmers in rain-fed areas. Many are relatively new entrants with limited experience of intensive agriculture. Farmers often lack proper tools and draft power. Neglect and low investment in resource development further reduce returns, setting in motion a vicious cycle, impoverishing people as well as resources.

**Weak Organizational Capacity:** There is a dearth of human resources with skills in social mobilization, nurturing local institutions, participatory planning for natural resource development and inter-disciplinary work. There are no institutions to develop such human capabilities and provide support to those engaged in implementing programmes. No mechanisms exist to systematically engage PRIs and NGOs.

### 3.1.2 FLAWED STRATEGIES & GAPS

**Fragmented Programming:** There are now large budgets for IWMP, RADP, NHM, MGNREGA, Minor Irrigation, NRLM, etc. The activities promoted/ permissible under these are highly relevant for the development of rain-fed areas. However, each of these is conceived and

implemented in departmental silos and there is no unified mechanism for coordination and convergence. As a result, these programmes do not lead to “area development”, potential synergies are lost and investments, interventions and results remain sub-optimal.

**Flawed “Solutions”:** Watershed development is the main programme for the development of rain-fed areas. Given their ecological characteristics, developing rain-fed areas does broadly require a watershed approach. Unfortunately, with its roots in protection of dams from silting watershed thinking has remained preoccupied with “erosion-prevention” and “run-off harvesting”. Together, these objectives have spawned a “ridge-to-valley fundamentalism” and a “tool-kit” approach of sticking on the ground various structures and “treatments” – check-dams, trenches, loose boulder structures, drainage line treatment, etc. Watershed development projects lack clear development goals and standards for investment and outcomes. There is no focus on production and regeneration and no investment in private lands which occupy a major portion of most landscapes. ‘Livelihood’ added to the watershed lexicon during 11<sup>th</sup> FYP is understood as an “add-on” activity of promoting enterprises – including grocery shops! – often with no bearing on the design of the “treatments” in the watershed.

### ***3.1.3 THE OPPORTUNITIES***

Developing about 150 mHa of rain-fed areas<sup>13</sup> would require about Rs 7.5 lakh crore at the rate of Rs 50,000/Ha. Current allocations for MGNREGA, RKVY, RADP, NHM, IWMP, MI and BRGF alone are of the order of Rs 60,000 crore a year. At this rate it would take only about a dozen years to transform our rain-fed areas.

Much of what needs to be done to develop rain-fed areas is labour intensive and would create large scale employment and reduce poverty in villages on the way to opening the doors to rural prosperity. By reversing the process of resource degradation, rain-fed area development would mitigate effects of climate change and lead to food and water security locally as well as nationally. High skills are not required, except in social mobilization and preparing resource development and usage plans—the so called “treatment”. Like MGNREGS, work can be taken up simultaneously in every village and micro-watershed and phased out across years. The gestation period for investment is very small as some returns from “treatment” begin to flow from the very next rainy season. The large and growing urban demand for diverse farm products provides the pull for much needed diversification of farming systems in rain-fed areas. Though scattered, there is a fair amount of experience and know-how among practitioners compared to when the NWDPR was initiated and it is possible to outline broad planning approaches to develop rain-fed landscapes. Finally, PRIs now provide a broad institutional framework to take up systematic, decentralized investment to develop rain-fed areas.

### ***3.1.4 THE WAY FORWARD***

**Need for a Holistic Perspective:** Developing rain-fed areas requires pursuing three interconnected goals *simultaneously*: enhancing current livelihoods for most people (equity), enhancing current carrying capacity (growth) and setting in motion regenerative processes to enhance future carrying capacity continuously (sustainability). This calls for re-shaping interactions between people and natural resources as well as those between nature’s elements to produce multiple, long-lasting, synergetic effects rather than merely maximizing current production. Relationships between people need to be reordered by fostering institutions to

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<sup>13</sup> One needs to take a comprehensive view of the resource base that includes farmland, pastures and other commons and forests. The total area needing systematic development would be of the order of 150 mHa.

regulate resource use and facilitate joint action to develop resources so that everyone gains and future needs are balanced against present demands. Alternate resource use systems need to be developed by changing people's interaction with resources to expand the production frontier in a viable way. Finally, interactions between nature's elements – earth, water, sun and air – need to be facilitated to regenerate soils, recharge aquifers and make the land-bound part of the water cycle most productive.

**Convergence:** The policy making, programming, budgeting and implementing silos need to be dismantled. Mechanisms need to be created to ensure that policy making is focused on “development of rain-fed areas” as a single theme and schemes relevant for this theme converge in the field regardless of their origins in Central and State Ministries. In the present context, at least MGNREGA, IWMP, Minor Irrigation, RKVY/RADP and NHM must be planned and implemented in a convergent manner. Besides such convergence across schemes, there is a need to create mechanisms to pool knowledge resources from various government and non-government agencies engaged in research and action and to harness the grassroots capabilities of NGOs.

**Need to Bridge the Water Divide:** Irrigation is typically planned in isolation as the sole or standalone means to secure crop production<sup>14</sup>. Use of fresh rainwater or green water thus receives no attention while planning and designing irrigation projects. Though ‘full’ and widespread irrigation is not possible in rain-fed areas, opportunities do exist<sup>15</sup> for small scale and supplemental irrigation. An alternative formulation is therefore required for the development of rain-fed areas whereby blue water or irrigation is seen in conjunction with green water to maximize productivity of all water.

## 3.2 KEY RECOMMENDATIONS

The working group concluded that ‘**Developing Rain-fed Areas**’ was the common ground for the three themes assigned to it, namely, watershed development, MI and NRAA. Each theme was, however, deliberated upon by separate sub-groups to facilitate discussions. It is envisaged that the recommendations presented separately for each theme will be integrated through NRAA.

### 3.2.1 WATERSHED DEVELOPMENT

With the induction of the Common Guidelines during the 11<sup>th</sup> FYP, new watershed projects were taken up only by DoLR under the Integrated Watershed Management Programme (IWMP). Completing projects earlier sanctioned under various schemes was a key watershed development focus of DoLR. New projects were sanctioned only from FY 2009-10 after the Common Guidelines were approved by the Union Cabinet towards the end of FY 2008-09. Projects covering 15.13 mHa were approved till the end of FY 2010-11 against a Plan target of 22.65 mHa.

National Mission for Sustainable Agriculture (NMSA), one of the eight missions under the aegis of National Action Plan on Climate Change (NAPCC), outlines series of interventions for

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<sup>14</sup> Irrigation systems provide only a fraction, called water duty (usually 60%), of the water required by crops but nothing is done to work out where the rest would come from or how the water duty could be lowered.

<sup>15</sup> Such opportunities can also be created through groundwater recharge, storage of run-off and by allocating water from medium and large projects to fill local water bodies.

addressing issues related to impact of climate change in agriculture sector. Sustainable agricultural growth can only be realized by promoting conservation and sustainable use of natural resources like soil, water etc. in production process. NMSA envisages synergizing resource conservation, improved farm practices and integrated farming for enhancing agricultural productivity especially in rainfed areas which is most vulnerable to climate change. This necessitates a cohesive, synergetic, sequential and integrated development of rainfed areas under a single window development strategy.

**Rationale:** Several schemes relevant for the development of rain-fed areas are being implemented by various Ministries and MGNREGA is expected to prioritize activities focused on rain-fed area development. What, then, is the rationale for continuing IWMP?

The main rationale for continuing and expanding IWMP is that a ‘watershed programme’ provides the framework necessary for rain-fed area development schemes just as urban planning provides the framework for housing and other urban development schemes. While a ridge-to-valley approach should not be rigidly enforced, especially in undulating terrains, rain-fed area development planning does require a watershed approach because of the ecological connectivity of typical rain-fed landscapes. Besides, certain activities needed for the development of rain-fed areas, such as use of light machinery for land leveling and deepening of water bodies, pipes for conveying water, larger masonry works, etc. cannot be taken up under MGNREGS<sup>16</sup>.

The recommendations of the Working Group are as follows.

### **1. Strengthen the Implementing Structure for Convergence & Quality**

- Watershed development programmes to be integral part of NMSA.
- There should be a single agency at State and District levels for implementing IWMP and MGNREGS.
- A single Steering Mechanism should be created at the State and District levels for IWMP, MGNREGS, RKVY/RADP and NHM.
- Consortia of NGOs and research organizations should be promoted for capacity building of PIAs/PRIs.
- Research agencies (e.g. Soil & Land Use Survey of India, CSWCRTI, CRIDA) should be mandated to provide technical support to watershed and rainfed area development programmes.

### **2. Enhance Livelihood Focus & Sustainability of Watershed Programmes**

- Areas treated in the past should be included in new projects since the treatment generally was marginal.
- Maintenance of watershed works should be included under MGNREGA.
- Promotion of production-related institutions should be included in Common Guidelines.
- Necessary legal framework should be created to enable CBOs to play a regulatory role in the use of natural resources, such as groundwater, pastures, etc.
- MSP should be declared for rain-fed area crops, such as millets and these crops should be procured.

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<sup>16</sup> Though MGNREGS permits 40% capital expenditure, one-fourth of it has to be borne by States. Other capital intensive projects, such as roads, often take precedence in using up the 40%. More importantly, being demand driven, MGNREGS cannot be converted into a watershed programme even though a watershed approach can and should be mandated for natural resource related works under it.

### 3. Develop Data Base, Know-how & Standards (common with NRAA)

- A National Level Data Center should be set up.
- Network based research support system should be set up, linking up NGOs and research institutions.
- Action research pilots should be initiated jointly with NGOs and research institutions for special areas (the Himalayas, ravine areas, areas where groundwater has been overexploited, inland salinity affected areas and water-logged areas).

#### 3.2.2 MINOR IRRIGATION

The lowest end of projects irrigating up to 2,000 Ha, including all groundwater irrigation projects by virtue of their small size are clubbed into this category. The nomenclature 'minor' conjures insignificance and needs to be changed. Further, projects with command area limited to a village or a Panchayat need to be implemented and managed by PRIs.

The main Centrally Assisted Schemes for developing MI during the 11<sup>th</sup> FYP were AIBP, RRRWB and the MI component of Bharat Nirman. Overall, the targets are expected to be met.

MI schemes can broadly be conceived in four contexts, namely, in areas with underutilized groundwater potential, e.g. Bihar, West Bengal and Assam; in the UHM regions, such as the central and eastern plateau, Hills and Mountains with potential for lift and diversion-based irrigation from springs and streams; across the country for restoration and rehabilitation of water bodies/ water courses (tanks, *pokhars*, natural drainage channels in the foothills as in Assam, the *Ahaar Pyne* system, etc.); and groundwater management in the non-alluvial areas. The first category is in the nature of standalone irrigation where access to finances and electricity and their efficient use are concerns. The other three contexts call for convergence and integration with the broader theme of rain-fed area development.

The recommendations of the Working Group are as follows.

#### 1. Change in Nomenclature

- Surface Irrigation:
  - Small Scale : 100 ha to 2,000 ha
  - Tiny/ Mini : up to 100 ha
- Ground Water: Ground Water Irrigation

The above recommendations of the Working Group for the change in nomenclature of Minor Irrigation schemes shall be applicable only after taking a decision on the same in consultation with the Ministry of Agriculture and Ministry of Water Resources.

#### 2. Modifications in Cost Structure of AIBP for Surface Water

- For Small Scale 2.5 lakh/ha; for Mountains 3.5 lakh/ha
- For Tiny/Mini 1 lakh/ha
- For Special Category States & Tribal Areas:
  - Reduce Eligibility of Individual Schemes from 20 to 5 ha
  - Reduce Eligibility of Schemes within 5 km from 50 from 20 ha
- For Other States Reduce Eligibility of Individual Schemes to 20 ha

**3. Include in RRRWB Restoration of Traditional Systems, e.g. *Ahaar-Pyne*, Natural Drainage-cum-Irrigation Channels in foothills, e.g. in Assam**

**4. Implementation and O & M**

- Handover Schemes up to 100 Ha to PRIs
- Involve NGOs as Support VOs

**5. Data Collection**

- Complete 5<sup>th</sup> MI Census & Preparatory Work for 6<sup>th</sup> MI Census
- Integrate MI Data into PRIs' Data Base and into the national database structure proposed in Chapter 5 of this report.
- Earmark 1% of Allocation for Data Collection
- Make Data Available on Public Domain

**6. Enhancing Water Use Efficiency**

- Identify & Support NGOs (SVO) for Training & Extension
- Earmark 2% for Training/Capacity Building
- Expanding the coverage under Micro Irrigation

**7. Ground Water**

- Stimulate Development in Less Developed Areas, with a “Common Pool” focus.
  - Introduce Scheme with Central Subsidy and proper knowledge inputs.
- Take up Pilots on Community Tube Wells
- Promote Artificial Recharge using a strategic approach
  - Central Subsidy for Artificial Recharge through Dug Wells, keeping in mind the local conditions.
  - State Scheme in Overexploited Areas for Artificial Recharge
- Ground Water Management & Regulation (as discussed in Chapter 2 of this report)
  - Aquifer Mapping
  - Strengthen Ground Water Monitoring Observation Wells
  - Develop Enabling Laws for Participatory Ground Water Management
  - Technology Up-gradation
  - Restructuring and Strengthening of CGWB.

**3.2.3 NATIONAL RAIN-FED AREA AUTHORITY (NRAA)**

The NRAA was established in November 2006 as an inter-ministerial body in the Department of Agriculture and Cooperation, Ministry of Agriculture following an announcement by the Prime Minister on 15 August 2005 to set up such a body. It was later moved to the Planning Commission. Though the Prime Minister had promised to set up a body to ‘focus on removing the problems of farmers in dry-land areas’ with the hope to ‘have a new green revolution’, the mandate eventually assigned to NRAA was as an advisory body to provide knowledge inputs, make perspective plans, formulate policies and coordinate to bring about synergy and convergence. It has been hobbled by weak strategic positioning (in one Ministry), emphasis on knowledge and advisory role and corresponding staffing with scientists and technocrats, lack of mechanisms to ensure convergence, lack of field presence and weak support systems.

The NRAA since its inception has prepared a vision document, helped develop the Common Guidelines for watershed development, assisted MoEF in a programme for the development of

fringe forest areas, developed the Bundelkhand Package and conducted a few research studies. It is yet to play the spearhead role towards the development of rain-fed areas envisaged in its conception. It clearly needs to be re-conceptualized and restructured with clear objectives and corresponding resources and authority.

The recommendations of the Working Group are as follows:

- 1. Restate Mandate, with Convergence—*Not Advisory*—as the Main Role**
- 2. Restructure Governance Consonant with the Mandate of Facilitating & Ensuring Convergence**
  - Council Chaired by Dy. Chairman of PC with MoA & MoRD as Co-Vice Chair, Representation from relevant GoI Departments, States & NGOs
  - CEO Designated Secretary GoI, Selected from Open Market with Five Year Term
  - (Alternatively, Separate Body, with a NDC-like Council Similar to PC & CEO the Rank of MoS)
- 3. Strengthen the Organization**
  - Provide Adequate Support Structure
  - Set Up Units in Key Rain-fed Farming States or Regions (Perhaps Six)
  - Strengthen Human Resource Base with Multi-disciplinary Teams
    - People with Field Experience
    - Community Development, Institution Building & Livelihoods Promotion Besides Technical (Natural Resources) Fields
  - Set Clear Goals & Monitoring Mechanisms for NRAA
- 4. Set Up Convergence Mechanisms at State & District Level**
  - Common Convergence Body for IWMP, MGNREGA, RADP, etc.
  - Chaired by CS or Development Commissioner at State & Collector at District
- 5. Knowledge, Capacity Building & Dissemination**
  - Develop & Orchestrate Strategies for
    - Capacity Building, Especially in the Field
    - Knowledge Building, by Engaging Relevant Knowledge Institutions & NGOs
    - Systematic Involvement of PRIs & NGOs
  - Set Up a Clearing House for
    - Accumulation, Sharing & Dissemination of Knowledge & Information
  - Set Up Mechanisms for
    - Facilitating Technical Support to PIAs

## 6. Pilot Large Scale Convergence Demonstrations During the 12<sup>th</sup> Plan

- At Least One Pilot in Each of 15 Agro-Climatic Regions
- 10,000 to 25,000 Ha Each
- NRAA Role:
  - Orchestration, Mobilising Technical Support
  - Ensuring Goal-Oriented Planning
  - Facilitating & Incentivising Convergence
  - Facilitating NGO Participation
  - Facilitating Knowledge Building, Dissemination & Uptake of Experience

### ***PROPOSED ALLOCATIONS (RS. CRORE)***

#### **Watershed Development:**

Completion of Old DPAP, DDP & IWDP Projects	288
Completion of Projects (22.65 mHa) Sanctioned During 11 <sup>th</sup> FYP	21,350
Partial Cost for New Projects (25 mHa) During 12 <sup>th</sup> FYP	14,722
Pilots for Special Areas	100
<b>Total</b>	<b>36,460</b>

The major share of the allocation is towards spillover costs of projects approved during the 11<sup>th</sup> FYP. Only a marginal increase (less than 10%) is being proposed in the area to be covered during the 12<sup>th</sup> FYP at 25 mHa.

#### **Minor (Small & Tiny Scale) Irrigation**

	mHa	State Plan	Central Plan	Total
<b>Surface Water</b>				
AIBP Schemes 100 ha to 2000 ha	0.7	17,500	0	<b>33,000</b>
AIBP Schemes up to 100 ha	0.3	3,000	0	
By States	0.5	12,500	0	
<b>Sub Total</b>	<b>1.5</b>	<b>33,000</b>	<b>0</b>	
<b>Ground Water Development</b>				
Alluvial	3.4	17,000	0	
Hard Rock	0.5	4,000	0	
Hilly Area	0.1	1,500	0	

	<b>mHa</b>	<b>State Plan</b>	<b>Central Plan</b>	<b>Total</b>
Sustainable GW Irrigation Development Programme in NE States <sup>17</sup>	1.12	9,000	0	<b>46,510</b>
GW Management and Regulation		0	4,655	
GW recharge via dug wells in hard rock areas	1.43	10,355	0	
<b>Sub Total</b>	<b>6.55</b>	<b>41,855</b>	<b>4,655</b>	
<b>RRRWB</b>	<b>0.4</b>	<b>30,000</b>	<b>0</b>	<b>30,000</b>
<b>Investigation, R&amp;D &amp; Awareness</b>	<b>LS</b>	<b>40</b>	<b>10</b>	<b>50</b>
<b>Best practices</b>				
Pilots on Stream tank integration	<b>LS</b>	<b>50</b>	<b>0</b>	<b>50</b>
Accelerated Artificial GW Recharge	<b>LS</b>	<b>15,000</b>	<b>0</b>	<b>15,000</b>
<b>RMIS</b>	<b>LS</b>	<b>0</b>	<b>127</b>	<b>127</b>
<b>Grand Total</b>	<b>8.05</b>	<b>1,19,945</b>	<b>4,792</b>	<b>1,24,737</b>

Note: The outlay of Rs.1,19,945 crore under the State Plan includes Rs.26,000 crore as additional central assistance to States through AIBP.

#### **National Rain-fed Area Authority (NRAA)**

	<b>Apex Level</b>	<b>Regional Level</b>	<b>Total</b>
Establishment (Salaries & Operating Costs)	65	124	189
Workshops, Publicity, Data Base & Website	1.4	8	9.5
Convergence Demos (Gap Filling Funds)	225	0	225
<b>Total</b>	<b>291.5</b>	<b>131.9</b>	<b>423.4</b>

<sup>17</sup> To be taken up in under developed areas from groundwater development perspective for NE and Eastern States.

## **CHAPTER 4 – RURAL DOMESTIC WATER AND SANITATION**

### **4.1 INTRODUCTION**

A Nirmal Bharat is the dream of a clean and healthy nation that thrives and contributes to the well-being of the people. A clean hygienic environment is possible when there is access to both safe drinking water and sanitation and the population is attuned to using it. In the rural areas, the Ministry of Drinking Water and Sanitation is committed through its programmes NRDWP and TSC to ensure the provision of safe drinking water and open defecation free habitations. As per information from the States, 72% of the total rural habitations are fully covered with safe drinking water. The rest are either partially covered or have drinking water sources which are chemically contaminated. Through the TSC, 607 rural districts are being covered. Efforts over the last decade have given effect, with sanitation facilities increasing by 6.6% on an average annually. The Nirmal Gram Puraskar instituted in 2003 has given a boost to the programme of sanitation.

While both NRDWP and TSC have been successfully implemented as separate programmes, there has been no conscious endeavour to integrate the two for a wholesome outcome to achieve the objective of Nirmal Bharat. Though TSC is a Campaign, the approach has been targeting individual households and not the community or habitations. There is thus need to evolve strategies for focussing on entire habitation in a saturation mode, apart from targeting individual households. Again, NRDWP and TSC have been laying emphasis on coverage. There has not been sufficient focus on the aquifer management, solid and liquid waste management and O&M which are all integral to both these programmes.

Therefore, a paradigm shift in the approach to the programme is necessary in the Twelfth Plan. The States will have to prepare projects which will integrate drinking water supply along with sanitation with components of solid and liquid waste management, water quality, aquifer management, O&M and water security through re-charging. This cohesive and holistic approach will pave the way to achieve the dream of Nirmal Bharat.

This will further entail a strong IEC activity with proper communication strategy involving NGOs, CBOs and industries. The need for large scale capacity building at the grass root level to ensure the sustenance of the above programmes will also have to be taken up through association with programmes like NRLM, National Skill Development Corporation.

The review of performance in the 11<sup>th</sup> FYP and recommendations of the Working Group for the 12<sup>th</sup> FYP on Rural Domestic Water and Rural Sanitation are presented below.

### **4.2 RURAL DOMESTIC WATER**

The Ministry of Drinking Water and Sanitation administers the National Rural Drinking Water Programme (NRDWP), through which financial and technical assistance is extended to the states for implementing rural domestic water supply schemes.

## **4.2.1 REVIEW OF THE PERFORMANCE IN THE 11<sup>TH</sup> FIVE YEAR PLAN**

### **A) PHYSICAL PERFORMANCE**

The achievement measured by habitations where the population is fully covered with adequate (40lpcd) and safe drinking water, as per information entered by States on the online monitoring system of the Ministry, is about 72% of total rural habitations. The rest are either partially covered or have drinking water sources contaminated with chemical contamination. The achievement as estimated by independent studies like the NSSO 65<sup>th</sup> Round Survey of 2008-09 shows that about 90% of rural households obtain their drinking water from improved sources. However coverage of piped water supply is still poor at 35% as per IMIS. As against the target of 6,53,798 habitations for coverage during the 11<sup>th</sup> Five year Plan, the coverage up to 31<sup>st</sup> March 2011 was 5,26,667 (80.56%). States of Jharkhand, Chhattisgarh, Nagaland, M.P., Orissa, Himachal, Tamilnadu, Kerala and Uttarakhand have exceeded their targets whereas Sikkim, Punjab, Assam, Rajasthan, Arunachal Pradesh & Jammu & Kashmir have reported low (less than 50%) achievement against targets. All uncovered habitations have been reported covered as on 1.4.2011.

### **B) FINANCIAL PERFORMANCE**

As against the planned outlay of Rs 39,490 crore for Rural Drinking Water Supply in the 11<sup>th</sup> Five Year Plan the actual outlay is Rs. 39,200 cr. and the anticipated utilisation is Rs 39,218 crore i.e. (100.05%).

The increase in the 11<sup>th</sup> Plan outlay is 282% over that in the preceding Plan. While the Central outlay increased by about 242%, the State outlay increased by much more namely, 324%. Looking at these figures it is feasible to invest about 275%-300% higher outlay in the Rural Drinking Water Sector in the 12<sup>th</sup> FYP, given the necessary demand.

## **4.2.2 CHALLENGES AHEAD IN THE RURAL WATER SUPPLY SECTOR**

The following are the major challenges in the rural domestic water sector.

- i) Ground water sources are deteriorating in quantity.
- ii) Many areas are classified as water quality affected
- iii) Poor operation and maintenance
- iv) Low coverage of pipe water supply
- v) Demand for Higher quality of service.
- vi) Social exclusion of services to SC, ST, minority concentrated habitations.
- vii) Impact on Health of inadequate quantity and quality of water supply.

## **4.2.3 ROAD MAP FOR THE XII TH PLAN.**

The Working Group has made the following recommendations for the XII Five Year Plan.

### **A) VISION AND GOAL**

- The vision for rural domestic water supply should be to cover all rural households with safe piped drinking water supply at 55 lpcd for the 12<sup>th</sup> FYP.

- By 2017, it is targeted that at least 55% of rural population in the country will have access to 55 lpcd within their household premises or at a horizontal or vertical distance of not more than 100 meters from their households without barriers of social or financial discrimination. Individual States can adopt higher quantity norms. By 2017, it is targeted that at least 35% of rural population have individual household connections.
- There should be greater investment on the preventive and public health aspect of health.
- India being a signatory to global agreements should progressively work towards the Right to Domestic Water.
- Convergence between drinking water supply and sanitation should be strengthened by concrete measures to reduce bacteriological contamination. Villages that are covered with piped water supply should be taken up for coverage to attain open defecation free (ODF) status on priority and vice versa.
- A part of the Rural Water Supply outlay be set apart for funding integrated projects by States to provide housing, water and sanitation facilities in rural areas on par with urban areas.

#### B) MONITORING AND DATABASE

- There should be shift in focus from monitoring of just construction of water supply systems to monitoring of specified service delivery parameters.
- There is an urgent need to set up a Monitoring and Evaluation Division in the Ministry of Drinking Water and Sanitation to undertake monitoring through IMIS.
- It is recommended that there should be an evaluation of the status of drinking water projects every two years.

#### C) COVERAGE

- The Government of India, through the NRDWP, in the 12<sup>th</sup> FYP, should primarily focus on funding the provision of piped water into the household premises through piped water supply schemes from the nearest feasible sources or roof water harvesting. Handpumps can be implemented by the State Governments from their own resources. For remote, small, tribal, SC habitations the States can be allowed to spend 5-10% of the overall allocation on handpumps.
- At the village level, water budgeting exercise should be carried out and projects taken up accordingly.
- Participation of the beneficiaries in water supply schemes should be ensured right from the conceptualisation stage and the planning stage, including O&M. planning, investment and implementation in all new water supply schemes.
- Subsidiarity principle has to be followed and decisions should be made at the lowest level possible especially on issues like location, implementation, sustainability, O&M and management of water supply schemes, while retaining an umbrella role for the Gram Panchayats for effective implementation.

- A Project Appraisal Cell at the State level and the State Technical Agency or some qualified technical body should vet the quality of the project proposals that are placed before the State level Scheme Sanctioning Committees.
- GPs/VWSCs should ensure a minimum level of safe drinking water and sanitation for transient communities.
- All government schools and anganwadis should be provided with water supply for drinking and for toilets as per relevant quantity norms by convergence of NRDWP for existing schools and SSA for new schools set up under SSA.
- Promotion of solar powered pumps for implementation in remote, small habitations and those with irregular power supply.
- Waste water treatment and recycling should be an integral part of every water supply plan or project.
- Design of schemes for peri-urban areas should factor in the requirements of increasing population and increasing per capita demand in the planning stage itself so as to avoid wasteful expenditure.
- Women should be included in all aspects of decision making with respect to drinking water security planning, implementation, operation, maintenance and management.

#### D) ENSURING DRINKING WATER SECURITY

- A holistic aquifer and surface water management approach with active community and PRI participation in villages at aquifer or at hydrological unit level, should be followed to ensure drinking water supply.
- The MDWS, should prepare a convergent approach with the Ministries of Water Resources, Health, Agriculture, Environment and Forests, Power, Industry etc. For efficient management of water resources.
- A District Water Vision based on the availability of overall water resources and water requirements for irrigation, rural and urban drinking water, and industry should be prepared. It should draw up Aquifer Management Plans with water harvesting and groundwater recharge structures to benefit drinking water sources on a watershed basis using Ground Water Prospects maps, GIS and Watershed Development Department technical inputs.

#### E) WATER QUALITY

- Wherever feasible hydro-geologically, the States should go in for artificial recharge of groundwater for in-situ dilution of chemical contaminants.
- A Water Safety Plan to address water quality problems should be prepared for every VWSC, with technical inputs.
- It is recommended to create a Centre of Excellence for Water Quality in NEERI, Nagpur with its regional laboratories to function as regional level laboratories.

- The Ministry should pursue with the WQAA for notification of drinking water quality standards based on BIS Standard IS-10500.
- The WQAA should play a bigger role in ensuring drinking water quality assessment and monitoring.
- All States should be asked to set up a “Water Quality Cell” attached to the office of State Secretary dealing with rural water supply.
- The present Jalmani programme of providing stand alone safe drinking water to schools should be mainstreamed and continued under the NRDWP as part of its quality component.

#### F) SOURCE SUSTAINABILITY

- Sustainability Plans should be prepared using Groundwater Prospects Maps and the Aquifer Mapping Outputs proposed in Chapter 2 of this report, particularly in overexploited, critical and semi-critical blocks. Such plans can be integrated into a GIS-enabled system on which the GW Prospect Maps and Aquifer Maps will be developed.

#### G) OPERATION AND MAINTENANCE

- The weakest aspect of rural water supply is O&M and there is need for raising O&M allocations. It is recommended that allocation for O&M be increased from 10% of NRDWP allocation at present to 15%.
- States should draw up a State O&M policy for rural drinking water supply focusing on ensuring sustainable service delivery at the village level and laying out the roles of VWSCs, GPs, PHEDs, operators, outsourcing agencies.
- VWSCs should be set up in all villages with 50% women members as a sub-committee or standing committee of the GP.
- All water supply schemes within the GP shall be maintained by the Gram Panchayat. Zilla Panchayats should have a Water Supply O & M Wing to provide continuous technical support to GPs in managing their water supply schemes.
- An O&M Plan should be included in the DPR of all schemes. Schemes should be transferred to the MC/VWSC together with an O&M Corpus fund amounting to 10-15% of the project cost.
- Efforts should be made to provide local wage earners, women SHGs, Bharat Nirman Volunteers, local youth with training in masonry, plumbing, electricity through programmes like NRLM, BRGF etc.
- Incentives may be provided to the GPs for collecting user charges from the beneficiaries. A minimum collection of 50% of O&M cost (including electricity charges) through user charges is advocated.

- For multi –village or bulk water supply schemes the source, treatment plants, rising mains etc., shall be maintained by Managing Committee/PHED or the concerned agency while the distribution and other components are to be maintained by the GP.
- States should introduce standard operating procedures for O&M of handpumps and piped water supplies.
- Water metering, both bulk and individual household, should be promoted in all piped water supply schemes to reduce unaccounted for water.

#### H) SAFE WATER TO DISADVANTAGED SECTIONS

- Higher per capita cost should not be an obstacle to cover SC, STs and PTGs. Norms of handpump per population, minimum population for coverage with piped water supply schemes followed by some States should be relaxed in cases of SC, ST and PTG concentrated habitations.
- Inequities in water supply within villages especially in regard to SC, ST, OBC households need to be taken care of.

#### I) DOMESTIC WATER IN HIGHLY VULNERABLE AREAS

- People living in remote and small habitations in arid and semi-arid areas should be encouraged to adopt roof-top rainwater harvesting, creation of village ponds (Ooranies as developed in Tamil Nadu and Andhra Pradesh) and khad/nala-based water supply schemes (e.g. Himachal Pradesh).
- 10% of NRDWP allocation should be earmarked for IAP districts on a 85:15% sharing pattern with the State share supplementing the O&M of schemes in these districts.

#### J) DECENTRALISED GOVERNANCE AND INSTITUTIONAL MECHANISM

- The National Resource Centre should be strengthened on the lines of National Rural Roads Development Authority to play a greater role.
- The Block Resource Centres that are being newly set up by the States shall be strengthened.
- Water and sanitation is more about changing of mind sets of people. There needs to be a plurality of approaches to overcome the problem and civil society can play a major role. Involvement of NGOs, CBOs, SHGs etc. has become important in those areas where the traditional engineering departments do not have core competence.
- The role of the Gram Sabha has to be institutionalized to be able to obtain peoples participation in water management.
- The NRDWP and TSC should be administered in the State through a 3-tier Governance structure:
  - a. State level: A multi disciplinary Rural Water & Sanitation Management Organisation (RWASMO) at the State level in the shape of a Society registered under the Societies Registration Act.

- b. The Multi disciplinary District Water & Sanitation Mission (DWSM) for each district would report to the RWASMO.
  - c. The Block Resource Centres would report to the DWSM and work with the Managing Committees/ VWSCs for implementing water supply and sanitation schemes.
- PHEDs can be converted into Boards/Corporations with multi-disciplinary teams at State, district levels. Alternately the PHEDs can look after larger projects and PHED engineers be deputed to the multi-disciplinary organisation.
  - There is a case for merging the administrative departments of urban water supply and sanitation with that of rural water supply and sanitation in the new Ministry of Drinking Water and Sanitation.
  - Incentive fund for reforms - A fund should be created from which States will be given additional allocation to incentivise States for maximum investment in PWSS, adoption of Model DPRs and establishment of Rural WASMO. Completed schemes that recover adequate user charges to cover O&M cost should also be rewarded on the lines indicated in the full report.

#### K) REGULATION AND OVERSIGHT

- E-procurement should be introduced for rural water supply schemes in all States.
- Social Audit needs to be mandated by States for rural drinking water supply schemes.
- At the National level MDWS should engage independent experts as National Quality Monitors to submit reports to the State Govt and MDWS on deficiencies and suggestions for improvement. Similarly at the State level, State Quality Monitors should be engaged.

#### L) IEC AND HRD

- IEC for habitations affected with fluoride and arsenic etc. in drinking water and in LWE districts, should be taken up on the same scale as that of IEC campaign for HIV/AIDS & Pulse Polio Campaign.
- An entertainment feature film like “Manthan” by Amul should be produced by MDWS.
- For schools and Anganwadis, IEC should be strengthened for institutions, use of water testing kits (FTKs) taught, social mobilization through rally & door-to-door IPC etc.
- At least 2 days initial and regular refresher training for VWSC members should be ensured.
- National Key Resource Centres should be identified in all major States to provide continuous training and resource support.
- A one-time grant of Rs. 10-15 crores be given to each state to establish a State Resource Centres.

## M) ROLE OF CSOS

- Role of CSOs is also critical to bring about behavioural changes and to ensure equitable access of drinking water and sanitation. Through processes such as social audits and joint monitoring, CSOs can enable a dialogue between service providers and the user community to optimise the programme delivery.

## 4.3 RURAL SANITATION

Access to basic sanitation is a crucial human development goal. TSC was launched in the year 1999 as a community led programme and demand driven through effective IEC so that people would look upon sanitation as a felt need for their everyday life.

### 4.2.1 REVIEW OF PERFORMANCE IN THE 11<sup>TH</sup> FIVE YEAR PLAN

#### A) PHYSICAL PERFORMANCE

Physical performance is assessed by coverage against the district-wise projects proposed by the States of households, schools and anganwadis that require toilets and solid and liquid waste management projects, as reported by States on the online monitoring system. The cumulative progress against the physical objectives in respect of IHHL, school toilet and anganwadis has been 64.75%, 85.65% and 77.12% respectively as of August, 2011. Independent studies like the NSSO 65<sup>th</sup> Round Survey of 2008-09 that take usage of toilets as the parameter report it at 35% of the total households in the country.

#### B) FINANCIAL PERFORMANCE

As against the planned outlay of Rs. 7816 crore in the 11<sup>th</sup> Five Year Plan, the actual allocation was Rs. 6690 crore and expected utilisation upto the end of 11<sup>th</sup> Plan period is Rs.6300 crores. The savings were only in the first 2 years of the 11<sup>th</sup> Plan.

### 4.2.2 CHALLENGES IN SANITATION SECTOR

- i) Providing access to sanitation facilities to all households, schools and anganwadis in rural areas.
- ii) Bringing about behavioural change to ensure usage of facilities created.
- iii) Scaling up and capacity building of institutional mechanism for service delivery.

### 4.2.3 MAJOR RECOMMENDATIONS FOR THE 12<sup>TH</sup> PLAN

#### A) COMMUNITY SATURATION APPROACH:

A saturation approach should be undertaken with creation of Nirmal Grams by covering whole Gram Panchayats (GPs) through provisioning of Individual Household Latrines for every household alongwith Institutional and environmental sanitation, to ensure community sanitation outcomes especially in sectors of health including reduction in Infant and Mother Mortality Rates (IMR & MMR), malnutrition and burden of disease, reduction in school dropout rates, removal of gender inequalities in access to education and ensuring women's empowerment.

## B) PHASED APPROACH

Districts should be given flexibility in planning for community outcomes for IHHLs and Institutional coverage with focused fund flow to GPs having achieved identified milestones.

## C) CONJOINT PLANNING & EXECUTION OF SANITATION & WATER SCHEMES

Availability of water for sanitation is crucial for success of TSC. Priority should be given to whole GPs with functional PWSS in toilet construction, followed by toilet construction in ongoing PWSS that are nearest to completion. New PWSS should be taken up in GPs / villages of districts where IHHL coverage under TSC has reached higher milestones of coverage in a descending order, including Nimral Gram Puraskar awarded GPs.

## D) FUNDING

- TSC incentive funds may be routed to the GPs through State Water and Sanitation Mission (SWSM) and District Water and Sanitation Mission (DWSM) on basis of eligibility as per existing TSC Guidelines. The DWSMs would prioritise release of funds to GPs, based on performance milestones aiming at creation of whole GPs as Nirmal Grams. The DWSM should release funds for GPs based on following performance milestones on basis of conjoint approach to sanitation and drinking water so as to ensure incentives post construction and usage to the beneficiaries:

Installment	%	Stage
1 <sup>st</sup>	30%	Against passing of resolution to achieve ODF status
2 <sup>nd</sup>	30%	Achieving 50% of project objectives
3 <sup>rd</sup>	30%	Achieving 80% of project objectives
4 <sup>th</sup>	10%	On verification of 100% achievement of project objectives

- Incentives to be inclusive at realistic levels: The current incentive amount should be made more realistic at a higher acceptable amount so that toilets constructed are technically sound and sustainable. Moreover, for community outcomes, funding should not be restricted to only BPLs but made available to the entire community.
- Higher allocation for TSC: TSC suffers from inadequate funding. To achieve the goals of sanitation within the Plan period, considerable scaling up of funding is absolutely necessary.

## E) RESTORATION, OPERATION & MAINTENANCE:

Mechanisms must be evolved for identification and restoration of dysfunctional toilets to attain community outcomes, by VWSCs and these should be approved by the Gram Sabhas. Thereafter, while O&M of these and other completed functional toilets would be the responsibility of individual households, O&M of Community Complexes may be entrusted to GPs/VWSCs/ SHGs/ identified NGOs of repute etc. 10 % of District TSC fund should be earmarked for repairs and O&M

#### F) IMPLEMENTATION MECHANISM

TSC should be implemented at the GP level through identified Village Water & Sanitation Committees (VWSCs)/NGOs/CBOs by the DWSMs.

#### G) COMMUNICATION STRATEGY (IEC)

- Comprehensive region specific communication and information strategy should be finalized for demand generation and sustainability in the districts. Priority should be to inter-personal contact and motivation over publications etc. Office-bearers and members of GPs, VWSCs, BRCs, SHGs, Swachhata doots, women's and youth groups, school committees, Health, Education, SC/ST and other deptt. functionaries etc. should be involved for dissemination of information and effective communication. NGOs & CBOs of repute may be engaged for maximum results for individual contact, motivation and implementation and monitoring. Key Resource Centres must be identified within States/Districts for training of State/District level functionaries in IEC. State Sanitation Week/Fortnight must be celebrated to prioritise sanitation as a key goal for attainment.
- States/districts to have flexibility in IEC funding to GPs identified as per the 'conjoint approach' policy and for community outcomes. Guidelines should include IEC fund for State level activities and hand holding for a suitable time period even post NGP for which IEC fund may be earmarked.

#### H) FACILITATING CREDIT

For additional finance for toilet construction apart from incentive & Mahatma Gandhi National Rural Employment Guarantee Scheme (MNREGS ) arrangement for bank credit as an add-on should be available to the beneficiary. Credit facilitation may also be made available for bathing room alongwith toilet as per demand from which Ministry may promote toilet with bathing facility as an IHHL option. . The current Revolving Fund available at district level should be more effectively utilized with specific operative guidelines. Coordination and Liasoning with Banks with agreed specified conditions, to facilitate giving of loan by Banks to needy beneficiaries and SHGs/NGOs for sanitation purposes must be undertaken.

#### I) SCHOOL & ANGANWADI SANITATION:

School Toilets and child friendly Toilet units in Anganwadis must be taken up at District level with priority to GPs identified for saturation approach conjoint with water facilities under NRDWP. Ministries in charge of School Education and Women and Child Welfare should be asked to mandatorily ensure functional toilets in schools and anganwadis located in Government aided and private premises through capacity building of their functionaries.

#### J) INCLUSIVE APPROACH FOR VULNERABLE COMMUNITIES AND AREAS

Vulnerable communities like SCs, STs, PTGs, NTs, DNTs, HIV, physically handicapped and minorities apart from SC/ST should be brought under the ambit of financial assistance.

#### K) GOVERNANCE STRUCTURE

NRDWP and TSC should be administered in the State by establishing a 3-tier Governance with a dedicated Monitoring Directorate to be set up at National level. A multi disciplinary Rural Water & Sanitation Management Organisation (RWASMO) be set up at the State level to be headed by an All-India Service Officer. The District Water & Sanitation Mission (DWSM) for each district

should be a multidisciplinary body that would report to the RWASMO. A dedicated Group A level officer on deputation must head TSC at District level to plan, co-ordinate & implement activities Also, Block Resource Centres with a Block Programme Officer for Sanitation may be put in place. Jalsurakshak (Water) and Swachchhata Doot (Sanitation) at GP level should be encouraged.

#### L) CAPACITY BUILDING FOR REPAIRS/O&M

Local wage earners/SHGs must be trained in trades such as masonry work, brick-making, toilet pan making and plumbing under TSC/National Rural Livelihood Mission (NRLM). 'Nirmiti Kendras' may be set up for development and manufacture of cost effective construction materials. The existing Production Centres and Rural Sanitary Marts may also be considered in this regard to work on a business model.

#### M) CAPACITY BUILDING OF STAKEHOLDERS FOR IEC

State Resource Centres and Regional/District Resource Centres to be identified for conducting training. NGOs/CBOs of repute should be engaged. University Grants Commission (UGC) and other appropriate bodies may be contacted to introduce sanitation related Graduation and Post Graduation courses.

#### N) PRIORITIZING SOLID AND LIQUID WASTE MANAGEMENT:

Solid Liquid Waste Management should be prioritized by developing a clear roster of options. Convergence with MNREGA for effective implementation of SLWM should be made. Capacity building of PRI representatives and other stake holders on SLWM needs to be prioritized.

#### O) INCENTIVISING FIELD FUNCTIONARIES

Performance linked honorariums for Swachchhata Doots, ANMs and ASHA and Anganwadi workers should be introduced

#### P) CONTINUATION OF NIRMAL GRAM PURASKAR

Nirmal Gram Puraskar must be continued during 12FYP period. The award amount should also be revised so as to have sufficient incentive for the community to become ODF apart from other incentives.

#### Q) INTEGRATED HABITAT DEVELOPMENT SCHEME AS A SECOND STREAM OF TSC

State Rural housing schemes and Indira Awas Yojana (IAY) should essentially provide toilet and domestic water facilities within the houses. Solid and Liquid Waste Management (SLWM) also should be an essential component of these habitats. Funds for construction of toilets should be provided by MoDWS as a second stream under TSC and SLWM may be supported under MNREGS.

#### R) MONITORING & EVALUATION

Evidence based real time monitoring by MoDWS through IMIS should be adopted. Monitoring should track communities for achievement of total sanitation outcomes. Outcomes should also to be assessed through tracking of water-borne diseases through ASHA workers and independent assessments. Mandatory independent evaluation of programme once in two years by all States should be compulsory.

## S) MANDATORY REFORMS

- VWSC should be mandatorily a Standing Committee of GP to ensure community participation in planning, construction, operation and management. 22% fund utilization for SCs and 10% fund utilization on STs at State level should be ensured. Specific Monitoring mechanism for identified groups like SCs/STs/Minorities/Disabled etc should be implemented.
- Local Govts. should build up social norms against open defecation. State governments should be encouraged to introduce regulations making it obligatory for PRIs, and SHG members, all Government employees among others to build and use toilets at their residence.

## 4.3 FINANCING THE 12<sup>TH</sup> FIVE YEAR PLAN

- Besides own sources of funding by States and the Centre, finances for drinking water supply should be raised from other domestic and external sources.
- A separate piped water supply programme for assisting lagging States should be launched to meet their enhanced funding requirements to achieve the goals set out in this Report and the Strategic Plan of the Ministry.

Further the following need to be considered in the case of financing the TSC

- Scale of funding for TSC shall need to be scaled up vis-à-vis the 11<sup>th</sup> Plan to achieve the objective of Nirmal Grams.
- Appropriate incentivisation needs to be given for Individual Household Latrines (IHHLs) keeping in view actual cost of constructing a toilet to ensure construction of functional and sustainable toilet units. For community outcomes, funding should not be restricted to BPLs but made available to the entire community.
- Separate dedicated components under TSC for restoration of dysfunctional toilets including those affected by natural calamities, solid and liquid waste management, and a minimum programme delivery mechanism shall be necessary for achieving the goals of the Programme.
- Administrative component is proposed for increase from 5 to 9% to set up a minimum administrative structure for implementation of scheme that as of now is dependent on execution by Departments in States with large schemes that allow no dedicated manpower for TSC
- A total outlay of Rs 44114 crore as Central share for attaining goals as spelt out in this report has been envisaged, against which the States shall have to contribute the State share of Rs 14600 crore, that is one third against total allocation to be made by the Centre.
- A total outlay of between Rs. 3,31,091 (2,72,377 + 58,714 crore) and Rs.3,61,879 (3,03,165 + 58,714 crore) is suggested for the 12th Five Year Plan for Rural Domestic Water Supply i.e. for all the components of National Rural Drinking Water Programme (NRDWP) including that for lagging states and for rural sanitation TSC. At the macro level this level of funding appears to be within the feasible range. The total planned investments by Centre and States under the XI Five Plan is about Rs. 1,10,000 cr. including NRDWP, TSC, State Plan funds, Finance Commission grants and external assistance.

PLAN OUTLAY IN THE 10<sup>TH</sup> AND 11<sup>TH</sup> FIVE YEAR PLANS  
(Rural Domestic Water (NRDWP) + Rural Sanitation (TSC))

Period	Central Outlay	State Outlay	Total Outlay	Percentage increase over previous Plan
10 <sup>th</sup> Plan(2002-07)	18,424	15102	33,526	
11 <sup>th</sup> Plan(2007-12)	47,966	49,000	96,966	289%

The increase in the 11<sup>th</sup> Plan outlay is 289% over that in the preceding Plan. While the Central outlay increased by about 260%, the State outlay increased by much more namely, 324%. Looking at the It is therefore feasible to invest about 275%-300% higher outlay in the Rural Drinking Water Sector in the 12<sup>th</sup> FYP given the necessary demand.

RECOMMENDATION OF FINANCIAL OUTLAY FOR 12<sup>TH</sup> FIVE YEAR PLAN

A total outlay of between Rs. 3,31,091 crore at state specific per capita costs of piped water supply and Rs. 3,61,879 crore at a uniform per capita cost of Rs. 3600 for water supply, is suggested for the 12th Five Year Plan for Rural Domestic Water Supply and TSC, including the component of National Rural Drinking Water Programme (NRDWP) for lagging states, Special Component for Scheduled Castes and Scheduled Tribes, Support activities and Sustainability, Nirmal Gram Puraskar etc. The Central outlay taking the lower outlay of Rs. 3,31,091 cr. would be about 50% i.e. Rs. 1,66,684 cr. (1,22,570 + 44,114) This would be about 352% of the actual allocation in the 11<sup>th</sup> FYP for the sector. The State outlay would be 1,37,170 cr. i.e. a similar increase. This would be feasible for States also considering the increase in the 11<sup>th</sup> Plan over the previous Plan.

# **CHAPTER 5 – WATER DATABASE DEVELOPMENT AND MANAGEMENT**

## **5.1 INTRODUCTION**

As part of the preparation for the XII Plan the Planning Commission decided to constitute, for the first time, an expert group to review the present system of collection and dissemination of water-related data and to suggest improvements. The 17-member Working Group (WG) consists of eight senior officials from the CWC, CGWB, NIC, WRD Government of Maharashtra and principal Government research organizations dealing with water-related issues. The rest are non-official experts from academia and non-Governmental research institutions.

The deliberations were structured around the following major themes:

- agro-meteorological data and water resources potential from rainfall, surface and groundwater
- current utilization of water from different sources and for different uses
- impact on end uses
- major gaps in current data relating to the last two aspects and measures to fill them;
- broader issues of organization and structuring of a comprehensive and integrated National Water Resource Information

On each of these the WG has reviewed the existing institutional arrangements, the extent to which data generated are adequate to meet the requirements of planning and policy, identified deficiencies and gaps (in terms of scope, coverage and reliability) and provided concrete suggestions to remedy them over the long run and specifically during the XII Plan.

## **5.2 AGRO METEOROLOGICAL DATA**

The source of all renewable water resources by way of natural recharge of soil moisture and groundwater or the volume of surface flows is rainfall. The volume of precipitation and its distribution over the year and the extent to which surface and groundwater are utilized for irrigation, taken together with other elements of climate (temperatures and sunshine) are critical determinants of the natural vegetation as well as the production of crop and non-crop biomass.

Data on rainfall and other aspects of climate are collected by observatories maintained and operated by IMD as well as the CWC, State Governments, and numerous non-Governmental organizations. Observatories have grown in number and the quality of instruments used has also improved. But these are not adequate to provide reliable and validated estimates, especially at the sub-district level, because of the inadequate density of the observatories, variable design of the instruments, and care with which observations are made and validated.

We have made some suggestions for studies to assess the correspondence of time series of rainfall in different regions based on IMD and non-IMD observatory data; and of the probable margin of

errors in estimates of precipitation in high-rainfall upper catchments and the difference this can make to estimates of mean rainfall for the basin.

A major effort to expand and upgrade the network of observatories using up-to-date technologies is essential. In order to build an optimal network, we recommend that during the XII Plan the number of automatic telemetering rain gauges be increased from the present 10,000 to over 60,000 and also the installation of 60 Doppler Weather Radars. Such a system will drastically reduce problems in collection and transmission of rainfall data inherent in the current system. It is however important that this National network be built and operated as a cooperative effort between IMD and the States.

Besides rainfall, data on several other climatic variables (temperature, humidity, sunshine and radiation) are needed, though not on as large a scale as for rainfall. The number of climate stations equipped to collect these data needs to be increased taking into account the level of spatial detail required and the costs.

Techniques and methodology for estimation of potential evapo-transpiration (PET) and soil moisture – critical parameters for preparation of water budgets for basins and projects, and estimating crop water requirements – need to be improved. IMD has lysimeters for direct measurement of Evapotranspiration (ET) at some 219 centers and the CWC at several reservoir sites. The number of centers with these devices needs to be expanded and their equipment modernized in a phased manner. Database on ET should include direct measurements from micro met towers of ISRO and CSIR.

IMD should continue to provide estimates of PET for different agro-climatic regions and sub-regions using empirical formulae. We recommend that in future the Penman method recommended by the FAO be used for this purpose, calibrated on the basis of systematic comparison of direct measurements in selected centers and formula-based estimates in the contiguous regions. The potential of satellite-based approaches for the estimation of ET also needs to be seriously explored.

### **5.3 WATER RESOURCES POTENTIAL**

In the 1950s, A.N. Khosla, who headed the then newly constituted Central Water and Power Commission, used an empirical equation relating surface run-off to rainfall and evaporation (postulated as a function of temperature) to estimate average annual water resources potential in six regions. Subsequently, the CWC sought to assess the water resources potential in major basins. Studies based on statistical analysis of flow data wherever available and rainfall–run-off relations were done for 23 basins and sub-basins between 1952 and 1966, and for some major peninsular rivers and the Ganges and Brahmaputra basins during the 70s. At that time the needed data on rainfall, terminal discharge observations, and validated rainfall–surface flow relationships were limited.

In the early 90s, the conceptual framework for assessing water resources availability for several basins was refined on the basis of observed outflows at the terminal site for upstream extraction of surface water, reservoir evaporation and return flows, and taking explicit account of the contribution of groundwater recharge and interactions between surface and groundwater. For some large basins, estimates adopted by tribunals ((Narmada, Godavari, Mahanadi and Cauvery) and those based on special studies (Ganges and Brahmaputra) were used. Subsequent reviews by the NCIWRD and an internal group of the CWC followed the same procedures and more or less endorsed the 1993 estimates of the country's water potential. In any event, the estimates of

overall water resources potential for the country made at different times have remained more or less the same.

The CWC is currently engaged in a joint project with NRSC to develop and test a water balance approach using remote sensing data for assessing overall water potential in two basins. It is also important to undertake rigorous analysis of rainfall–run-off relations in different regions using up-to-date data, ensuring that estimates of upstream extractions are based on reliable measurements, conducting systematic surveys to determine the magnitude of groundwater actually pumped, consumption for various non-agricultural uses, and other components of the balance equation. The problems involved and ways to address them are discussed in the report.

### ***5.3.1 UTILIZABLE RESOURCES***

Estimates of overall water resources potential cover both surface flows and groundwater. Though these two sources are interrelated, estimates of their individual contributions, both overall and to utilizable volumes, are made independently by the CWC (for surface water) and the CGWB (for groundwater). Since interactions between these sources are significant, the sum of these two estimates cannot be taken as a measure of the total volume of available and utilizable water resources. It is essential that this exercise be done jointly by these two bodies.

### ***5.3.2 SURFACE FLOWS***

The CWC estimates the potentially utilizable volume of surface water in the country at 690 BCM. This is the same as shown in the 1976 report of the National Agricultural Commission and in subsequent exercises undertaken by the CWC in 1988 and more recently in 2001. The estimates for most major basins made at different times have also remained more or less the same.

The WG was unable to locate any document explaining the basis for estimating utilizable flows. Reference was made to an early CWPC exercise based on a detailed study to identify potential storage sites and their capacities in all major river basins and their sub basins. These studies are no longer traceable. Nor do they find any mention either in the Irrigation Commission report or in any accessible CWC documents on water resources assessments.

The latest (2001) estimates of utilizable potential for major basins are reported to be based on the expected requirement for various end uses in 2025; estimated surface flow at 75% dependability, and in some cases tribunal awards. This exercise has also been done at the sub-basin level with a view to ensure equitable distribution of available water between regions where supplies exceed project requirements and those which face a deficit or are drought prone.

The limitations of these estimates have been highlighted in our report. Strong pressures for wider diffusion of irrigation in backward regions have led to a huge overhang of unapproved projects, enormous delays in completing the projects and realizing their design potential. It cites growing concerns about the current neglect of the role of rivers and river systems in maintaining a healthy environment, the social and environmental impact of large storages and of the controversial proposals for inter-basin transfers.

These concerns and the widely recognized fact that the country is facing an increasingly serious water crisis, underscore the importance and urgency of a rigorous and transparent review of the methodological and empirical basis for assessing utilizable potential of surface water and for techno-economic evaluation of projects in a professional and transparent manner to ensure equitable, sustainable and economical utilization of the available resources. We strongly

recommend that the Planning Commission entrust these tasks to a group of knowledgeable and independent professionals with expertise and experience in water resources development in a broader and longer-term perspective.

### **5.3.3 GROUNDWATER**

The CGWB is the principal agency responsible for assessment of groundwater potential and its exploitation in the country, as well tracking trends in its utilization. It has done a considerable amount of work to develop, test and refine the conceptual framework and estimation procedures for this purpose. It has assessed the volume of renewable groundwater resources generated by direct recharge from rainfall and indirectly on account of lateral seepage from rivers, streams, water bodies and canals.

These estimates are based on field studies of recharge rates under different agro-climatic and geological conditions. In addition, the CGWB (along with the State Boards) monitors the behaviour of water levels in over 50,000 observation wells across seasons and over the years. Studies on a more limited scale are being done on the estimation of several other aspects (delineating and mapping of aquifer disposition, specific yield, extraction rate, and groundwater quality) relevant for groundwater potential and use. Based on these data, estimates of groundwater potential and utilization as well as secular trends in water-table levels are estimated and mapped at the block level.

The report highlights the need for improvement in both methodology and empirical basis for several aspects of estimation of groundwater potential. It has made a number of detailed recommendations to address these deficiencies during the XII Plan as part of a phased long-term program. Following are the main areas that need attention. Details are spelt out in the report.

- Prepare a comprehensive plan for mapping the geometry, boundary and depth of aquifers, determined with an uncertainty less than 10%, using a conjunction of state-of-the-art geophysical technologies. Develop methodologies for micro-level mapping of aquifers under ongoing pilot projects and further downscaling of maps to 1:50,000 scale.
- Analyse existing data from sub-surface explorations, geophysical surveys and logging data available with different agencies and detailed information on well characteristics from the Minor Irrigation Census, to delineate major aquifer systems. Data gaps to be filled with various geophysical techniques to get continuous data of subsurface disposition.
- Obtain knowledge of the characteristic properties (flow and transport) of the aquifer, e.g. permeability/transmissivity, specific capacity, dispersion coefficient, storage coefficient using up-to-date methodologies covering the various geophysical, geo-hydrological and geo-morphological aspects.
- Periodic specific yield determination using multiple methods to be made at the level of assessment units.
- Monthly groundwater-level data at an optimally distributed network of ~100,000 monitoring wells in the country to be generated, of which 20% be equipped with digital water-level recorders (DWLRs).

- Use multiple methods to estimate rainfall–recharge relationship. Estimates to be made for all agro-climatologic zones and updated periodically (3–5 years). Periodical evaluation of the estimation methodologies and parameters necessary.
- Groundwater-level data along canals and around other storage structures together with the respective surface water-level data are needed for the determination of seepage factors.
- Assessment of groundwater draft requires comprehensive studies of spatio-temporal variability across various assessment units or even sub-basins.
- The CGWB and the State groundwater departments are to be strengthened with high-resolution water quality labs to serve as cross-verification and validation from other laboratories.
- It is necessary to explore ways to increase the capacity for such assessment at the micro-watershed community level. Both rigorous studies using up-to-date scientific techniques by academic institutions (like IISc) and efforts by NGOs to promote local institutions/groups involving Panchayati Raj Institutions, local urban/rural bodies for local-level planning and management should be encouraged in more locations on a selective basis.

## **5.4 WATER UTILIZATION BY SOURCE AND USE**

### ***5.4.1 RAINWATER***

Discussions of water resources availability and use focus mostly on surface flows and groundwater. Very little attention is given to the contribution of rainfall, which is the sole source of water for all uses in un-irrigated areas and a significant source even in irrigated areas. That more effective use of rainfall is necessary to increase water availability for domestic and agricultural uses in rainfed areas is widely recognized, and is in fact the rationale for the integrated watershed development program.

It is therefore important to know the extent to which local rainfall is effectively utilized, the potential for augmenting the proportion that can be harnessed for local use, and the efficacy of various programs being implemented for this purpose under different agro-climatic regimes.

Government and academic institutions as well as NGOs should be encouraged and supported to correct this lacuna by conducting properly planned and scientifically rigorous studies in selected watershed communities typical of different agro-climatic regimes. We strongly recommend that this must be taken up as a program of high priority during the XII Plan.

### ***5.4.2 SURFACE WATER***

The responsibility for the regular upkeep and proper maintenance of the various measurement and gauging systems for maintaining daily records of the measured volume of water released into their canal systems is left entirely to functionaries of the State Governments.

Functionaries responsible for managing all major and medium water resource projects and the CWC have done much to provide technical and financial assistance to set up instrumentation for the projects. The CWC regularly monitors the storage position of only major reservoirs, but not actual deliveries.

Arrangements to ensure observance of prescribed protocols of record-keeping and reporting are variable and on the whole quite lax. The States are reluctant to make the data available to the Centre, despite the fact that it is authorized in law to require the States to furnish the data and to check their accuracy.

The CWC is therefore, unable to compile validated estimates of gross utilization from all major and medium projects on a regular basis. Such estimates are published for some years without details of their basis, coverage and accuracy.

The position with respect to minor works is much worse. Periodic censuses of minor irrigation works give some idea of their nature, size and spatial distribution, and of the area irrigated. But nothing is known about the volume of water supplied by them for various uses. They may account for a relatively small proportion of surface water use, but are the lifeline of hundreds of thousands of villages.

There is considerable concern about their deteriorating conditions and reported decline in area that they irrigate. Little is known about the impact of programs for their expansion and modernization in checking these trends. We have underscored the importance of undertaking special surveys periodically to monitor these aspects on a regular basis.

In order to expand the observation network at National Level, the Group recommends setting up of additional observation stations and strengthening of the existing CWC observation network to meet data gap as well as to prepare for climate change adaptation which require more intensive data both in terms of quantity and quality. The expansion of CWC hydrological network would invariably require restructuring of CWC. The Group is also of the view to strengthen the present WRIS being implemented by CWC. Based on the discussion in the Working Group meetings and the observations of the Group, CWC has prepared a detailed proposal which includes strengthening of Hydrological data network, Coastal management information system, NWRIC, Satellite based monitoring of reservoirs amounting to Re. 3850 crore. The details of the proposal are included at relevant section of the main report.

### **5.4.3 GROUNDWATER**

In the case of groundwater, the present method of estimating extraction is based on the number of wells/tube wells as reported in the Minor Irrigation Census and assumptions about unit draft. In the absence of any systematic survey, it is not clear whether they capture variations in the volume pumped per year per well across different types of wells in different regions. Besides, these characteristics are changing significantly and rapidly. Ideally, we need reliable estimates of end use (disaggregated by industrial, agricultural and domestic uses) and their temporal variations at the level of assessment units.

For this purpose it is necessary to adopt a differentiated strategy to collect and validate the data for different kinds of wells across regions and those used for irrigation, domestic and commercial uses, and by different categories of industry. The only way to get reliable estimates of actual groundwater extraction is through sample surveys of all types of wells in rural and urban areas, distinguishing between wells which are primarily for irrigation as a sole source and used conjunctively with surface water, and those which are used primarily as a sources of domestic, commercial and non-agricultural uses.

The design and conduct of such a survey covering all regions is urgently needed both to assess the volume of water they supply and to assess the extent of lowering water table over time. We

strongly recommend that this be undertaken during the XII Plan. Assessing trends over time requires that such surveys be repeated periodically.

#### ***5.4.4 USES NOT COVERED BY THE ABOVE***

Water supplied by canals is not used only within their designated command. Considerable volumes are used outside the command area. Pumping of flowing water in rivers and streams, and ground water from river beds is quite widespread. Much of this is unauthorized and therefore, is likely to go unrecorded in the official statistics.

In order to assess their extent, we suggest a two-stage approach. (i) First identify locations of pumping sites along all major rivers and map the extent of irrigated area outside of but contiguous to major canal commands using satellite imagery. (ii) This is to be followed by a field survey of areas in a sample of identified locations to verify whether they are authorized, and assess the quantum of water extracted by them.

This is a challenging exercise for which we suggest that pilot studies of a few select rivers or river stretches be taken up in the XII Plan and extended later in the light of their experience.

#### ***5.4.5 WATER CONSUMPTION BY END USE***

Estimates of current and projected water consumption suffer from even more serious limitations. These are not based on measurements of actual use, but on the assumption that estimated gross utilization from irrigation projects is used entirely in agriculture; and for non-agricultural uses on the basis of norms of desirable levels of consumption for domestic use and limited data on requirements per unit of output for industries and power.

Future requirements for agriculture are related to expansion of irrigated area required to meet targeted levels of output; requirements for domestic use are estimated by applying norms of per capita use to the projected growth of the population; those of industries and power presumably are linked to the projected growth in their outputs.

All these estimates relate to gross volume of water used by different sectors: effective consumptive use is much smaller and the balance, which forms a substantial part of gross use, returns to the hydrological cycle as wastewater or non-consumptive evaporation. Besides underscoring the importance of distinguishing between gross use and net consumptive use, we have suggested more direct ways to estimate these aspects.

Reliable region-wise estimates of consumptive use by crops can be made on the basis of area under different crops and seasons, crop patterns on irrigated and rain-fed lands and estimates of their respective evapo-transpiration. We have recommended that this approach should be used to generate, on a continuing basis, seasonal and annual estimates of consumptive use in agriculture. Such studies should be initiated in the XII Plan using validated data on crop patterns and with appropriate refinements in the empirical formulae for estimating crop water requirements.

For other sectors, the only way to get reliable estimates of gross usage and the purposes for which they are used is through properly designed sample surveys of different categories of users (rural and urban households, commercial establishments, different industries and power generation). We recommend that the design and conduct of such surveys, on a scale that would generate reliable estimates at the State and National levels, should be taken up during the XII Plan.

## **5.5 IMPACT OF IRRIGATION ON AGRICULTURE**

### **5.5.1 IRRIGATED AREA AND PRODUCTION**

Irrigation impacts agricultural production by expanding irrigated area, raising cropping intensity, and increasing productivity of land through changes in crop patterns and higher yields per hectare of individual crops. Official statistics of land use and crop patterns is based on village-level records, and crop yields on the basis of sample surveys. Though comprehensive in coverage and level of crop and regional detail, the quality of data generated by this system (in terms of coverage, reliability and timelines) leaves much to be desired.

Efforts to restructure the arrangements for collection of land use and cropping statistics at the village level to make it more manageable have not been effective. Nor has the carefully designed scheme of sample surveys for estimating yields of major crops. There are considerable unexplained differences between the official estimates of land use and irrigated area at the State and National levels, and those generated by the National Sample Survey and the Planning Commission.

The deficiencies in the working of the existing system and the measures needed to address them have been reviewed recently by a committee constituted by the Department of Agriculture and Cooperation, Ministry of Agriculture. Implementation of their recommendations—which is currently in process – will provide reliable and objectively validated data on land use, cropping and yields and will become available in sufficient detail at the State and National levels. That would vastly improve the quality of data needed to assess the impact of irrigation in different dimensions at a macro level on a continuing basis.

This however needs to be supplemented by more detailed and in-depth surveys of both rainfed lands and areas irrigated by different kinds of projects – major and medium surface systems, minor surface works, and wells/tube wells. The purpose of these surveys is to provide comprehensive data on all important technical and operational aspects of water utilization and impact from different types of projects in different regions and river basins. These surveys, which would provide benchmarks to be tracked by repeating them at regular intervals in subsequent periods, should be launched during the XII Plan.

The systems to be surveyed, the scope and content of the surveys and their methodology should be decided by a Steering Committee comprising official and non-official experts in relevant disciplines under the auspices of the Planning commission.

Besides working out these details and formulating operational guidelines to be followed in the surveys of all selected locations, the identification of official agencies and non-Governmental research institutions for undertaking field work, the criteria for screening and selection among them and the MoUs laying out the terms and conditions of the contract with them, and the arrangements for supervision and inspection of field work should also be vested with the Steering Committee.

### **5.5.2 WATER USE EFFICIENCY**

The above improvements would provide a better basis for assessing the impact of irrigation, overall and by the type of projects under different conditions of cropping intensity, crop patterns and yields. Alongside it is important to conduct studies to assess the water use efficiency in different regions under irrigated and rainfed conditions in terms of: (a) the proportion of total

water applied that meets the consumptive use requirements of crops; and (b) overall crop production and of individual crops per unit of consumptive use.

We have cited studies, based on available data that seek to assess technical efficiency at the level of groups of major river basins and of productive efficiency in irrigated and rainfed areas at the level of agro-climatic regions. They leave much room for improvement using more detailed and reliable data now available along the suggested lines. Sustained research to improve the methodology and empirical basis for assessing water use efficiency is essential and should be actively encouraged and supported.

## 5.6 IMPLEMENTATION OF RECOMMENDATIONS

Successful implementation of the program requires active support from the highest levels of the Planning Commission and agencies responsible for water resources development. Data improvement should be viewed as a National effort of the Centre and the States, with the Central Government taking the lead in working out protocols and procedures for collection and validation of data by all agencies, creating appropriate institutional arrangements to ensure independent and professional conduct of the surveys, providing financial and technical support to the States and ensuring that all agencies follow prescribed protocols and transmit the data to the central pool.

To handle these tasks in a coordinated way and with a broad perspective, we suggest the constitution of a Steering Committee chaired by the Deputy Chairperson of Planning Commission (or the member in charge of water resources) with senior professionals from Central and State agencies, and from academia and research institutions.

An outlay of Rs. 8050 crore would, on an approximate estimate, be required for implementing the aforesaid recommendations for suggested program for the XII Plan. This includes Rs 3862 crore for improvement of surface water data by CWC, Rs 1445 crore for improvement of groundwater data by CGWB, Rs 2241 crore for improvement of Agro-met data by IMD and Rs 500 crore for surveys & sponsored research. The details are given in the Table below:

**Table: Proposed Outlays for XII Plan for Data Improvement**

(Rs. in Crores)

Sl. No.	Activity	Outlay
<b>A.</b>	<b>IMPROVEMENT OF SURFACE WATER DATA (CWC)</b>	
I.	Expansion and modernization of hydrological observations, including snow hydrology, water quality and monitoring of glacial lakes	3300
II.	Coastal Management Information System	180
III.	Strengthening of monitoring unit in the CWC for AIBP-assisted projects and to assess irrigation potential by remote sensing techniques	170
IV.	NWRIC	100
V.	Water Quality Assessment Authority	60
VI.	Up-gradation and modernization of IT and Library Information Bureau	23

Sl. No.	Activity	Outlay	
VII.	Telemetry-based monitoring of reservoir level and live storage	24	
VIII.	In-house data bank and Online Information System	5	
<b>Sub-Total (A)</b>		<b>3862</b>	
<b>B.</b>	<b>IMPROVEMENT OF AGRO-MET DATA (IMD)</b>		
1	ARG 40,000 @ Rs 2.00 Lakh each inclusive of maintenance (2500 stations of IMD shown here but accounted in their XII FYP proposal)	800	
2	Data management, computer hardware etc. & Training	85	
3	DWR 43 No, including maintenance and processing facilities (Accounted for in IMD XII FYP proposals)	1300	
4	<ul style="list-style-type: none"> <li>• 130 Lysimeters (ET) @ Rs. 5 lakh each station</li> <li>• 620 Soil moisture @ Rs 8 lakh each station</li> </ul> including maintenance Accounted for in IMD proposals	6.5. 49.6	
<b>Sub-Total (B)</b>		<b>2241.10</b>	
<b>C.</b>	<b>IMPROVEMENT OF DATA ON GROUNDWATER (CGWB)</b>		
1.	Expansion of observation well network	50,000 wells	1075
2.	DWLR with telemetry	10,000	150
3.	Continuous monitoring of water level in observation wells	40,000	10
4.	Determination of aquifer parameters and specific yield in aquifer units	500	30
5.	Assessment of groundwater utilization in 6000 assessment units and 12000 clusters		150
6.	CGWB sponsored R&D studies in different agro-climatic zones		30
<b>Sub-Total (C)</b>			<b>1445</b>
<b>D.</b>	<b>SURVEYS AND SPONSORED RESEARCH</b>		<b>500</b>
<b>Grand Total</b>			<b>8048</b>
<b>Say</b>			<b>8050</b>

**Note:** In addition to above, outlay for aquifer mapping has been proposed by 'Working Group on Sustainable Ground Water Management' constituted by the Planning Commission (Chapter 2).

The suggested outlay on data improvement amounts to barely 4% of this total plan outlay for the water sector. It is necessary to begin to make up for past neglect to build an adequate and reliable database and objective analysis of high professional standard for planning and policy.

The real challenge is not so much finance as in devising effective institutional arrangements and ensuring trained personnel to implement the programs. The following are the crucial tasks that need to be tackled:

### ***5.6.1 DATA COLLECTION FOR ASSESSMENT OF WATER POTENTIAL AND USE***

Central nodal agencies should articulate a common framework of scope, concepts and instrumentalities for collection and collation of data for assessing water resources potential and utilization from different sources and for different uses. They should also lay down procedures and protocols to be followed by all agencies and ensure that they are in fact observed by these agencies, including non-Governmental agencies. Concerned official agencies and non-official experts should work in collaboration to evolve a coherent overall framework mindful of the complex interrelations between different aspects.

Compliance by the States, which will continue to collect much of the primary data, is particularly important. Their reluctance to ensure strict observance of protocols and provide complete and validated data to the central pool has been a problem. The Centre must persuade them about the importance of their cooperation in this respect. Besides incentivizing them to do so (by funding the cost of installing and operating upgraded physical infrastructure and training of personnel), the Centre must assert its authority under existing law to require the States to provide the data specified by it and to verify their validity.

The proposed program requires significant up-gradation of skills of the existing staff of both Centre and the State at the ground level. Ensuring adequate number of trained staff is the other important requirement. Effective use of more sophisticated instrumentation on the scale proposed in the report calls for a significant increase in the number of staff with higher order of training and skills than is currently available, and facilities for its proper maintenance and repair. Central nodal agencies must make an in-depth review of the requirements and work out an operational plan to meet them.

### ***5.6.2 SAMPLE SURVEYS***

Available data for assessing trends in land use, crop patterns and crop yields are quite inadequate in terms of both coverage and reliability. Restructuring of the existing system for generating these data is in urgent need of a thorough reform. We have endorsed the recommendations of the expert committee for improvement of agricultural statistics for such a restructuring to get objective and validated estimates at the State and National levels.

In addition, we have suggested sample surveys to provide: (a) comprehensive data on all important technical and operational aspects of water utilization by source and for different uses and their socio-economic impact of different types of projects, and (b) reliable estimates of consumption of water for non-agricultural purposes in different regions and river basins. These are meant to provide a benchmark of the current situation, against which changes over time are to be tracked through periodic resurveys of the same projects and locations.

The actual surveys will have to be entrusted to the Government and non-Governmental research institutions with interest and experience in such studies. It is important to have an institutional arrangement for the proper conduct of these surveys through a network of research institutions using well-defined common concepts and methodologies to ensure comparability across regions and over time. In order to track trends over time, the surveys of selected projects/regions should be repeated periodically.

They should be planned as a National effort with the Central Government taking the lead in providing adequate and assured funding for these surveys and creating appropriate institutional arrangements to ensure independent and professional conduct of these surveys.

We suggest the constitution of a high-power Steering Committee in the Planning Commission to work out the modalities of organization and funding of the program, deciding the criteria for screening and selection of institutions for conduct of the surveys, MoUs laying out the terms and conditions of the contract with them, and the arrangements for supervision and inspection of field work.

The scope, objectives, design and field procedures and validation must be the same for all basins and regions for each survey theme to be worked out by specialist sub-groups and Steering Committees set up by official and non-official experts in relevant disciplines.

We recommend adoption of the structure and processes evolved by the National Family Health Survey as being appropriate for the survey program, and one which would help create and nurture an interactive and collaborative research network for sustained research on water-related issues.

### **5.6.3 RESEARCH**

Our recommendations, if implemented, would generate far more data of wider scope, greater reliability and detail than are currently available for assessing water resources, their use and impact; tracking trends in the use of water from different sources and for different purposes and policy, program and project planning at different levels based on rigorous and objective analyses. But in order to exploit this potential it is necessary to strengthen interest in, and in-house capability for, such analysis as the basis for decision making in Government agencies at both the Central and State level.

Equally important, Government agencies must do a lot more to encourage both Government and non-Governmental research institutions and scholars to use the data for research on specific issues and operational problems of current concern and longer-term strategic issues of more basic scientific interest. This can be, and needs to be, done in several ways.

1. Commission experts from research institutions as consultants to provide analysis and advice on technical aspects relating to the design of particular projects or problems relating to particular regions.
2. Sponsor similar research projects but of broader scope and focusing on a class of problems of interest to each agency.
3. In select areas that call for a multi-disciplinary approach, undertake collaborative projects with other Government agencies and with participation from invited outside experts.
4. Prepare a program of research on selected themes, invite proposals from interested researchers/institutions, and select projects to be funded based on an independent review process.
5. Give liberal access to all available data on all aspects to interested researchers, leaving them free to explore themes/issues of their interest.

Our report has indicated numerous issues on which rigorous and sustained research is needed.

In order to facilitate research, it is important to ensure that all primary data collected by field agencies of all departments be digitized and transmitted to a pool at the State and National levels. Collations at the higher levels have to be selective and less detailed in terms spatial and time coverage. But they should form part of an integrated and interlinked system which permits details to be accessed at all levels. While individual agencies may have their own computerized data networks, the creation of such a platform is therefore essential.

The current program of the WRIS unit of the CWC is not equipped to handle this task. Its scope is limited. Even within the areas it seeks to cover, the coverage, reliability and details of data being collected are inadequate, and there are difficulties in getting other agencies (including especially the states) to report all the data they collect. We strongly recommend the proposal to set up a special, professionally managed and autonomous National Water Resources Information Centre. The organization has to be much larger, staffed by trained professionals specialized in relevant fields, and become a continuing activity.

The expansion in scope and detail of the platform, training programs and in-house research needs to be prioritized in terms of importance and feasibility. We suggest the constitution of a National Advisory Committee on Water Data Base, comprising experts in the design of digitized databases, professionals from the data-generating and using agencies within the Government, and experts from academic and research institutions to recommend (a) the scope and content of the data to be included; (b) technical aspects an appropriate design of the website; (c) the scale and composition of the staff in terms of professional qualification and training; (d) the organizational and managerial structure of the organization, and (e) a program for training of professional manpower and arrangements for implementing it based on a prioritized and phased expansion of the scale and scope its activities. It needs, however, to be planned carefully and implemented in a phased manner as the new data system begins to deliver and the staffs with professional skills in designing and managing a large and sophisticated system are trained. Besides professionals from agencies generating the data, it is important to involve outside experts knowledgeable about interconnections between different aspects of water resources in the design and management of the platform.

# CHAPTER 6 – URBAN AND INDUSTRIAL WATER SUPPLY AND SANITATION

## 6.1 INTRODUCTION

The Working Group on Urban and Industrial Water Supply and Sanitation has met to deliberate on the critical challenges of this sector and has suggested the way ahead. This report focuses on one aspect of its task – urban water and sanitation.

### *CRITICAL CHALLENGES*

- i) The public health implications of unclean water are enormous and unacceptable. The country is on a deadly spiral -- on the one hand, water scarcity is growing and on the other, water is getting increasingly polluted, which is further increasing the cost of treatment or leading to increasing deaths and illnesses.
- ii) Urban and industrial India will have huge implications on the use of water and discharge of waste. While it is well understood that the growth of cities and industries is inevitable, what is not understood is that this growth will have massive implications on the use of water and discharge of waste. In most parts of the industrialized world, water use is primarily in the industrial and urban sectors and in India this is also bound to grow.
- iii) The issue of allocation of water resources between rural and urban India needs to be addressed in ways that reduce intra-national tension. The growth of urban-industrial sectors will demand water. This 're-allocation' of water between areas becoming urban and those remaining rural may lead to conflict. Water, as much as land, will be the biggest impediment for urban growth and this demands careful consideration of new-age policies in these sectors.
- iv) Policy planning is happening today without any real numbers of the use of water in different economic sectors. The last estimation of water use was done in 1999, which had predicted that cities and industries would use some 15 per cent of the total water use by 2025. There is a need for re-assessment of water needs of different economic sectors.
- v) The system of estimating demand and supply of water in cities is rudimentary and leads to poor accounting and poorer planning. Indian cities compute demand by simply multiplying the population (as known) by an estimate of water demand per capita (as understood). This leads to huge variations between cities in terms of how much water needs to be supplied. The guidelines provided by the Central Public Health and Environmental Engineering Organisation (CPHEEO) are used at times by city planners, but these often fail to provide clarity about how much water is needed. Therefore, cities have poor accounts of their water need assessments. They are planning for water augmentation – which is then funded through expensive schemes – without this critical information.
- vi) The quantum of water that is supplied is not the problem; the problem is its management and equal supply to all. In most cities, water supply is sourced from long distances. In this system of bringing water from far and in distributing it within the city, the length of the pipeline increases, as does the cost of infrastructure and its maintenance. In the current water supply system, there are enormous inefficiencies—losses in the distribution

system because of leakages and bad management. But equally, there are huge challenges, for water is divided between poor and rich India. Even today, in all the cities there is a huge gap, not just in the demand and supply in the water. There is a huge gap in the supply within the city, which some parts getting all, others getting none. Water is needed in the city, but it must also reach everybody in the city and not just a few.

**Access to drinking water: according to Planning Commission**

City/town population	Average access to drinking water (%)
Class I (100,000 and above)	73
Class II (50,000-99,999)	63
Class III (20,000-49,999)	61
Other cities (<20,000)	58

Source: GOI 2007, Eleventh Five-Year Plan, Planning Commission, New Delhi

**Urban water sources: NSS**

Major source of drinking water	49 <sup>th</sup> round: 1993 (%)	58 <sup>th</sup> round: 1998 (%)	65 <sup>th</sup> round: 2009 (%)
Bottled water			2.7
Tap	70.4	73.6	74.3
Tubewell/ handpump	18.5	19.6	17.5
All well	8.6	5.1	3.3

Source: NSS 2010, Housing Condition and Amenities in India, 2008-2009, NSS 65<sup>th</sup> Round, July 2008-June 2009, National Sample Survey office, GOI, November

- vii) The quantum of water that is lost in distribution is a serious problem. This must be the focus of future policy and plans in cities. Currently, cities estimate that as much as 40-50 per cent of the water is 'lost' in the distribution system.
- viii) The length of the pipeline adds to distribution losses and financial costs. This cost is not computed or understood when cities map out the current and future water scenario. In most cases (as evident from the city development plans submitted to JNNURM for funding), cities emphasize the need to augment supply, without estimating what it will cost, in physical and financial terms. Data suggests that most cities spend anywhere between 30-50 per cent of their water supply accounts for electricity to pump water. As the distance increases, the cost of building and then maintaining the water pipeline and its distribution network as increases. Worse, if the network is not maintained then water losses also increase. All this means that there is less to supply and more to pay. The end result is that the cost of water increases and the state is not able to subsidize the supply of water to all. The situation is worse in the case of the poor who often have to spend a great deal of time and money to obtain water since they do not have house connections. Worse, as the city municipal water system collapses under the weight of under-recoveries, the rich move to private water sources like bottled water. The poor suffer the cost of poor health.

- ix) The challenge is to supply water to all – the inequity in water supply within a city must be understood and removed. In all the presentations made to the Working Group, it was evident that cities do not keep a record of the distribution of water within the city. As per the NSS 65<sup>th</sup> round, only 47 per cent urban households have individual water connections. The rest have shared or common water supply. In the next five years, this must be the focus of policy and practice.
- x) Groundwater remains the missing link in city water accounts. City water agencies only provide estimates of the groundwater that they ‘officially’ source and ‘officially’ supply. They have no records of the amount of groundwater, which is privately extracted in the city, through private wells or supplied through tankers. The Working Group in its many meetings struggled to make an assessment of this source, but found that data was weak and inadequate. This missing link leads to critical flaws in policy. Firstly, it covers the inequity in official water supply. It is clear that parts of the city that remain un-served by official water supply will depend increasingly on groundwater. Secondly, without this assessment of groundwater usage, any policy of increased tariff, will lead to even greater dependence on this source and its over-exploitation. It is therefore clear that when cities increase tariffs of water, they should plan simultaneously for strategies that work to recharge aquifers. Thirdly, without an assessment of groundwater usage, a city cannot estimate its wastewater discharge accurately. This then leads to flawed planning in terms of sewage and results in pollution.
- xi) The lack of recognition of the existing role of groundwater in city water supply leads cities to discount the need to provide for recharge. Today no city values its local water bodies as the function of its water supply – instead, these water bodies are seen as lucrative options for land – the hole in the ground is first filled with garbage and then taken over as real estate for housing and other developments. The catchment is encroached – by the poor, who are thrown out of the city and then by the rich who need it for everything from housing to airports. The essential role of water bodies as sources of local water supply and even potential spaces for sewage water treatment is never considered. This is an important area of intervention.
- xii) Cities worry about water but not the waste this water will generate. Sewage, once generated has to go somewhere and it invariably does go -- into streams, ponds, lakes and rivers of the town, polluting the waterworks so that health is compromised. Alternatively, it goes into ground, contaminating the same water, which will be used by people for drinking. It is no surprise then that surveys of groundwater are finding higher and higher levels of microbiological contamination – a sign of sewage contamination.
- xiii) We have no national accounts for the excreta we generate or the excreta we treat or do not treat. The fact is that we have no way of really estimating the load of sewage in our cities, because of the different ways in which people source water and the different ways in which people dispose sewage.
- xiv) It imperative is to provide sanitation to all, but equally to ensure that this facility is hygienic and that it does not add to pollution. Currently all cities are on a sanitation trajectory – at the lowest are those with no access to sanitation facilities and at the top are those connected to a flush toilet, which in turn is connected to the official underground sewage network. It is important to note that currently data on the availability of sanitation facilities and their disposal system is lacking. The 2001 Census found 74 per cent of urban India had access to sanitation; 46 per cent urban Indians had water closets. But it did not specify whether these flush toilets were connected to septic tanks or underground

networks or open drains. The 2011 Census should correct this anomaly as its data sheet differentiates between toilets and disposal systems. The only available data is from the National Family Health Survey (NFHS-3), 2005-06, which puts the toilets connected to piped sewer systems as 18.8 per cent. But providing hygienic, safe and convenient sanitation to all in urban India is the primary goal. According to NSS 65<sup>th</sup> round, 11 per cent of urban households have no option by open defecation – this adds up to 41 million people every day. This is clearly unacceptable.

- xv) The challenge of sewage collection and treatment has not received adequate attention. It is assumed that cities will eventually have sewage systems, which will connect all toilets – by then converted to the flush variety. It is also assumed that this system will connect the waste to the treatment plant, which will then treat it and dispose it in the river or the neighbouring water body. As yet investment in creating these facilities has been ad hoc and piece-meal.
- xvi) No Indian city is in a position to boast of a complete sewerage system, which can keep up with the sanitation and pollution challenge. In fact, most Indian cities have a massive backlog of incomplete sewage systems or systems in serious need for refurbishment and repair. Many cities do not even have the beginnings of a sewage network, let alone systems of taking back the waste. In this situation, it is critical, we invest in sewage systems, but it is equally and even more critical that we invest in building affordable and scalable sewage networks and fast. This will require relooking at the current technology for sewage and its treatment.
- xvii) The capital intensity of the current waste system results in the fact that cities can only provide for a few and not for all. It is also a fact that smaller cities cannot afford a sewage drainage system, let alone a sewage treatment system. The waste system needs capital investment in infrastructure, but more importantly it needs funds for operation, particularly energy costs for pumping and treatment. The costs of capital investment or the costs of operation and maintenance are not paid for by even the richer users, who use water and thus generate waste. Large parts of the modern cities remain unconnected to the sewage system as they live in unauthorised or illegal areas or slums, where the state services do not reach.
- xviii) If sewage systems are not comprehensive – spread across the city to collect, convey and intercept waste of all – then pollution will not be under control. Currently, according to estimates of the Central Pollution Control Board, the country has installed capacity to treat roughly 30 per cent of the excreta it generates. But it is well accepted that some of these plants do not function because of high recurring costs – electricity and chemicals or some that do function cannot because they do not have the sewage to treat. This is because, like water pipelines, sewage pipelines will have to be built and then maintained. The fact is that most of our cities, old and new, do not have underground sewerage systems. If all this is put together, then officially the country actually treats 30 per cent of the human excreta it generates. The bulk of sewage treatment capacity exists in the metropolitan cities—with 40 per cent of wastewater generation, these cities have some 70 per cent of the installed capacity. More importantly, just two cities—Delhi and Mumbai—have some 40 per cent of the country's installed capacity. In other words, although these cities generate some 17 per cent of all the sewage in the country, they hog the bulk of the country's sewage treatment infrastructure. The final blow comes when the partial sewage cleaned through expensive treatment gets mixed with the untreated sewage of the majority of the people. In most cities some, not all, waste is collected and conveyed for treatment. This is because most cities work on the assumption that unless they first build

the underground sewerage and unless they can convey it in these official drains, the waste in open drains cannot be treated before disposal. Sewage is divided between ‘official’ and ‘unofficial’ matter, depending on the nature of the drain it is being transported in. In most cities, then, only a proportion (and nobody can hazard a guess on the exact amount) is transported for treatment. The tragedy of pollution is that if the treated sewage – transported in official drains – is allowed to be mixed with the untreated sewage – transported in unofficial and open drains – then the net result is pollution. The added problem is that the location of the hardware – the sewage treatment plant – is not designed to dispose off the treated effluent so that it actually cleans the water body. To understand pollution in cities, it is important to understand where the sewage goes, where is it disposed off. Most cities don’t seem to think of this factor when they build their infrastructure for sewage. They build a sewage treatment plant where there is land. The treated sewage is then disposed off, as conveniently as possible. If the plant is near a river, then the treated effluent is disposed off in the river; if it is far from a river or lake then it is disposed off in the nearby drain.

- xix) Climate change will demand that cities get serious about water. Already every rainfall becomes an urban nightmare as roads flood and dirty water enters homes and adds to filth and disease. Scientists predict that climate change threats will manifest in more extreme and variable rainfall – it will rain but in shorter number of rainy days. Cities, which cry today because of shortages of water, will weep tomorrow because of the growing intensity of rainfall. Clearly, the way to cope with this new threat is to do better on the waterways of the past, which created water storage as locally as possible.

## **6.2 KEY RECOMMENDATIONS**

The Working Group has the following recommendations for the implementation in the 12<sup>th</sup> Five Year Plan.

### ***6.2.1 THE SCALE OF INVESTMENT NEEDED IN THIS SECTOR IS SUBSTANTIAL***

We require careful assessment of the total costs of water and sewage sector so that the effort is to ensure that the projects are planned for affordability and sustainability.

It is clear that Urban India will require huge investment in building and keeping pace with the water and sewage infrastructure needs of all. In the past five years JNNURM has been an important game-changer in this sector, providing much needed public funding to build and refurbish assets. Under JNNURM the bulk of the projects are for water and sewerage – some 70 per cent of the sanctioned cost of Rs 60,000 crore.

Between 2005 and 2011, roughly Rs 43,000 crore worth of water, drainage and sewage projects were sanctioned under these schemes. This needs to be compared to the Rs 3,700 sanctioned for the same purpose in the 25 years before and the Rs 5,000 crore sanctioned under the river conservation programmes.

**Table: Money on water and sewage over the decades**

		Rs/crore
1980-2005	Central assistance for water and sewage	3700
1995-2010	Central assistance for river conservation	5000
2005-2011	Central assistance (JNNURM)	43,000

The investment incurred in this sector is small as compared to the scale of the transition that is needed. The Working Group has tried to assess the financial implications of the urban water and sewage sector.

The High Powered Expert Committee Report on Indian Urban Infrastructure and Services pegs the per capita investment needed for capital infrastructure in the water, sewerage and storm-water sector at Rs 14,000 and another Rs 840 annually for operation and maintenance. The total capital investment needed according to this estimation is Rs 7,54,627 crore in the next 20 years. However, this may be an underestimation, given that the costs of water treatment and sewage drainage and treatment, are increasing.

The average cost of a comprehensive water supply scheme under JNNURM is roughly Rs 3 crore per mld. The average cost of a sewage project is Rs 3.33 crore per mld. However, the cost of building sewage treatment systems and networks under the Union government's revamped Ganga programme averages over 5 crore per mld – with small cities like Munger in Bihar getting as much as Rs 7 crore per mld.

**(A) COSTS OF WATER TREATMENT**

The cost of water treatment depends on the quality of the water to be cleaned. Conventional water treatment technologies, in use in most cities, require relatively clean and living water, water that conforms to most parameters of surface water quality. The capital cost of such technology would be Rs 20-22 lakh/mld currently; operation costs would be minimal – Rs 0.01-0.10/kl. But as water quality deteriorates, the cost of treatment is going up. Most cities are installing plants with modern technologies, using flocculation or membranes. The most expensive plant in the country is clearly in Agra, where polluted water in the Yamuna has made the city's task impossible. The city will end up paying a phenomenal Rs 1 crore/mld and as much as Rs 4-5/kl to clean its water for supply.

**Table: Cost of water treatment: modern plants in India**

	Technology	Capacity (mld)	Capital cost (Rs/crore)	Capital cost (Crore/mld)	O&M costs (Rs/kl)	Power costs (Rs/kl)	Total O&M costs (Rs/kl)
Sonia Vihar, Delhi*	Pre-settler-Pulsator+ Aquazur (Degremont)	635	189	0.30	0.38	1.04	1.43

	Technology	Capacity (mld)	Capital cost (Rs/crore)	Capital cost (Crore/ml d)	O&M costs (Rs/kl)	Power costs (Rs/kl)	Total O&M costs (Rs/kl)
Chembarambakkam*	Pulsator+ Aquazur (Degremont)	530	135	0.25	0.39	0.82	1.21
TK Halli-1*	Pulsator+ Aquazur (Degremont)	300	45	0.15	0.22	0.10	0.32
Nagpur*	Pulsator+ Aquazur (Degremont)	120	15	0.13	0.39	1.04	1.43
TK Halli-II*	Aquadaf+ Aquazur (Degremont)	550	190	0.34	0.32	0.10	0.42
Agra**		144	156	1.08	3-4	+	4-5
Minjur, Chennai	Desalination plant	100	473	4.73	48.66***	10-12	59-61
Nemmeli	Desalination plant	100	1034	10***	--	--	21

Source: \* Mukesh Grover 2011, Degremont; water treatment technologies and a case study of 635 MLD water treatment plant at Sonia Vihar, Delhi, presentation at Ministry of Urban Development, New Delhi, mimeo

\*\* Uday Kelkar and Ghulam Mustafa 2011, Agra Water Supply Project, presentation made to Ministry of Urban Development, March, New Delhi, mimeo

\*\*\* MetroWater 2010, Annual Report 2009-2010, Chennai Metro Water, Chennai; difference in cost because of contract – Minjur is BOT, while in Nemmeli, cost of capital being paid by government

#### (B) COSTS OF SEWAGE TREATMENT

The cost of a treatment plant for waste depends on two key factors – the quality of raw influent and the quality of the receiving medium. Currently, most cities do not have treatment plants, installed or running to treat human excreta or chemical industrial waste. Furthermore, most sewage treatment plants use basic technologies for cleaning waste. These were built at times when the characteristic of waste was basic – biological and not chemical – and more importantly, the receiving environment had capacities to assimilate the treated waste. CPCB's last detailed evaluation on sewage technologies in mid-2006 revealed that most cities use waste stabilisation ponds or activated sludge process (ASP), a conventional sewage treatment system, which uses

biological processes to settle solids and then a variety of aeration systems to oxidise and clean the waste.

The big issue for sewage technology is the price of capital, the availability of land and the cost of operation and maintenance. Land is in short supply in urban areas. It is particularly so because sewage treatment is discounted in public planning. In all this, cities are struggling to find the right answers to treat and clean waste, all at a time, when costs are rising.

In the mid-1990s, when the first-generation sewage treatment plants were built, they cost Rs 20 lakh to Rs 30 lakh per mld. Today, the same plants cost close to Rs 1 crore per mld to build, with operation costs increasing because of rise in energy bills. If the cost of capital investment in building the sewage treatment plant is taken at Rs 1 crore per mld and if the quantum of sewage is taken at the current 'gap' (untreated) sewage then India needs to invest Rs 30,000 crore to build capacity to treat its 30,000 mld of sewage. But this is the case, if the cost of treatment does not increase even further. We know that the choice of technology and its cost will depend on the capacity of the giving and receiving environment. As rivers become dry and polluted, sewage and waste treatment will mean more advanced and more expensive technologies.

In Srinagar, the battle to clean the Dal is bringing new technology challenges. The lake is highly eutrophied – it is shallow and has large numbers of people living inside its water body. As a result, even treated effluents add to the burden of nutrients in the lake. So the city has ordered two new sewage treatment plants, based on SBR but including de-nitrification technology. The plants, being built under the Central government's lake cleaning programmes, will cost Rs 1.5 crore/mld – much above what is paid for sewage treatment in normal cases.

Tertiary treatment plants, capable of cleaning water for reuse in households and industries (and close to drinking water) are being built, but at steep prices. In the case of Cubbon park, where a small plant has been set up to supply the city garden drinking quality water, the price of capital is high – Rs 3 crore/mld – and the operation costs is Rs 9/kl. Given these costs, it is critical that urban infrastructure is planned carefully and funded with scrutiny to assess how cities will afford costs and how they will build for sustainability. It is important to choose the correct technology in order to prevent wasteful expenditure. There is no need to pay for more expensive technology to treat water to a higher level than is required for subsequent use. Similarly, in the case of Cubbon Park, tertiary treated water is not required for gardening – secondary level treatment would suffice and be much cheaper.

Cities can also find ways for (at least partial) cost recovery, by putting restrictions on freshwater use and actively promoting the sale and use of sewage treated water from which they can earn revenue even if it is priced at a discount. Companies with large water requirements that build their own pipelines to the city's sewage treatment plant can recover their pipeline costs in a few years just by buying treated water at a lower price than the industrial tariff.

### ***6.2.2 PRIVATE INVESTMENT WILL NOT BE THE ANSWER TO THE INFRASTRUCTURE CHALLENGE. PUBLIC-PRIVATE PARTNERSHIP WILL HAVE TO BE DIFFERENTLY CONCEPTUALIZED IN THIS SECTOR.***

Current models of city public-private water partnerships are diverse, from concessions for treatment plants to service contracts for billing, collection and metering. In India, as yet, most projects focus on distribution improvement –that is, managerial and technical skills of the private company are employed to improve functioning of the water distribution system. Only in a few places has the country experimented with citywide distribution — Jamshedpur, where the

industrial house of Tatas have set up the water supply system, and in Tirupur, where a joint sector company is in charge of this hosiery capital's water.

**Table: Private water efforts in India**

City/ value	Operator	Scope	Private investment	Status (as of June 2011)
<b>Tirupur (1993)</b> <b>Rs 1000 crore</b>	IL&FS	To build, operate and charge for water supply	Yes: Rs 1000 crore	Operational
<b>Salt lake, Koltaka (2010)</b> <b>Rs 60 crore</b>	Jusco-Voltas	30 year contract for management of water supply and sewerage -- distribution contract	Yes: Rs 60 crore	Under implementation
<b>Chennai (2006)</b> <b>Rs 473 crore</b>	IVRCL	100 mld desalination plant -- bulk supply on fixed rates	Yes: Rs 473 crore	Operational
<b>Nagpur (2007)</b>	Veolia	7 year contract for 24x7 for distribution system -- contract distribution, rehabilitation, augmentation and bulk supply	No: Management contract	Under implementation
<b>Hyderabad</b>		Non-revenue water reduction and performance improvement	No: Management contract	Being tendered
<b>Hubli-Dharwad, Belgaum-Gulbarga (2005)</b>	Veolia	4 year contract to increase connections, supply 24x7 water -- distribution contract -- in pilot areas	No: Management contract	Operational
<b>Latur, Maharashtra (2008)</b>	Subhash Projects	10 year contract for distribution	No: Management contract	Work suspended as disputes arose on terms of contract and delays
<b>Mysore</b> <b>Rs160 crore **</b>	JUSCO	24x7-- over million people and 150,000 connections	No: Management contract	Under implementation but may require renegotiation as final contract underestimated work and money

City/ value	Operator	Scope	Private investment	Status (as of June 2011)
<b>Haldia **</b> <b>Rs 100 crore</b>	JUSCO	25 year contract for design, development, operation and maintenance of water supply in Haldia on lease (of existing assets) and BOT of new assets	Lease cum BOT	Under implementation
<b>Dewas (2006)</b> <b>Rs 60 crore</b>	MSK projects	Bulk water supply to industries	Yes: BOT	Ongoing but is facing problems as industries are reluctant to take water at agreed rates; domestic supply is irregular and theft from pipeline is common.
<b>Khandwa (2009)</b> <b>Rs 115.32 crore)</b>	Vishwa Infrastructure, Hyderabad	Conveyance of Narmada water over 52 km and ensure 24x7 water supply	BOT (90% public financing of Rs 96 crore); concessionaire to invest rest and pay for O&M; base price Rs 12 kl	Under implementation but long-term viability of project is questionable
<b>Shivpuri (2010)</b> <b>Rs 60 crore</b>	Doshion-Veolia, Ahmedabad	Bringing water from Modhikheda dam and supply 24x7 to city	BOT (90% public financing of Rs 54 crore); concessionaire to invest rest and pay for O&M; base price of water set at 15.40 kl	Under implementation
<b>Naya Raipur (2009)</b> <b>Rs 156 crore</b>	Jindal Water Infrastructure	Wells on Mahanadi, pipeline to city, treatment distribution and billing for 52 mld	BOT	Under implementation
<b>Kolhapur (2010)</b> <b>Rs 75</b>	Vishwa	76 mld sewage treatment plant	BOT (70% – Rs 52 crore public financing and to pay for fixed and variable cost of treated sewage)	Under implementation

Source: ICRA 2008, Presentation on Financing Experience in Water Sector, ICRA Ltd (an associate of Moody's investors services USA), Bangalore

#### (A) CURRENT EXPERIENCE OF PPP PROJECTS

In India, currently, most projects are publicly funded and the capital belongs to the water utility. The private entity brings in managerial expertise. However, in the Chennai-desalination project, for instance, the proponent has invested in the capital project costs of the plant, but on the guarantee of long-term off take of the output. Similarly in the Haldia project JUSCO, has been contracted by the Haldia Development Authority to take on lease existing assets and invest in building new assets and create systems for management. In this case, JUSCO is the water operator of the project, with the responsibility for selling water and earning revenue. It promises a guaranteed income to the development authority—over the 25 years concession period—of Rs 1,220 crore. This model has been applied in Salt Lake as well, where there are substantial residential areas for the utility to reach and recover costs. It is early to say if these projects will fructify and will be successful in providing models for private investment in water, with returns that are bankable.<sup>18</sup> But clearly, these few models must be carefully watched and experience for the future gathered.

Who will set and recover the tariff? Where the operators invest in capital, then the agreement is to allow them to earn revenue from higher tariffs. In Haldia, where the project is primarily geared to industrial users, the Haldia Development Authority has kept the charge of setting tariffs, with the contract agreeing that these will increase by 3 per cent at the minimum each year. But in Salt Lake city, JUSCO has been allowed to levy ‘water and sewerage charges’ of Rs 25/kl (Rs 15 for water and Rs 10 for sewerage) from connected industries. It pays for bulk water at Rs 5/kl, which it needs at a specified quality. The tariff escalation of 10 per cent is accepted every five years. The ‘risk’ of collecting the charges remains with JUSCO.

In the water supply projects of Madhya Pradesh – Khandwa and Shivpuri – the base tariff is set before the project takes off. What is surprising here is that even with 90 per cent public financing, the project is only viable when the tariff is between Rs 12-15/kl – way above what water utilities across the country can charge or recover. In other words, in these two cases, public subsidy for capital does not lower costs of providing water.

In almost all other cases, the tariff is set by the public utility and its private contractor has the responsibility for improvement of recovery of the charges, for which it is paid a pre-determined fee. For instance, in the case of Karnataka 24x7 projects, the operator is paid over Rs 5/kl, based on performance indicators.

Who will pay for sewage costs? In almost all cases (except Salt Lake city) there is no reference to costs of sewage, which will need to be inbuilt into the project design and management costs. It is clear that the quantum of water, if it increases, will increase the quantum of sewage as well. No project, it would seem, is designed to take care of the capital and operational costs of this fall-out. This is the biggest risk in the projects of today.

The risk of data gaps is high: In most other cases, the private operator, has limited financial exposure and limited risk. The payment is given to manage the operations of the project, based on pre-determined performance indicators – quantum of leakage loss to be reduced or resolution of complaints in serviced area.

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<sup>18</sup>JUSCO 2011, 24x7 Urban Water Supply at Jameshedpur: Experience on PPP in urban water supply and sanitation sector, presentation to Working Group on Urban and Industrial Water Supply for 12<sup>th</sup> Five Year Plan, April, mimeo

The private sector claims that even in situations where public funds are driving the project, risks remain considerable, as it has to deliver. Guaranteeing performance is difficult as the project design often is misleading and inaccurate. In these cases, the contract requires modifications – on the design and cost – but this puts the project in a bind, as renegotiation on tendered agreements is difficult in most cases. The project then becomes unviable or even poor in implementation.

For instance, in Mysore, where JUSCO bid for a performance-based contract to refurbish the city's water supply system to provide 24x7 water, it found that the total pipeline that needed replacement was 1,900 km, not 800 km, and the cost rocketed accordingly. There may be a need for renegotiation with related complexities related to transparency and accountability. If the cost is not revised, the work will be half done and results will be poor. The aim of the investment will be negated. Without baseline data on the water-sewage situation in a city, contracting becomes difficult and estimating costs of what needs to be done is almost impossible.

As a result, some serious players are not bidding for projects. The newer water contracts are going to newer companies and it is yet an open question how serious these will be in a difficult and untested business.

#### (B) PRIVATE SECTOR'S FUTURE ROLE

The Working Group is of the view that the private sector already plays a role in water and waste services — as a contractor to the public utility to build and even operate key components of the system. This role must be recognized and indeed encouraged. However, the current experience is that the private sector is reluctant to enter into capital and operational investment.

But equally important is that this partnership must be planned carefully and with full knowledge. Often city governments bid for more and more expensive pieces of hardware, without any idea of how this investment will be sustained. Chennai, for instance, has already invested in a 100 mld desalination plant in Minjur, where the agreement with the private operator is on a BOOT basis. The capital cost of Rs 473 crore was borne by the private operator, but with the guarantee that MetroWater, the city's water agency, would pay the company Rs 48.66/kl for the next 25 years. In addition, it would pay for power costs, according to information given to the committee by city engineers. The second plant at Nemmeli, also of 100 mld, is being built also by a private company and with a different arrangement. The contract is to build the plant and to operate it for the next seven years. The water board will own the plant and capital investment has been paid through Central subsidy. This will underwrite the costs of the delivered water – at roughly Rs 20/kl.

But the big issue is what these two capital-intensive and expensive plants will do to the sustainability of the city's water board. Chennai Metro Water is an efficient water utility with balanced books – more than many others. But the high capital and operation and maintenance will require the utility to rethink its future finances. The Tamil Nadu government has committed that it will pay for the cost difference. But all this does mean that utilities will continue to have to depend on external funding for their viability.

It is the same in Agra where, for good reasons, the city municipality has contracted out the building of a water treatment plant to take near-sewage from its river Yamuna and turn it into water. According to the presentation made to the committee, the plant is expensive – paid here through Japanese assistance – and the cost of water it produces will be Rs 3 to Rs4/kl without the cost of energy. In a city like Agra, with poorer water accounts, where will money come from to bear these high costs?

Water utilities must be required to consider financial sustainability before embarking on projects.

### **6.2.3 24X7 PROJECTS MUST BE CAREFULLY SCRUTINIZED AND LEARNT FROM BEFORE ADOPTING THESE AS THE MODEL FOR PPP IN THIS SECTOR**

In India, municipal water reforms have become synonymous with 24x7 projects. The reasoning of these projects is impeccable: supply constant water so that pressure in the pipes will reduce leakage from sewage pipes and, in turn, reduce contamination of household water supply. Furthermore, create tight management contracts based on performance terms so that leakage -- non-revenue water -- is reduced. This will add to the financial viability of the municipality/water utility.

The most cited example is from Karnataka, where in 2004 the cities of Hubli-Dharwad, Belgaum and Gulbarga were chosen for continuous water supply demonstration projects. Later, Mysore was added to the list. In Tamil Nadu, Madurai's 24x7 has been announced. In Maharashtra, besides Mumbai, work has started in Nagpur and Pimpri-Chinchwad, a city on the outskirts of Pune. Many other cities are waiting to adopt 24x7 schemes. The experience till now needs to be studied.

#### **(A) HUBLI-DHARWAD**

Karnataka's water reform began with a project period of 2004-2008, but this has been extended to 2011. The Rs 237 crore project, funded jointly by the World Bank and the state government, has led to the establishment of the Karnataka state urban water supply council. The project awarded performance-based management contracts to private companies—French water major Veolia water won the contract—to repair the water system for 24x7 supply and to manage operations, including billing and collection, in the pilot zones in February 2011. With some Rs 200 crore spent, the project had laid 108 km of transmission mains, 238 km of distribution mains and 26,045 metered house connections. Continuous water supply was operationalized in all demonstration zones across the three cities. Leakages are down without any major increase in water tariffs. The project also included a specific tariff plan for the urban poor, defined as those living in houses of less than 600 sq feet built up area.

#### **Karnataka's 24x7 achievements: what has been done**

	Demonstration zones	Reached (no of house connections)	Real losses (litres/connection/day/metre pressure)
1	Belgaum (south)	4566	5.21
2	Belgaum (north)	4314	10.52
3	Hubli	7834	5.45
4	Dharwad	5945	4.84
5	Gulbarga	3386	2.36
		26045	

Source: KUWASIP 2011, World Bank assisted Karnataka Urban Water Sector Improvement Project (KUWASIP) – experience on PPP for achieving 24x7 water supply and control of UFW, presentation to Ministry of Urban Development, New Delhi, April, mimeo

To reduce losses the pipeline network had to be completely re-laid and modernised. The new pipes are of high-density polyethylene (HDPE), replacing PVC pipes. A system has also been devised to check data from meters over a 24-hour period; if the meter is running during non-use hours of the night, leaks can be isolated and fixed.

In the project area, tariffs have been revised upwards, but functioning and high-quality meters ensure the measure is accurate and based on consumption. There are four slabs, with tariffs ranging from Rs 6 per kl to Rs 20 per kl, the latter for consumption above 40kl. This, say analysts, has helped cross-subsidise revenue collection. The Dharwad demonstration zone has 5,500 connections with a population of 37,000. Veolia's records show 43 per cent of the customers consume less than 15kl per day, contributing to 15 per cent of the total water charges and 16 per cent of the water used. On the other end of the spectrum, 40 per cent of the households use more than 25 kl per day, use 60 per cent of the water and account for 58 per cent of the collections. Monthly collections in this pilot zone have increased from Rs 2.5 lakh to Rs 8 lakh, which pushes towards financial sustainability.

#### (B) PPP EXPERIENCE: HOW WORKABLE IS IT

It is important to analyse the experience of 24x7 to understand how it will succeed in the country.

Firstly, it is clear that the challenge of scaling-up and replication will be significant. In Hubli-Dharwad the pilot project has taken time for implementation and has also been implemented at significant capital cost. In other words, reaching some 10 per cent of the twin cities' existing connections has taken some 7 years and more. It has also been costly. How will this reach the rest of the city, and by when? More importantly, will it impact the supply and sustainability of water sources – will there be quantifiable reductions in the amount of water to be sourced for supply? As yet, there is no evidence to suggest this will happen.

Secondly, more experience is needed to assess its effectiveness: For instance, the claim on the reduction of leakage also needs to be carefully scrutinized, as the experience is limited. The proponents of this scheme often end up comparing the total leakage (as estimated) for a city, against the reduction of leakage seen in limited households with careful intervention. While extrapolating, due care needs to be taken of other variables.

Thirdly, financial sustainability must be reviewed: The project (across all cities), with high tariffs and efficiency of recovery, is not able to balance its books. This is also because the cost of water is high, over Rs 12 per kl. Interestingly, the cost to the operator and auditor is more than the cost of bulk water—Rs 5.45 per kl.<sup>19</sup> Clearly, in this scenario, the big question is the cost of delivery of water in our cities and what this will do to the sustainability of local bodies and the strain on the already poor investment of sewage systems. The more water the city uses, the more its sewage.

It is clear that the cost of management will have to be paid and the question remains that if these costs are paid then even public water utilities would be able to deliver on supply and quality. The question is how to reorganize and restructure water utilities for public delivery.

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<sup>19</sup>KUWASIP 2011, World Bank assisted Karnataka Urban Water Sector Improvement Project (KUWASIP) – experience on PPP for achieving 24x7 water supply and control of UFW, presentation to Ministry of Urban Development, New Delhi, April, mimeo

Fourthly is the non-answered question of sewage. In other words, more water will be supplied, which will not be paid for completely. And in addition, more sewage because of the increased water supply will be generated, which will not be paid for at all. In this way the public utility will be burdened with these costs, without sources of revenue. It is clear that these projects must be reviewed to ensure that the cost of building sewerage infrastructure and running it are provided in the initial design.

In the next few years there will be enormous experience gathered in the cities, which are currently operationalizing these projects. This knowledge must be gathered and learnt more, before further projects are signed. We would suggest that a mid-term review of the 12<sup>th</sup> Plan includes this assessment.

#### ***6.2.4 WATER AND SEWAGE COSTS MUST BE PAID FOR BUT EQUALLY IMPORTANT IS RECOVERY OF COSTS AND SUSTAINABILITY OF THE RESOURCE. FUTURE PLANNING MUST TAKE THIS INTO ACCOUNT***

Water and sewage costs must be paid for, but the questions are how will this cost be recovered and how much can be charged. It is important to note, that contrary to perception, many municipalities and water utilities have in the recent past raised tariffs for domestic and industrial use. But the question is how will they recover their bills. Meters do not exist and where they do, they often do not work. The cost of recovery adds to the costs of operations. This is where innovative solutions are needed. But it is also a fact that the higher the costs of operations, the less the municipality and water agency can and will balance their books.

In fact, municipalities have found that they can recover part of their costs through high tariffs on industrial users. In a survey of water utilities, jointly by the Union ministry of urban development and the Asian Development Bank, commercial and industrial consumption of water averaged to 15 per cent in the 20 cities surveyed. But interestingly, billing for this water filled only 40 per cent of the revenues.<sup>20</sup>

In Bengaluru, while the commercial and industrial usage is 5 per cent of its total water supplied, the billing amounts to almost 40 per cent. This city, which charges Rs 6 per kl for the lowest domestic slab and Rs 36 per kl for the highest, charges as much as Rs 60 per kl for industrial and commercial use. The situation is the same in Chennai and other key cities. Hyderabad has also revised its tariff, arguing that most metropolitan cities like Chennai, Mumbai and Bengaluru charge higher rates for non-domestic use. Its tariff is now Rs 35 per kl, against Mumbai's Rs 40 per kl and Delhi's Rs 50 per kl. But interestingly, Hyderabad is the only city, which charges increased rates -- Rs 60 per kl -- where water is used as a raw material--in bottled water, soft drinks or alcoholic beverages.

It is also logical that cities, struggling to find ways to meter all houses that use water, will recover costs from high-users of their product. These are institutional buyers, easier to locate and easier to bill. It is for this reason that most cities have different rates for water usage in commercial and industrial areas. The danger however is that as the price increases, industries and institutions simply move to the source that provides them cheaper water – groundwater. This then leads to greater unsustainability of this resource.

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<sup>20</sup> GOI and ADB 2007, Benchmarking and data book of water utilities in India, Ministry of Urban Development and Asian Development Bank, Asian Development Bank, New Delhi

#### (A) PRICE AND THEN RECOVERY

If meters are needed to measure and account for water—then the technology for these is also the most neglected within the country. It is well known most customer meters will register airflow. Given that most cities have intermittent water supply, this could lead to inaccurate reading. But no study exists on the extent of such error. There are no real facilities to test and to certify meters, something all water utilities need before they can go ahead and procure or ask customers to install. The country has only three laboratories – Fluid Control Research Laboratory (FCRI), in Palghat, Kerala, Electronic and Quality Development Centre of the Gujarat government in Gandhinagar and BIS Central Laboratory in Sahibabad near Delhi. These laboratories test against basic parameters laid down by the Bureau of Indian Standards (BIS). These parameters and tests need an urgent revamp as does the capacity for testing and certification.

#### (B) INSTALLING METERS: CITY EXPERIMENTS

Jamshedpur, has been able to install meters across its area or has used the technology of measurement to reduce its losses. Jamshedpur is uniquely placed because of the nature of the township—it is an industrial town of the Tata's steel industry. Its work to control distribution losses is exemplary.

Most cities – Chennai, Hyderabad and even Bengaluru – have pilot projects on metering and measurement. But these cities are finding it difficult to scale up this work. Cities are experimenting with various kinds of electromagnetic meters. Bangalore has installed some 38,000 meters, Nagpur 15,000 and Chennai roughly the same.

There is a huge challenge to scale up these experiments. Equally, it is clear no city knows the full cost of this transition: the cost of the household meter is only a small component, for the pipelines that bring water to the house have to be refurbished drastically for the system to work. Hyderabad, for instance, started its pilot non-revenue water reduction project in early 2000. By 2006, the city replaced some 140 km of cement mains and 650 km of modern pipes. It also installed 73 bulk flow meters and changed the domestic meters in some 1,76,000 households. Still, there was no result—the water utility could not assess or quantify reduction in water losses. It then decided to take up a micro-study in two sites, where it installed conventional and flow meters in some 40 households each. The study showed some reduction in measurement of unaccounted water, from 33 per cent to 29 per cent in conventional meters and from 25 per cent to 18 per cent in flow meters.

The city then took up the challenge to tackle a medium-level pilot project, in the rich locality of Banjara. It was confident that this time it would learn to deal with this challenge. The area was relatively easy to map, for the source of water was from a single point and meters existed in households. The effort was laborious. Each day, city water officials were tasked to record daily readings from the bulk meters to check on water supply and to reconcile this with individual meters. But with all this done, the study was still not accurate and the city could not reconcile its water accounts. Now Hyderabad is devising a new experiment to arrest its water loss. It is putting in place a SCADA (system for supervisory control and data acquisition) for mapping its water system. It hopes this will help it get a handle on the losses.<sup>21</sup>

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<sup>21</sup> HMWS&SB 2011, Non Revenue water reduction and management in water supply distribution system, Hyderabad Metropolitan Water Supply and Sewerage Board, presentation made to Ministry of Urban Development, April, mimeo

The question also is if metering of households is indeed the best (and only) way ahead in managing an efficient billing and accounting system. Chennai, for instance, has no metering but it has an efficient revenue collection system. The city lowers its costs using the existing property tax system to collect its water bills. The water and sewerage tax is a component of the annual rental value of the property, collected in two equal installments.

Surat shows the possible way ahead, as it combines various options to manage its water. First, it has taken control of its high-value and bulk consumers, to check for water consumption. Out of the 770 mld the city supplied in 2011, roughly 55 mld (7 per cent) is directed to industrial users, whom it charges Rs 22 per kl. Each user has been metered using electromagnetic instruments and water consumption is carefully monitored. As a result, losses are down to negligible; the city even imposes a leakage charge on industry, of 5 per cent, to cover its missing water. As a result, the city earned in 2009-10 some Rs 36 crore from industrial users, a little less than half its annual revenue. The city water agency is now exploring the possibility of contracting out its sewage for tertiary treatment, which it can use to supply additional water to industries. It has received proposals from private companies, willing to treat and sell sewage-water for Rs 18 per kl.

In addition, it has identified its bulk users: hotels, malls, hospitals and the like. In each such case, defined as a user with over ½ inch pipe, the city water agency installs meters and charges hefty rates (Rs 18 per kl). All new areas are also metered.

In the rest of the city, water bills are raised as a component of the property tax. This city has a collection efficiency of 93 per cent for this tax. But the charge is miniscule and so the option is for the city to increase its flat water rate, based on the size of property or location. It has mapped the city for leakage—the old city area was found to be the worst in this regard, and so the city is taking remedial steps to improve piping.

The bottom line is that Surat, with just 1 per cent of its area metered, has a cost recovery of 92 per cent and its efficiency in collection of water charges is 94 per cent. The downside is that it still has 20 per cent (estimated) non-revenue water.<sup>22</sup> This nuanced and step-up approach is a good example for other cities to follow.

### ***6.2.5 ENSURE THE RIGHT TO CLEAN WATER TO ALL: LEGISLATE AND IMPLEMENT***

While much has to be done to make our water systems deliver to all, the starting point is to provide a framework for an entitlement based drinking water system. This will create conditions for people to demand water as a right. In addition, if the quality standards for clean and potable water are defined and mandated, it will create the right to clean water. This will in turn provide the incentive for reform and build the pressure on government agencies to deliver on the promise.

In the Indian Constitution, water is a state subject. It features in the state list (list II, schedule 7, entry 17), “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 1 (inter-state rivers)”. The 73<sup>rd</sup> and 74<sup>th</sup> Constitutional Amendments devolved the responsibility to local bodies. However, as the Constitution does provide the fundamental right to life, which has been

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<sup>22</sup>Jatin Shah 2011, NRW reductions and management in water supply and distribution system, City Engineer, Surat Municipal Corporation, presentation made to Ministry of Urban Development, May, mimeo

interpreted by the Supreme Court, as the right to a clean environment, water must be seen as an unalienable right.

In India, water is not provided free as a right, but cities have differential pricing, to provide for lower rates for smaller users of water – where it is metered – and for smaller holders of property -- where it is charged based on the pipeline connection. Across different cities, this lowest water slab varies between 6 kl to 15 kl per household. At 6 kl, assuming a family of six, each person would get 30 litres per day and with eight in a family it would be down to Rs 25 lpcd – subsistence level water usage. Delhi, for instance, charges Rs 2 up to 10 kl consumption; Kerala charges Rs 4-5 for up to 10 kl. But this rate, does not guarantee water, which in many cities does not reach households un-connected and un-served by the pipeline.

People also need to have the right to clean water, which is safe to drink. In India, there are no legislated standards to define clean water, unlike other parts of the world. For instance, in the US, potable water quality is legally enforced through the Safe Drinking Water Act. The act, lays down standards for drinking water and also penalties for failure. In India, the Bureau of Indian Standards defines the quality of drinking water (Drinking water – specification, IS 10500, revised in 2011). These standards are not mandatory, but instead provide guidance. In addition, the CPHEEO combines these standards and those published by the World Health Organisation to issue separate guidelines to cities. The IS 10500 defines two sets of standards – acceptable limit and permissible in absence of alternative source.

The question that is often raised is that municipalities do not have the wherewithal to invest in infrastructure to meet standards for potable water. This will put a burden on the water supply agencies. Water Quality monitoring infrastructure needs to be strengthened. But the fact is that while it costs to clean water, it also costs double to clean water, which is already dirty. Agra, for instance, will spend roughly the same to clean its drinking water from the much-abused Yamuna as it would to treat its sewage. This is when Agra is still trying to clean the easiest of contaminants – biological – and not industrial and chemical waste, which is difficult to clean and gets progressively more expensive as the toxins become more complex and more industrial. The wise choice is not to pollute. It is imperative to protect the source of drinking water. But in India, municipalities and water agencies have no control over the pollution of their drinking water source – surface or groundwater. This needs to change.

If this is not done then the cost of bad water will be paid. It will be paid in terms of health costs – waterborne diseases costs big time in terms of mortality and morbidity. The cost of bad water is also paid in terms of investments made by households in buying devices to clean water before consumption – household water purifiers. If the size of the market is any indication, then dirty water is an issue that pains. According to market analysts, the water purifiers in the household segment have been growing at 22-25 per cent annually, reaching Rs 1500 crore by 2010-11. If the market for bottled water – estimated at Rs 2000 crore is added to the water purifier business then this roughly Rs 3500 crore investment is benefiting private industry and not public municipal services.<sup>23</sup> While it is difficult to compute the exact budgets of the water agencies of the country, given their poor state of accounting, it is clear this private market is a substantial competitor.

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<sup>23</sup> Sunita Narain 2012 (In press), *Excreta Matters*, How urban India is soaking up water, polluting rivers and drowning in its own waste, Centre for Science and Environment, New Delhi

### ***6.2.6 FUTURE INVESTMENT IN WATER SUPPLY MUST FOCUS ON DEMAND MANAGEMENT (REDUCING WATER USAGE); ON REDUCING INTER-CITY INEQUITY AND ON QUALITY OF WATER SUPPLIED***

The focus on augmentation of water supply must change to managing the supply of clean water for all. First, we will have to spend less in bringing water to our houses. In other words, cut the length of the pipeline to reduce the electricity and pumping costs and its resultant 'leakage'. This means that we will have to revive local water bodies and recharge groundwater, so that we can source water from as close as possible. Secondly, we must use less, not more water in our homes, so that we have less to treat and less to dispose off. Thirdly, we must again cut the costs and transportation of sewage – use decentralized networks and a variety of technologies to treat sewage as locally as possible. Finally, we must begin to learn that we will have to reuse every drop of our sewage – turn it into drinking water with expensive technology or re-use and recycle it in our gardens, in our industries or use it (after treatment) to rejuvenate natural water bodies. This would require change of standards so that groundwater pollution boards incentivize the reuse of wastewater for recharge. This water-waste agenda needs to be incorporated deliberately into city plans.

This will require reworking the reform conditions, essential for investment in this sector.

### ***6.2.7 TO CUT THE COSTS OF WATER SUPPLY AND DISTRIBUTION LOSSES FOCUS ON BUILDING, RENEWING AND REPLENISHING LOCAL WATER SOURCES, INCLUDING GROUNDWATER***

The single biggest charge on municipal water supply today is the problem of distance – cities are expanding their water footprint because they find it easier to look for new water rather than fixing their infrastructure of supply. The first problem with distance is that it adds to the burden of costs because there are huge losses in transportation. Cities are struggling to contain water leakage.

In all this, there is still no understanding how water losses will be controlled, if the length of the pipeline gets longer and longer. Water planners, engineers or consultants do not make this connection. They believe there are answers to check wastage, without reconfiguring their water system. Clearly, given the lack of resources for maintenance, this will remain a dream.

Secondly, water utilities spend little or everything they have in building and then repairing the pipe system. It is a catch-up game, which they never win. It costs to build each kilometre of pipeline – some Rs 1 crore per km, is the cost that is estimated. It costs to connect each household to the pipeline network – some Rs 20-30,000 per connection is estimated. In all there is little money for new investment, what there is goes into fixing what is broken.

The expenditure that the city incurs in bringing water to its people is high. Most cities today spend the bulk of their water supply budgets in electricity bills – pumping to bring water, a considerable amount of which is lost, and then pumping to supply it to households.

The fact is that cities have choices, which they are ignoring today. Cities had sources of water close to where people need supply. Rain, as it is said is decentralised and so should be water supply. The city sources are its water bodies, which capture rain or floodwater in rivers and the underground water aquifers. All these have been neglected, desecrated and decimated – lakes and ponds wilfully destroyed for land and groundwater over-extracted because there is no official water for use.

This is not to say that these sources will suffice to meet the city's water needs. But these are certainly the start of the water supply pipeline. The rest of the solution lies in taking back the water, treating it and then recharging the same waterbody and aquifer – water to water. It is only in times of crisis that the city must need to bring water from distance.

#### (A) INCLUDE GROUNDWATER IN WATER SUPPLY CALCULATIONS

There is a need to factor in groundwater as a part of the overall planning for water in the city. If cities understood the critical need that groundwater supply is currently meeting in water supply, planners would perhaps be less disrespectful of the underground wealth. The groundwater-sewage connection also needs understanding. It is clear that the sewage, which is not connected, transported, treated and then safely disposed off, will make its way into drains and into the ground. It will contaminate the same water that is used for drinking.

There is another aspect. All economists talk about the need for pricing water supply. This is undisputable. But the unforeseen outcome of the increased water tariff is the increased dependence on groundwater. Across the country, as the price of water begins to pinch the company bottom-line, water's bottom-line is exploited. Bangalore, Chennai and even Hyderabad are clear instances of this water-switch. In this way, the water agency loses twice over.

Any move to regulate extraction rarely works as licensing only raises the transaction costs and breeds corruption. In Gurgaon, the important direction of the high court to ban the extraction of groundwater for non-drinking water uses, has been flouted with impunity. It is impossible to regulate the licenses of million well-owners.

In all these ways, the agenda to map groundwater will inform, advice policy and stimulate action. The fact is that groundwater is critical and we need ways of keeping the source healthy and replenished. The agenda for supply is to build on this underground reserve, not to write it off. Groundwater as a source of supply is the way of the past and the way of the future.

#### (B) LEGISLATE TO PROTECT WATER BODIES

There is no specific legislation in India to protect water bodies – urban or rural. In December 2010, the Union ministry of Environment and Forests issued the Wetlands (Conservation and Management) Rules, 2010. Under the rules, wetlands have been classified, into different categories based on location and size. In addition, the Central Wetland Regulatory Authority has been set up for regulation. But these rules, however, important will still leave out most urban water bodies from the ambit of protection. In cities, water bodies, are supposedly governed by city development rules. In most cases, these are listed and the change of landuse will require notification. However, this is easier said than done and will require working with other ministries whose mandate covers water bodies.

As a result, these lakes and water systems are in desperate need of recognition and protection. The only cover is the hundreds of struggles of individuals fighting land mafia and indifferent government agencies to protect local lakes. There is a growing concern that climate change and its promise of the growing intensity of extreme rain will bring even more flooding to cities and even more despair.

The question is how will cities protect urban water bodies and make them a part of their water system. This is when cities have grown over the waterbody and its functional parts – its drains and its catchment. Guwahati is the one city, racked by incessant flooding, which has decided to legislate the protection of its key water structures. It has identified the land holding the water and

recorded the area of the catchment in its waterbodies preservation and conservation bill 2008. But it is finding protection difficult. The catchment over years has been legally handed over to the rich and powerful for buildings. It has also been taken over by the city's poor for their settlements. This is not unique to this city on the banks of Brahmaputra as poor, marginalised by the city, neglected for their housing and yet essential for growth, are relegated to finding homes on unused public lands, catchments of waterbodies and drainage channels – the same lands that cities need water security. Perhaps this ironical twist is the real revenge – the valued asset is now in the hands of the most neglected and forsaken.

What makes matters worse is that for years, waterbodies have been truncated to suit disjointed bureaucracies and policies. In most cases, either the waterbody itself has been divided – the waterhead is owned by one agency and the waterbody by another. Or there will be many agencies which 'own' different waterbodies of the city and so planning, policing and protecting it is difficult. Jammu and Kashmir is one state, which has mandated its Lakes and Waterways Development Authority the right to manage not just the lake but also the catchment. Clearly, this is the model for other cities as well.

#### (C) INCLUDE LOCAL WATER BODIES INTO WATER SUPPLY INFRASTRUCTURE

The agenda for change requires each city to consider, as a first source of supply its local waterbody. Unless these structures are built into the water supply infrastructure, there will be only lip service for protection and at best, efforts to 'beautify' the lakefront for recreational purpose and not for its essential life-giving service. Therefore, cities must only get funds for water projects, when they have accounted for the water supply from local waterbodies. This condition is vital. It will force protection and will build the infrastructure, which will supply locally and then take back sewage – the water's waste connection -- also locally. It will cut the length of the pipeline twice over – once to supply and the other to take back the waste.

#### ***6.2.8 FUTURE INVESTMENT IN THIS SECTOR, MUST FOCUS ON SEWAGE AND JOIN THE DOTS WITH POLLUTION OF RIVERS AND WATERWAYS***

Investment in sewage must match the investment in water supply. It is also important to note that pollution control is not possible without the investment in sewage systems – to convey waste and then to treat it before disposal and reuse. More importantly, if the waste of all is not treated, then pollution control will not work. In other words, sewage facilities must be extensive – reach all people and intercept the waste of all for treatment. Otherwise, treated sewage – and it is expensive to build sewage plants and it costs to run them – will be mixed with untreated sewage. The end result will be (and is) pollution.

It is also clear that India has a huge backlog of sewage facilities to build. In most cities settlements have grown without underground sewerage infrastructure. 'Fitting' in the sewage lines into already built, crowded and congested and haphazard construction is a difficult task. This challenge is compounded by the fact that even where sewerage lines exist, they are already buried, broken or choked. Worse, nobody really knows the state of disrepair. But even as the old needs repair, there is much more that needs to be built as city's sprawl out of control.

In this situation, pollution control is a near impossible task. It can only work when the method of controlling pollution is changed – it does not wait for sewage to be first intercepted through underground drainage and it does not treat pollution as waste, but as a resource.

The fact is that Indian cities have the opportunity to reinvent sewage paradigms, simply because they have not yet built the infrastructure. They can leapfrog into new ways of dealing with excreta, which is affordable and sustainable.

The principle has to be to cut the cost of building the sewage system, cut the length of the sewage network and then to treat the waste as a resource – turn sewage into water for irrigation or use in industry.

### ***6.2.9 TO CUT POLLUTION, BUILD SEWAGE SYSTEMS DIFFERENTLY AND FOCUS ON SOFTWARE AND NOT HARDWARE***

The sanitation divide in our cities – where toilets are not available or not working -- is bad for health and unacceptable. The need for sanitation is “more important than Independence” said Mahatma Gandhi. There is no question that this message is even more important today.

But equally important is to consider how the toilet in the home is connecting to its transportation system. The toilet ladder can go from no-toilet to the flush, but its connection with the outside world may still go nowhere. The flush toilet within the house – important for hygiene and sanitation – may lead to an open drain and this in turn would lead to even more unhygienic conditions and be the cause of disease. Therefore, the complete sanitation solution is the only answer – the toilet that works and the sewage system that can convey and treat sewage for safe disposal.

#### **(A) MAKE DRAINS TREATMENT ZONES**

Sanitary engineers-turned-pollution managers have a one-size fits all solution – first build underground sewerage network (however long it takes), then connect households to the system (even if there is resistance or delays) and then once the pipeline has been officially inaugurated, it will transport official waste to the treatment plant (built earlier but not working because of lack of sewage). This will be done and pollution will be controlled.

So, the question is how the waste generated in households and conveyed through open drains and then into the river can be cleaned? The drains lead to stench, disease and unlivable conditions. Instead of waiting for the end-day, solutions should be found. The drain, open and unhygienic, can be used as a treatment zone. The sewage can be treated in the open drain, intercepted in the open drain and then conveyed for after-treatment to the already built sewage plant. This is not to say that this open-air treatment will clean sewage and turn it into drinking water. But it will certainly reduce pollution and also turn the drain, from a stinky and dirty sewer to a planted waterway, which will be part of the city’s landscape. Again, this is not a tried or easy solution. But experiments to clean stretches of drains, using bioremediation technologies have been conducted, with success.

The challenge is now to up-scale this approach and to integrate it into the pollution plans of the country. It is also a challenge to compute the costs of this emerging technology and to develop indicators for its performance so that projects do not become new scams, this time in the name of pollution.

The bottom line is that the city has to invest in sewage management, but it has to invest to do things differently.

### **6.2.10 SET REAL AND HARD TARGETS FOR AFFORDABLE RECYCLING AND REUSE OF TREATED WASTE WATER**

The location of the sewage treatment plant is just as important as the plant and building. The fact is that cities plan for sewage much after they have generated their waste. By now the city has grown, water has been supplied and sewage flows through open drains – because it has nowhere else to go. Then the city grows up – it wants to be modern and wants to be counted. It plans for sewage disposal. The first step is to identify land in the already crowded and built area. It builds the sewage plant, without considering how it will get the sewage to the plant or how it will dispose off the treated effluent.

It is because of this that plants come and pollution does not go. The treated effluent, even if it meets the strictest of discharge standards has not been planned in its disposal. The plan is that the disposal will be done in the drains or streams that flow in the vicinity of the treatment plant and the assumption is that these disposal channels will be for the exclusive use of treated effluent. But this rarely happens because cities have more untreated effluent, than treated effluent. So instead pollution happens. And the built infrastructure goes waste.

Given this real-life situation, the sewage treatment system must plan for safe disposal, before it can even be planned for treatment. The following could be options:

- i) Discharge directly in rivers or lakes to add to water quality
- ii) Discharge in lakes or other waterbodies designed for secondary treatment for recharge of groundwater
- iii) Piped to green spaces for watering
- iv) Channels for irrigation in agriculture
- v) Reuse in industry

In each case, treatment plan will be different. But in all cases, the treated effluent will improve the hydrological cycle. It will return water and not waste to the environment.

#### **(A) RETHINK THE SCALE OF WASTE TREATMENT TO PLAN FOR REUSE**

In this situation where reuse is more important than use, the size of the sewage treatment plant will also matter. If the plant is designed to be big, the cost of operations is reduced, but the transportation of sewage to the plant and the treated effluent from the plant, has a cost. If the plant is designed to be fitted to size – collects the waste of a group of houses, an institution or even colonies – then the cost of operations may well increase but there is substantial saving in the piping and pumping cost.

If the city rethinks the scale of sewage plants, it also has the opportunity to rethink the technology. It can innovate to look for options like bioremediation and microbes to decompose and de-pathogenise its sewage.

#### **(B) DEFINE WHAT RECYCLING AND REUSE MEANS**

The question is what does this recycling mean? What will it cost and how can it be done? Clearly, it is in the interest of the city to find ways to find buyers and users for its sewage. In this way, it can work out the effluent profile of its treated effluent and segregate its waste to meet the needs of the end-user.

### (C) RECOGNISE AND SUPPORT REUSE IN AGRICULTURE

This is not to say that recycling or reuse is a new idea. In fact, most wastewater of cities is reused in agriculture – cities discharge waste, which farmers, desperate for water use to cultivate. This practice is not recognised or promoted, it just happens by default. As a result this system of reuse of wastewater is breaking down, or it is adding to the load of pollution – this time of the cultivated fields and vegetables that make it back to the city again.

Kolkata, for instance, had an intricately designed system for waste management -- using agriculture and fisheries to reuse its discharge. In this system, the waste is treated at no cost to the city. In fact, it provides livelihood benefits to people. This wetland of the city is its kidney and also its sponge – it cleans waste and helps to mitigate floods. But this system is not recognized as essential to its water-waste future. The city, like all others, wants the water for new land to build more houses and more industries.

Similarly in Hyderabad large proportion of the treated and untreated waste is an important resource for the farmers who live in the vicinity. Studies done by the Colombo based International Water Management Institute (IWMI) estimate that some 40,000 hectares (ha) of land is irrigated using the domestic-industrial waste concoction from the Musi. It is practically the only source of water available for farmers, other than the variable monsoon rain.<sup>24</sup> So, technically, this city, does promote reuse of its wastewater. The problem is that this reuse happens because of poverty of the people living beyond the city and their desperation for water – even wastewater. The use is not planned, so that policy ensures that water used for agriculture meets parameters, which will make it useful for agriculture but not harmful for humans.

It is in the interest of this city and many others, to improve the system of waste to wealth. It would require cities to segregate industrial waste from domestic waste. It would then require treatment of waste to remove pathogens and to meet parameters for discharge on land. It is important to note that treatment of waste for reuse in agriculture will be cheaper for the city, than cleaning water for reuse in drinking or industrial use. But this requires that this strategy for reuse is part of the grand design to clean waste of the city, not just its unintended consequences.

### (D) PLAN TERTIARY TREATMENT CAREFULLY

Cleaning sewage for reuse in industry or even for domestic use requires tertiary level treatment – using reverse osmosis membrane and other technologies. This is expensive, but not unaffordable, given the reality of water in the country.

There is insufficient experience in the country of building and running large plants, capable of tertiary treatment, but small plants – 2-10 mld are being built. In this case, the capital cost of the tertiary treatment plant, which is designed to treat sewage, which is already cleaned to the secondary level, is roughly three times more.

But compare this cost to the cost of bringing water to the city – Hyderabad notes that bringing Krishna water will cost it Rs 18 kl.

The challenge is also to find ways to treat sewage to turn it into clean water at affordable rates – reinvent technologies so that instead of expensive reverse osmosis options, the cycle of waste to

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<sup>24</sup> Stephanie Buechler and Gayathri Devi, Household food security and wastewater dependent livelihood activities along the Musi river in Andhra Pradesh, International Water Management Institute, mimeo

wealth is made cheaper and easier. This can be done by segregating the waste stream – taking out toxic chemicals at the source itself. It can also be done by changing technologies for treatment, using bioremediation and other coagulation options. This is important because reverse osmosis is becoming the mantra that could well fail.

#### (E) CURRENT PRACTICES IN RECYCLING

Chennai has the distinction of having the country's first recycling project – the city's sewage was sold to the Chennai Petroleum Company Limited (CPCL), which in turn used reverse osmosis technology to filter sewage and turn it into water for its use. In this water-scarce region, the refinery found the option viable. In 1990, when the plant was commissioned, CPCL (then Madras Refinery) spent Rs 25 to build this 12 mld plant. It costs the company Rs 28 kl to turn treated sewage into usable water. But this cost is cheaper as compared to the commercial and industrial water rates of MetroWater. More importantly, it is reliable. Even when there is no water to source, there is always sewage to buy.

Cities are also building the concept into their policies. But uncertainty and confusion abounds – nobody is clear why and how they will implement recycling and reuse.

The first response of cities has been to ask for the separation of water – black (sewage) and grey (wash and kitchen) in homes. This requires houses to construct dual pipe systems – one outlet for sewage and another for the rest. But it is expensive to install and the city direction asking for this to happen has been more or less neglected.

In February 2010, the town of Nanded in Maharashtra issued orders to revise its development control regulation to include grey water recycling systems. The byelaws are applicable to all housing, commercial and industrial premises more than 2000 sq metres or if the water quota is more than 60,000 litres/day. In these regulations, the waste from the toilets needs to be separated from grey water – bath and kitchen waste and taken into a separate discharge system. This grey water is then to be recycled and reused for non-potable purposes. The house or institution owner, who has done grey water recycling will be entitled to a rebate in the water, sewage tax. This is after the municipal officer is satisfied that the building or residential structure “has successfully reduced their potable water consumption by a specific percent.”<sup>25</sup>

Nanded is not the first city to do this. In 2009, Rajkot amended its byelaws making recycling mandatory for buildings more than 270 sqm. Again, the purpose was to separate out the grey from the dark water and to encourage use of this ‘reusable’ water for non-potable purposes. Under JNNURM 46 cities have included byelaws on reuse of recycled water. However, implementation of this dual piping system is still a challenge.

In India cities are also beginning to look at the potential of their sewage for water. But as yet the implementation is hesitant, small in scale and unclear of the purpose. Bengaluru treats its sewage to tertiary level. It has installed small plants – 1.5 mld -- in its prestigious green spots of Cubbon Park and Lalbagh. But the question is why it would need to treat water to this ‘tertiary’ level for its gardening needs.

Similarly, the planned city of Chandigarh has announced a policy to recycle its wastewater. The city has already commissioned a project to treat 90 mld sewage to tertiary level for use in its

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<sup>25</sup> Government of Maharashtra 2010, Development Plan Nanded, Notification, Urban Development Department, Mumbai, mimeo

parks. But the capacity created is hardly used – roughly 30-36 mld – because the city does not have the requisite pipes to take back the treated water to the gardens spread across the city. The location of the sewage treatment plant is such that the city would require an extensive pipe system to first bring sewage for treatment and then to take back the treated sewage for gardening.

It would possibly be more feasible for the city – with huge garden and open spaces – to implement a rainwater harvesting system to recharge groundwater, which can be used for watering green spaces. This local water harvesting, done without pipes to transport water and then sewage, would be cheaper and sustainable. Therefore, while planning recycling, other options such as rain water harvesting need to be examined

Modern Delhi inherited a sewage reuse system, designed by its Colonial masters, which uses only raw water for gardens. Now the city, a guzzler for water, finds that it needs new solutions. It has a number of sewage treatment plants but no strategy for reuse. In this case, treated effluent is mixed with untreated effluent and pollution gains are lost. So it is trying to look for buyers for its waste. But without an initial plan made when the sewage plants were built, this is turning out to be difficult. The plants are situated where there is no industrial buyer or no green space, which can be watered. As a result it has only found takers for 256 mld of treated effluent (as against over 1500 mld it cleans). In addition, it has signed agreements with two power stations in the city, which will take another 265 mld off its hands. The city is selling treated water at Rs 4 per kl and the power plant will install the tertiary treatment system.

#### (F) THE POLICY FOR RECYCLING MUST BE PART OF WATER SUPPLY SYSTEM

What is clear is that cities must plan for reuse and recycling of waste at the very beginning of their water and waste plan. It cannot be an after-thought. It is also clear that cities must think through the plan for reuse for affordability and sustainability. The diverse options for reuse must be factored in – use in agriculture, for recharge of waterbodies, for gardening and for industrial and then domestic use.

But the bottom line is clear; if Indian cities do not learn the science and art of living with scarce water then there is trouble ahead. Indian society is a water prudent society today because it is poor. As it gets rich it will have to learn not to first waste and then clean up.

### ***6.2.11 BUILD CAPACITY AT ALL LEVELS AND EXPLORE INSTITUTIONAL AND MANAGEMENT OPTIONS WHICH WORK FOR WATER AND SANITATION IN CITIES***

It is clear and often repeated that Indian cities need capacity to take managerial and technological decisions regarding essential public services and to implement and deliver these services to all. This internal capacity is even more important in the situation where many elements of the urban services are to be contracted to private companies.

There is no best model that is currently in place to manage water and sanitation services in the country. Therefore, what is needed is to build internal capacity to measure, to review, to implement and to monitor these services, with the objective of providing water to all and taking back and treating and reusing sewage of all. The challenge is to find models of service delivery and technologies that are affordable and sustainable. Therefore, the 12<sup>th</sup> Five Year Plan needs a deliberate and innovative strategy to build this capacity to plan and implement such a strategy.

In this context, the working group would suggest the following:

- i) To greatly build internal capacity at the Union Ministry of Urban Development and CPHEEO to be able to provide guidance and effective monitoring of funded projects.
- ii) To build capacity of municipal officials and engineers to implement innovative and emerging technologies and approaches in water and sanitation.
- iii) To strengthen state and city level water supply and sanitation institutions.

# **CHAPTER 7- FLOOD MANAGEMENT AND REGION-SPECIFIC ISSUES**

## **7.1 INTRODUCTION**

Floods are considered as a recurrent phenomenon in many parts of the country, causing loss of lives and public property and bringing untold misery to the people, especially those in the rural areas. There is also a larger economic impact, as they derail economic activities, thus affecting growth. Over the years, several expert committees have studied the problems caused by floods and suggested measures for their management to the Government.

As per constitutional provisions, the subject of "Flood Management" falls within the purview of the States. The flood control & management schemes are planned, investigated and implemented by the State Governments with their own resources as per priority of the State. The Union Government renders assistance to States which is technical, advisory, catalytic and promotional in nature. Therefore, a two tier system of flood management exists in India as briefly described below:

### ***7.1.1 STATE GOVERNMENT MECHANISM***

The State Level Mechanism includes the Water Resources Departments, State Technical Advisory Committee and Flood Control Board. In some States, the Irrigation Departments and Public Works Departments look after flood matters.

### ***7.1.2 CENTRAL GOVERNMENT MECHANISM***

The Union Government has set up following organizations and various expert committees to enable the State Governments to address flood problems in a comprehensive manner:

#### **A) CENTRAL WATER COMMISSION (CWC)**

The Government of India set up a Central Water Commission in 1945 for achieving the goal of furthering and promoting measures of flood control, conservation and utilization of water resources throughout the country in the areas of irrigation and hydropower generation, flood management and river conservation. As a national apex engineering organisation in the field of water resources development, the CWC with its vast experience, has developed considerable know-how in planning, investigation, management and design of water resource development schemes and made valuable contribution to the country's remarkable progress in this field. It has also shared its expertise with developing nations of the world. The CWC plays a direct role in real time collection of flood data, flood forecasting and dissemination of flood forecasts to the local administration for planning suitable administrative measures including evacuation of people from flood affected areas to the safer locations.

#### **B) BRAHMAPUTRA BOARD**

The Government of India set up Brahmaputra Board under Brahmaputra Board Act, 1980 (46 of 1980) under the then Ministry of Irrigation (now Ministry of Water Resources) The jurisdiction of Brahmaputra includes all NE States including Sikkim and North Bengal. The main functions of the Brahmaputra Board are as under :

- Survey and investigations in Brahmaputra and Barak valley.
- Preparation of master plans to control floods, bank erosion, and improve drainage system.
- Preparation of DPRs for dams and other projects
- Standard specifications for construction, operation and maintenance of dams.
- Construction of multipurpose dams and maintenance thereof.
- Any other function for implementation of Brahmaputra Board Act-1980.

#### C) GANGA FLOOD CONTROL COMMISSION

The Ganga Flood Control Commission (GFCC) was set up by Government of India in 1972 for the preparation of a comprehensive plan of flood control for the Ganga Basin and for a phased coordinated programme of implementation of works and monitoring & appraisal of flood management schemes of Ganga basin States. The GFCC has prepared comprehensive plans of flood management of the 23 sub-basins in the Ganga Basin besides drawing out a phased programme of implementation of these works to ensure proper standards and monitoring of various flood management schemes in the Ganga Basin States.

#### D) NATIONAL DISASTER MANAGEMENT AUTHORITY (NDMA)

For prevention and mitigation of effects of disasters including flood disasters and for undertaking a holistic, coordinated and prompt response to any disaster situation, the Government of India has set up a National Disaster Management Authority (NDMA) in 2005 under the Chairmanship of Hon'ble Prime Minister of India. The functions of the NDMA are to:

- (i) lay down policies on disaster management;
- (ii) approve national Plan;
- (iii) approve plans prepared by the Ministries or departments of the Government of India in accordance with the National Plan;
- (iv) lay down guidelines to be followed by the State Authorities in drawing up the State Plan;
- (v) lay down guidelines to be followed by the different Ministries or departments of the government of India for the purpose of integrating the measures for prevention of disasters or the mitigation of its effects in their development plans and projects;
- (vi) co-ordinate the enforcement and implementation of the policy and plan for disaster management;
- (vii) recommend provision of funds for the purpose of mitigation;
- (viii) provide such support to other countries affected by major disasters as may be determined by the central Government;
- (ix) take other measures for the prevention of disaster and for capacity building to deal with the threatening situation ;

- (x) lay down broad policies and guidelines for the functioning of the National Institute of Disaster Management.

The NDMA has issued guidelines in January, 2008 for the management of floods. The roles of various Central and State agencies have been specified for preparation of flood mitigation plans and taking relief measures during flood disasters.

## **7.2 INSTITUTIONAL REFORMS**

The Working Group suggests the following institutional reforms for effective flood management in the country :

### ***7.2.1 EXPEDITE SETTING UP OF RIVER BASIN AUTHORITIES***

The issue of setting up of River Basin Authorities has been raised by the Expert Committees long back. However, action in this regard is yet to be taken both by Central as well as State Governments. The primary action is to be taken up by the State Governments but so far no concrete action from their side has been taken for initiating a proposal for setting up of the River Basin Authorities. Integrated water resources management including integrated flood management can be addressed with collaborative efforts of all agencies / mechanisms involved in this gigantic task. Therefore, our efforts need to be concentrated in setting up of River Basin Authorities with top managerial skills and with appropriate delegation of powers in the interest of sustainable management of India's water resources and for addressing flood problems in a holistic manner.

### ***7.2.2 STRENGTHENING OF ORGANIZATIONS UNDER MOWR***

The Organizations, namely, Central Water Commission, GFCC and Brahmaputra Board under the Ministry of Water Resources are required to play vital roles in the preparation of master plans for specific river basins. The CWC plays an important role at the national level in coordinating the efforts made by various agencies in overall water resource management including, flood management.

The need for strengthening of these Organizations, in order to play advisory and coordinating roles, has been emphasized by various expert committees on flood management in the past as well as in the Committee of Secretaries meeting in 2007. The strengthening of CWC is required in a time bound manner in view of the expansion of its hydrological and flood data collection network, flood data transmission and management of floods. Therefore, it is recommended that the actions at all concerned levels for time bound strengthening of these Organizations may be expedited so that flood mitigation efforts are properly coordinated in the country. The needs of these organizations regarding infrastructural facilities required for flood data collection, flood forecasting, flood management and related inspection, supervision and coordination, are to be addressed appropriately.

### ***7.2.3 STRENGTHENING OF NWA PUNE***

The National Water Academy (NWA) located at Pune is presently involved in providing training to the engineers / officers of the Central / State Governments. Although the coverage of the training is exhaustive as per needs of the officers involved in various facets of water resources management, efforts may be made to convert NWA, Pune into a Centre of Excellence for International training programmes on matters pertaining to flood mitigation so that up-to-date globally available know-how could be shared under such training programmes. The NWA, Pune

may also be suitably strengthened to meet the requirement of NDMA for conducting trainings on disaster risk reduction programmes.

#### ***7.2.4 STRENGTHENING OF STATE FLOOD CONTROL DEPARTMENTS***

As per Constitutional provision the subject of flood management falls within the purview of the State Governments. Therefore, project-specific planning and their implementation is to be ensured by the State Governments. However, the present structure of the State level flood control departments needs to be revamped to discharge their role as prime flood managers in the State. The specific needs of human resources and their skill development are required to be addressed suitably. However, while making such revamping proposals, proper evaluation of the available strengths and the requirements of the departments to shoulder the responsibilities of flood management would need to be made.

#### ***7.2.5 DISPENSING WITH THE CONCEPT OF 'PLAN' AND 'NON-PLAN'***

There are nagging problems in ensuring proper maintenance of the assets created by the State Governments mainly because the assets are, as per existing financial procedures, arranged under various plan schemes. The sophisticated equipment and the works undertaken with plan funds suffer maintenance when the plan schemes are closed and their maintenance is shifted from Plan to non-Plan Heads of Expenditure. In order to overcome these bottlenecks, it may be appropriate to dispense with the concept of plan and non-plan in Government procedures and the funds to central agencies / departments may be provided by the Planning Commission / Ministry of Finance to the central / state agencies on a continuation basis.

#### ***7.2.6 NO RESTRICTION ON RECRUITMENT OF NEW STAFF***

Presently, there have been restrictions on recruitment of staff under the Central agencies. Important activities like collection of hydrological data, field survey works, flood forecasting and also many other functions being performed by central agencies suffer due to shortage of staff as a result of reduction in strength due to retirement / death of the employees. Therefore, it is recommended that there should not be any restriction on new recruitment of staff required for such emergent field works.

#### ***7.2.7 PROVIDING ADEQUATE INFRASTRUCTURAL FACILITIES***

The central agencies performing field activities related to flood management are facing various difficulties including inadequacy of infrastructural facilities for accommodating the field staff and shortage of inspection vehicles for carrying out field job, inspection and supervision. These nagging problems need to be addressed appropriately in order to enhance their output both in terms of quality and quantity.

#### ***7.2.8 CAPACITY BUILDING PROGRAMMES***

In order to have well planned and effective flood management measures with state of the art knowledge based inputs, it is recommended that specialized in-house and foreign training may be imparted to the officers/staff of Central/State Governments in all areas of flood management including hydrological data collection & its management, survey & investigation, planning & design, hydrological studies, preparation of techno-economically sound DPRs, flood forecasting, inundation forecasting, construction, equipment operation & maintenance, use of latest GIS based technologies in decision making, etc. The specific training programmes may be drawn by respective organisations and adequate funds for the purpose may be provided.

## **7.3 KEY STRATEGIES AND RECOMMENDATIONS**

In order to have effective programmes for addressing the problem of flood in the country, the following strategies are recommended to be effectively implemented during XII Plan.

### ***7.3.1 INTEGRATED BASIN MANAGEMENT APPROACH***

Integrated flood management calls for a paradigm shift from the traditional, fragmented and localized approach, and encourages the use of the resources of a river basin as a whole. Therefore, there is a need for an approach backed by latest technologies and implemented in a most effective manner. In order to have integrated basin development including flood management in a holistic manner, setting up of River Basin Organisations may be expedited by the States and the Central Government.

### ***7.3.2 CONSTRUCTION OF DAMS AND RESERVOIRS WITH ADEQUATE FLOOD CUSHION***

The long term solution to problems of recurrent floods and droughts lies in construction of dams and reservoirs with adequate flood-cushion and interlinking of water abundant and water scarce regions so that excess flood water is judiciously utilized and inherent agony of floods is turned to the benefit of people. However, due to geographical and political constraints, construction of large reservoirs in every region appears to be a tough task. There are other constraints too. Some reservoirs were initially constructed without any flood cushion but with development and population growth, the inhabitations have come up very close to the downstream of these reservoirs and operation of such reservoirs needs to be done carefully. Under such situations, the use of latest knowledge based techniques of inflow forecasting could be employed. Also, an optimum combination of structural and non-structural measures may yield fruitful results.

Construction of dams and reservoirs with adequate flood cushion may be undertaken wherever feasible. In the reservoirs initially constructed for power and other benefits and where flood cushion was not initially provided, inflow forecasting may be used for reservoir regulation to achieve flood moderation. The projects for interlinking of rivers for diversion of flood water to water scarce areas may be taken up in a time bound manner. Integrated reservoir operation should be adopted as a matter of rule and there should be a state of the art information system about releases from the reservoirs to enable timely operation of reservoirs located.

As a policy, a minimum flood cushion of 10% of the live storage capacity should be provided in all new dams and, if affordable with respect to other purposes, providing even a flood cushion upto 20% could be considered. A portion of the capital cost of the reservoir should be allocated to flood control and shared by all beneficiary States.

### ***7.3.3 EMERGENCY ACTION PLANS AND OPERATION PROCEDURES***

Development of dam break models and preparation of Basin-wise Emergency Action Plans may be undertaken by the State Governments / Project Authorities.

Special emphasis may be given to the formulation of operating procedures/manuals for operation of gates/structures in the water resources projects and the associated officers and staff be given specialized training to manage the distress situations in a professional manner.

### **7.3.4 DETENTION BASINS**

The States should identify suitable sites for creation of detention basins for their use to store flood water which would help in flood moderation besides availability of water during non-monsoon periods.

### **7.3.5 OPERATION AND MAINTENANCE**

A separate budget for O&M of the existing flood management works (excluding salary) may be provided by the State Governments in their annual budget estimates in order to ensure that maintenance of the existing works is given due consideration. The O&M works may also be supported by Planning Commission in the State Plan budgetary requirements.

### **7.3.6 FLOOD FORECASTING AND WARNING**

The existing flood forecasting network of Central Water Commission is not sufficient to cover adequately the entire country. More flood information about the important cities is required to plan measures for safety of lives and property of people. Therefore, a concrete plan for extension of CWC's flood forecasting network may be drawn in consultation with the State Governments and IMD to cover A, B-1, B-2 and C-class Cities located near rivers under the network of automatic data collection, transmission and flood information dissemination.

Presently, CWC provides inflow forecasts to 28 reservoirs / barrages in the country. It is recommended that the Inflow Forecast services may be extended to more dams to cover 80 to 90% of the live storage capacity. An additional 160 reservoirs are proposed under inflow forecasting network of CWC.

### **7.3.7 FLOOD PLAIN ZONING**

MOWR/CWC had prepared a Model Bill on Flood Plain Zoning and circulated it to State Governments for enacting suitable legislature and enforcement. The State Governments have reported difficulties in enactment of necessary legislation and enforcement of laws in this regard, due to constraints of evacuation of people who are already occupying the flood plains and their settlement elsewhere due to constraints of land. However, for orientation of plans for flood damage reduction, it is necessary to have the flood plain zones marked / demarcated by the concerned States in accordance with criteria suggested by CWC in the Model Flood Plain Zoning Bill and draw their zone specific strategies about the use of flood plains, including schemes of incentives and dis-incentives. The States should also bring out standard norms for types of buildings which can be constructed in different zones of flood plains considering that required water way is available for passing the flood discharge.

### **7.3.8 WATERSHED MANAGEMENT**

Watershed management in the hilly catchments of the rivers originating in Nepal, Bhutan and hilly areas of India should be selectively chosen and funded fully. Implementation should be done through a joint mechanism. Ministry of Agriculture, which is the nodal Ministry for the watershed management works should work out a detailed programme in consultation with the Ministry of Water Resources.

### **7.3.9 DRAINAGE IMPROVEMENT**

Drainage development aspects need to be given due importance, as there have been cases of flooding wherein the flood water stayed for long periods due to drainage related problems. Special schemes may be formulated by States for improvement of drainage.

### **7.3.10 NEED FOR PROPER STRENGTHENING OF ORGANISATIONS FOR EXECUTION OF WORKS WITH CONVENTIONAL APPROACH**

Presently, the execution of flood management works is done by the Government agencies and expenditure on execution of works including their maintenance is borne by the Government as a social responsibility. However, for effectiveness of this approach the working of existing departments needs to be appropriately improved by strengthening the monitoring system with very rigid financial discipline, transparent procedures of tendering of execution of works and involvement of local administration and *Gram Panchayats*. Proper infrastructural facilities including vehicles may be provided to the central and State organizations involved in flood management for more effectiveness of services being provided by them to the public.

Restructuring and Strengthening of existing organizations of State / Central Governments may be done in an appropriate and time bound manner to enable them in performing various activities of flood management in an effective manner. Also, there should not be any restriction on new recruitments required for undertaking flood management related field jobs.

Specialized in-house and foreign training may be imparted to the officers/staff of Central/State Governments in all areas of flood management including hydrological data collection & its management, survey & investigation, planning & design, hydrological studies, preparation of techno-economically sound DPRs, flood forecasting, inundation forecasting, construction, equipment operation & maintenance, use of latest GIS based technologies in decision making, etc. The specific training programmes may be drawn by respective organisations and adequate funds for the purpose may be provided.

Appropriate strengthening of NWA, Pune may be done for its functioning as a centre of excellence for conducting domestic and international training programmes in flood management and NDMA's disaster risk reduction programmes.

### **7.3.11 PUBLIC-PRIVATE PARTNERSHIP CONCEPT**

In order to address the concerns about irregularities and transparency in execution of various projects, the Planning Commission has recently favoured adoption of the concept of Public Private Partnership (PPP) in operation of Infrastructure related projects. Under this concept, the services to the general public are provided by the private agencies and the funds are arranged for implementation of projects through investments by private investors and revenue from the users as a commercial system. The responsibility for the services, however, remains with the Government. Such a system is already in practice in case of major highway projects where revenue generation is through toll plazas. Such a system ensures better financial discipline, transparency in award of works and maintenance of the services. However, efficiency, economy, competition and transparency should be the cornerstones for assessing the level of success when dealing with the private sector.

In the flood sector, if the embankments are made roadworthy, there are great investment opportunities by private investors. Therefore, efforts should be made to make the embankments roadworthy and adopt PPP model for their construction and maintenance and collection of revenue / tax by the private agencies by setting up Toll Plazas.

### **7.3.12 INVENTORY OF WORKS COMPLETED BY STATE GOVERNMENTS**

Presently, no consolidated records are being maintained by the State Governments about the flood management works completed by them. In order to have a holistic view on the works already

completed and further measures required for reasonable flood management, the State Governments are required to maintain inventory of the flood management works completed by them. These details may be compiled river-wise and district-wise. The appraisal agencies may emphasize preparation of such inventories and no new schemes may be recommended by them unless the inventory registers of works already completed are produced and gaps identified by the State Governments in flood management measures.

### ***7.3.13 SCIENTIFIC ASSESSMENT OF FLOOD PRONE AREA***

The flood prone area forms the basis of any assessment of prioritizing the programmes of flood management. The flood prone areas assessed by RBA in 1980 were based on many assumptions due to inadequate data for carrying out a scientific and rational analysis. Making use of new technologies available today, it is desirable that a scientific assessment of the flood prone areas is done. Detailing at micro level using latest satellite imagery data and considering frequency of flooding, duration and depth of inundation etc., may be done. The NDMA may play a lead role in this regard with the help of NRSC, CWC, GFCC, Brahmaputra Board and representatives from flood prone States.

### ***7.3.14 EMBANKMENTS***

Generally, the non-structural measures are conceived as short term measures but in absence of sufficient large storages, which could ensure safety on long-term basis, and on account of apprehensions developed due to recent breaches in major embankments; the modern techniques like flood plain zoning, durable buildings in flood plains, flood forecasting, inundation forecasting and all remote sensing technology based tools need to be included as part of our long term strategy of fighting against the menace of floods.

For better and assured preparedness against floods, conventional flood management measures like construction of new embankments, raising & strengthening of existing embankments, construction of spurs for deflecting flow directions to ensure safety to the embankments may be adopted, as per necessity.

The State Governments are constructing embankments in order to stop spilling of water from the rivers. Some of the important embankments were constructed long back and these have a huge risk to the people and their properties in case of breach. Therefore, State Governments should identify and classify the embankments according to their vulnerability and should draw programmes for regular monitoring of the critical reaches of embankments by using mobile arrangements to clear blockages so that the waterway gets cleared and pressure on embankments is reduced. The state Governments should follow the embankment maintenance guidelines.

There may be some embankments which were initially designed with a lower return period of flood for providing protection to save agricultural land but at present these embankments need to provide protection to townships and industrial areas as a result of development. Therefore, there is urgent need for revisiting the design procedures of such embankments, making use of latest design technologies and new construction materials by the concerned State Governments.

The State Governments should carry out plantation along the flood embankments for safety of embankments against erosion.

There is a need for identification of appropriate location for spilling sections/slucices in the flood embankment for controlled flooding of the protected areas, restoring fertility, recharge of soil

moisture and ground water. Drainage sluices are recommended to be made an integral part of embankments to prevent water-logging in the protected areas.

### ***7.3.15 FLOOD MANAGEMENT PROGRAMME***

During XI Plan, Government of India started a Flood Management Programme, a State Sector Scheme under Central Plan and as informed by the Ministry of Water Resources, central assistance is being provided under the scheme as per laid down guidelines. The Flood Management Programme may be continued during XII Plan also. However, the existing mechanisms and procedures of release of funds may be reviewed and simplified to remove the bottlenecks. Only those schemes which are very critical in nature from the angle of long-term protection against floods, costing above Rs. 100 crore and having Benefit Cost Ratio more than 2.0, may be considered for funding by Union Government under Flood Management Programme and other schemes may be taken up by the concerned State Governments through their State Plan allocation. However, works of special category States may be decided and funded on the basis of criticality. Planning commission may consider allocating major portion of the Plan outlay for flood management directly to State Governments as per their requirements under Flood Control Sector and make balance allocation under State Sector in Central Plan for critical flood management works only.

### ***7.3.16 RAISED PLATFORMS***

A system of scientifically designed raised platforms, community housing with livestock units, health units where people can be accommodated during the four months of floods may be adopted. Flood shelters may be used as school, community centers during non flood time. MHA / NDMA may include sufficient provision for development of model multipurpose flood shelters under the National Flood Risk Mitigation Project or any other related programme.

### ***7.3.17 PROCEDURAL REFORMS***

The Government may consider dispensing with the financial procedure of plan and non-plan, since at present meeting of expenditure on maintenance of assets created with plan funds becomes difficult with insufficient funds allocated under non-plan.

### ***7.3.18 INTERNATIONAL DIMENSIONS***

Expedite steps for construction of large storage dams in Nepal and emphasis may be given on flood control besides other benefits of irrigation and hydropower generation. The outstanding bilateral issues regarding mutual acceptance on the DPR of Pancheswar Multi-Purpose Project may be resolved with Nepal at the earliest.

Steps may be taken for installation of automatic data collection and its transmission through satellite-based communication systems for the stations, in the territories of neighbouring countries, on rivers which flow into India.

Steps may be taken for providing hourly data by China to India on Brahmaputra and Sutlej so that the same could be utilized in the flood forecasting system of India.

### ***7.3.19 APPLICATION OF NEW TECHNOLOGIES***

Digital Elevation Models (DEM) along major river systems including area falling in the flood affected zone in the range of 0.5 m to 1 m should be prepared for all river basins.

The State Governments may be encouraged to own the data using modern technology, get it fully digitized and put into application. The State Governments should develop capacity for undertaking such activities in order to tackle the flood problems.

The NRSC has been undertaking the activities of preparation of flood hazard zonation maps, close contour information, river configuration & bank erosion studies, development of geo-spatial tools and flood mapping & flood damage assessment under the Plan Scheme. “Disaster Management Support Programme” may be expanded to include more river basins and NDMA may provide necessary support to NRSC in this regard.

The States should include in their State Plans the activities of data collection, technology upgradation, capacity building, preparation of digital elevation models, hazard zonation maps, inundation maps and modeling, installation of computers, VSAT systems for automatic receipt of online flood information from CWC.

Basin-wise flood management models including ALTM technology based Digital Elevation Models, Inundation Forecast Models, Bathymetric Surveys and Cubature Study Models may be undertaken jointly by NRSC, CWC and concerned States.

Development of Integrated mathematical models may be undertaken jointly by IMD and CWC for flood / runoff forecasting using weather parameters, rainfall observed and rainfall forecast.

## 7.4 OUTLAY FOR XII PLAN

Under the constraints of non-availability of requisite information from all the States and UTs, the Working Group has relied upon the details as available with Ganga Wing(MOWR), CWC, GFCC and Brahmaputra Board and recommends continuation of all the schemes namely (i) River Management Activities and Works Related to Border Areas, (ii) Flood Forecasting, (iii) Infrastructure Development – Land and Buildings of MoWR/CWC and (iv) Farakka Barrage Project (under transport services) under Central Sector and one Scheme namely “Flood Management Programme” under State Sector during XII Plan. However, in order to enable the States to take up the major works of urgent nature expeditiously, it is recommended that during XII Plan, only critical flood management works with Benefit Cost Ratio more than 2.0 and costing Rs. 100 crore and above may be funded under the State Sector Scheme “Flood Management Programme” and flood management / anti sea erosion works below Rs. 100 crore may be undertaken by the State Governments through their state plans. During XII Plan, the flood management / anti-sea erosion works of UTs are proposed to be funded under the Central Sector Scheme renamed as “River Management Activities and Works Related to Border Areas and UTs” besides continuation of 100% funding of the bank protection /anti-erosion works on common border rivers. Thus, the Working Group recommends a total outlay of Rs. 57775 crore under flood control sector for XII Five Year Plan (2012-17) as under:

S.N.	Name of Programme / Scheme	Outlay (Rs.crore)
<b>A</b>	<b>Central Plan (CP)</b>	
<b>I</b>	<b>Central Sector (CS)</b>	
(i)	River Management activities and Works Related to Border Areas and UTs	1250.00
(ii)	Flood Forecasting	425.00
(iii)	Infrastructure Development – Land & Buildings of MOWR/CWC	200.00
(iv)	Farakka Barrage Project ( Transport Services)	800.00
	<b>Sub-total (CS)</b>	<b>2675.00</b>

<b>S.N.</b>	<b>Name of Programme / Scheme</b>	<b>Outlay (Rs.crore)</b>
<b>II</b>	<b>State Sector (SS)</b>	
(i)	Flood Management Programme	16000.00
	<b>Sub-total ( SS)</b>	<b>16000.00</b>
	<b>Total ( CP)</b>	<b>18675.00</b>
<b>B</b>	<b>State Plan (SP)</b>	<b>39100.00</b>
	<b>Grand Total ( CP+SP)</b>	<b>57775.00</b>

## **CHAPTER 8 - WATER GOVERNANCE**

The Working Group on Water Governance comprised the following three Sub Groups:

1. The Sub Group on Legal Issues related to groundwater management and regulation, including the strengthening of the ground water regulatory authorities at the Centre and States
2. The Sub Group on National Water Framework Law
3. The Sub Group on Model Bill for State Level Water Regulatory Authority

### **8.1 DRAFT MODEL BILL FOR THE CONSERVATION, PROTECTION AND REGULATION OF GROUNDWATER**

#### ***8.1.1 BACKGROUND – GROUNDWATER USE AND CONTEXT***

Groundwater use in India has dramatically increased over the last couple of decades and is the backbone of India's agriculture and drinking water security. It is used by millions of farmers across the country and over the last four decades, around 84 per cent of the total addition to the net irrigated areas has come from groundwater. Further, it remains the only drinking water source for most of India's rural households and forms an important supplement to municipal water supply in most of India's towns and cities.

Many industries also depend upon groundwater. Its over-exploitation by industries can cause drinking water shortages and shortages of water for other purposes, including irrigation. This has already triggered conflicts on access to and use of groundwater. This is illustrated by the high profile dispute currently on appeal with the Supreme Court involving the Perumatty Grama Panchayat and the Coca Cola Company in Plachimada, Kerala.<sup>26</sup>

With an estimated 30-million groundwater extraction structures, India is fast hurtling towards a serious crisis of groundwater overuse and groundwater contamination. The report of the Expert Group on Groundwater Management and Government of the Planning Commission (2007) stated that in 2004, 28 percent of India's blocks were showing alarmingly high levels of groundwater use. In addition to quantitative depletion, many parts of India report severe water quality problems, causing drinking water vulnerability. At the national level, therefore, the Mid-Term Appraisal of the 11<sup>th</sup> Plan notes that nearly 60 percent of all districts in India have problems related either to the quantitative availability or to quality of groundwater or both. This is a serious situation warranting immediate attention, particularly with regard to drinking water security, given the fact that more than 80 percent of India's drinking water needs are serviced by groundwater resources.

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<sup>26</sup> *Perumatty Grama Panchayat v State of Kerala* 2004(1) KLT 731 (High Court of Kerala, 2003) and *Hindustan Coca-Cola Beverages v Perumatty Grama Panchayat* 2005(2) KLT 554 (High Court of Kerala, 2005).

At the same time, some areas reel under the impacts of rising water tables and waterlogging. The challenges of excess groundwater are also a source of significant concerns in many areas that must be addressed on a priority basis.

Groundwater is a common pool resource, which follows complex dynamics influenced by its hydrogeological characteristics.<sup>27</sup> Water-related programmes such as drinking water and sanitation are still bound to sources rather than resources. Wells are only mechanisms of accessing aquifers, the scientific unit described to define this common pool resource. This focus on sources (rather than resources) has entailed a push for newer groundwater prospects as sources run dry or become unusable as a consequence of groundwater extraction or contamination or both. This approach has led to repeated silting of sources, leading to a proliferation of wells and a race to the pump house, both of which are in strong disagreement with common pool principles. Aquifer-based management of groundwater resources is emerging as a concept for managing groundwater in recent times and needs to be promoted in order to understand groundwater as a common pool resource and manage it as such.

The increasing use of groundwater has significant social consequences. In a context where the poor rely on less powerful extraction mechanisms, small farmers suffer from lowering water tables much before other users of groundwater who have the financial means to deepen wells or acquire alternative water sources for irrigation.

Further, there are increasing concerns with regard to the quality of groundwater available rendering a significant proportion of India's rural population vulnerable with regard to the availability of safe water to meet their basic life and livelihood needs. Critical issues include arsenic contamination in the Ganga basin; higher levels of fluoride in many states, in particular in Punjab, Tamil Nadu, Rajasthan and Haryana; and salinity in coastal states such as Gujarat, Kerala and Odisha. In addition, groundwater is affected where rivers are used as municipal or industrial conduit for raw wastewater and where contaminated water is pumped into the ground.

### ***8.1.2 GROUNDWATER RULES DEVELOPED SINCE THE NINETEENTH CENTURY***

The basic framework for control and access to groundwater has substantially remained unchanged since the nineteenth century. It is characterised by several elements:

- Existing rules of access to and control over groundwater are still based on the common law doctrine of absolute dominion. This gives the landowner the right to take substantially as much groundwater as she or he desires with virtually no limitation or liability to adjoining landowners or the environment.
- Common law rules of access to and control over groundwater are a regulatory basis that:
  - Is based on a scientific understanding of groundwater that fails, for instance, to take into account patterns of aquifer recharge and the interconnectivity between surface and groundwater;
  - Constitutes an atomised regulatory framework that does not take into account the need to regulate groundwater at the aquifer level (rather than the landowner level);
  - Excludes all landless groundwater users from the regulatory regime.

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<sup>27</sup> P.S. Vijay Shankar, Himanshu Kulkarni & Sunderrajan Krishnan, 'India's Groundwater Challenge and the Way Forward', 46/2 *EPW* 37, 42 (2011).

- In effect, the legal status of groundwater under common law rules is that of a chattel to the land. In other words, landowners do not own groundwater but enjoy access as part and parcel of their ownership rights to the land above. At the same time, there is no natural right to groundwater percolating in undefined channels under one's land.<sup>28</sup>
- The legal regime concerning access to and control over groundwater has often been linked to one of the few statutory frameworks that directly addresses groundwater, the Indian Easements Act, 1882. While this legislation is relevant, it does not define the rights of landowners over groundwater and consequently does not constrain reforms of the legal regime. This is for the following reasons:
  - An easement right involves by definition a (dominant) owner claiming the easementary right and a (servient) owner on whose land the easementary right is exercised. Consequently, 'ownership and easement are inconsistent and cannot coexist in the same person'.<sup>29</sup>
  - The legal position as clarified in *Acton v Blundell* is that there is no easementary right in groundwater but rather that access to groundwater is a right attached to the land.<sup>30</sup>
- The Indian Easements Act, 1882 provides guidance for distinguishing percolating groundwater from groundwater flowing in 'defined channels'. It confirms that wherever groundwater is found to flow in defined channels, the regime for appropriation is the same as that for surface water. In 2011, since surface water is regulated under the principle of public trust, the same applies to flowing groundwater.

The basic legal framework for access to and control over groundwater outlined here was never appropriate and reforms have thus long been necessary. This is due to:

- The inappropriate scientific understanding underlying the rules in place;
- The inappropriateness of the rules introduced for all the areas of the country that do not benefit from the same relative water abundance found in England where their conceptual framework was first developed;
- The limited scope of regulation, whose focus stops at administering the respective claims of different landowners, with no regard for the need to regulate groundwater at an aquifer level; and
- The socially inequitable framework excluding landless groundwater users from the purview of the rules even where it is their main source of drinking and livelihood water.

### **8.1.3 MODEL BILL TO REGULATE AND CONTROL THE DEVELOPMENT AND MANAGEMENT OF GROUND WATER**

Rapidly increasing groundwater use and lowering water tables led the Government of India to take early notice of the need for a statutory framework governing groundwater. As a result, starting in 1970, the Government of India put forward a Model Bill to Regulate and Control the

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<sup>28</sup> N.S. Soman, 'Legal Regime of Underground Water Resources', *Cochin University Law Review* 147, 148 (2008).

<sup>29</sup> M.S. Vani, 'Groundwater Law in India: A New Approach', in Ramaswamy Iyer ed., *Water and the Laws in India* 435, 444 (New Delhi: Sage, 2009).

<sup>30</sup> *Acton v Blundell* (1843) 12 M. & W., 324, cited in Frederick Peacock, *The Law Relating to Easements in British India* (Calcutta: Thacker, 1904).

Development and Management of Ground Water for adoption by the states. This model bill has been revised several times (1992, 1996 and 2005) but the basic scheme adopted in 1970 has been retained to date. In other words, the Model Bill to Regulate and Control the Development and Management of Ground Water, 2005 still reflects an understanding of the groundwater challenges of an earlier era.

The Model Bill, 2005 focuses on identifying zones where groundwater is already over-exploited. It provides for the establishment of a State Groundwater Authority that is established, in particular, with powers to notify areas to regulate and control the development and management of groundwater.

In the zones that have been notified, certain controls are put in place, including the necessity for users to obtain a permit for most groundwater uses. The permits are issued by the Authority, that may impose conditions while granting the permit and can also alter the same or cancel the permit if required by the groundwater situation.

While the Model Bill, 2005 introduces a limited regulatory framework to address groundwater depletion, it does not tackle the more difficult questions that arise. The questions that need to be addressed but do not find an answer in the Model Bill, 2005 include the need to:

- Address existing over-exploitation rather than largely grandfathering existing uses;
- Do more than restrict existing rights in a limited way without changing the legal status of groundwater. By failing to do so, the Model Bill ends up reaffirming the nexus between land and access to groundwater;
- Address the need to sever the link between land ownership and control over groundwater to ensure socially more equitable access to groundwater;
- Address the need to sever the link between land ownership and control over groundwater to ensure regulation of groundwater on an aquifer basis;
- Implement the 73<sup>rd</sup> and 74<sup>th</sup> amendments to the Constitution of India. The Model Bill fails in this regard by not providing for any institutional structure below the state level.

#### A) STATE GROUNDWATER LEGISLATION

The Model Bill to Regulate and Control the Development and Management of Ground Water was largely ignored by states for about three decades. It is only over the past fifteen years that states and UTs have started adopting groundwater legislation. The states/UTs that have adopted groundwater legislation are: Andhra Pradesh, Bihar, Goa, Himachal Pradesh, Karnataka, Kerala, Maharashtra (drinking water focus), Tamil Nadu, West Bengal; Chandigarh, Dadra and Nagar Haveli, Lakshadweep and Pondicherry. Some states, like Maharashtra and Uttar Pradesh have groundwater bills that are pending adoption by the legislative assembly.

In all the states/UTs that have adopted groundwater legislation, the basic framework is directly derived from the existing Model Bill. The very fact of adopting a law related to groundwater confirms the increasing importance of groundwater. At the same time, groundwater laws adopted in recent years are neither adequate nor satisfactory, in large part because of the shortcomings in the Model Bill, 2005 highlighted above.

#### **8.1.4 TOWARDS A NEW LEGAL FRAMEWORK FOR GROUNDWATER**

The present legal situation calls for significant changes. Overall, the existing legal framework is inadequate to address the challenges of groundwater use and conservation facing most states of the country.<sup>31</sup>

There seems to be an increasing recognition that the status quo is not appropriate anymore. Thus, even though some states still reject the very idea of adopting groundwater legislation, there is an increasing consensus that groundwater legislation is required.<sup>32</sup>

A number of reasons call for the adoption of a new legal regime:

- The overbearing power of landowners on access to and control over groundwater ensures that regulation remains atomised. It thus fails to provide an overall regime for tackling over-extraction, contamination and protection on a larger scale.
- The direct links between rights to groundwater and land ownership excludes the vast number of landless people from a direct stake in the regime. Given the inequality in land holdings, this rule gives large landowners a disproportionately larger access to groundwater. This rule also negatively affects landless farmers' access to groundwater as they are disqualified from acquiring institutional credit for development of groundwater.
- The existing groundwater legal regime (common law rules and legislation) fail to incorporate the many legal developments that have taken place over the past few decades in the legal framework. This includes failing to incorporate new water law principles (for instance, public trust), environmental law principles (for instance, the precautionary principle), decentralisation principles embodied in the 73<sup>rd</sup> and 74<sup>th</sup> amendments to the Constitution, and failing to take notice of the changes in irrigation law focusing on participatory irrigation management proposed for the past fifteen years and implemented in a number of states.<sup>33</sup>
- The existing groundwater legal regime fails to integrate the fundamental right to water that has been a part of Indian law for the past two decades.<sup>34</sup> In a context where groundwater is the primary source of drinking water for the overwhelming majority of the population, the legal framework related to groundwater needs to reflect the priority given to the fundamental right over rights granted to landowners.

#### **8.1.5 SALIENT FEATURES OF THE DRAFT MODEL BILL FOR THE CONSERVATION, PROTECTION AND REGULATION OF GROUNDWATER**

The Draft Model Bill for the Conservation, Protection and Regulation of Groundwater [hereafter Draft Model Bill] has been drafted keeping in mind all the elements mentioned above.

The Draft Model Bills built around an understanding that it is the farmers and all persons living in rural areas that are the most directly affected by the existing legal regime. It is thus based on the

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<sup>31</sup> cf. Planning Commission of India, Mid-term Appraisal – Eleventh Five Year Plan 2007-2012 (Government of India, 2011), para 21.52.

<sup>32</sup> eg Department of Drinking Water and Sanitation – Rural Drinking Water, Strategic Plan 2011-2022 – Ensuring Drinking Water Security in Rural India, 5(4)(2).

<sup>33</sup> eg Andhra Pradesh Farmers' Management of Irrigation Systems Act, 1997; Gujarat Water Users' Participatory Irrigation Management Act, 2007; Maharashtra Management of Irrigation Systems by the Farmers Act, 2005 and Tamil Nadu Farmers Management of Irrigation Systems Act, 2000.

<sup>34</sup> eg *Subhash Kumar v State of Bihar* AIR 1991 SC 420 (Supreme Court, 1991).

idea that while protection of groundwater is key to the long-term sustainability of the resource, this must be considered in a framework in which livelihoods and basic drinking water needs are of central importance.

The overall objectives of the Draft Model Bill are to:

1. Regulate and control iniquitous groundwater use and distribution, based on priority of allocation to ensure in particular that the drinking water/domestic needs of every person and irrigation needs of small and landless farmers can be met;<sup>35</sup>
2. Ensure safe and secure drinking/domestic water for all people, particularly in groundwater dependent regions;
3. Regulate the over-extraction of groundwater in order to ensure the sustainability of groundwater resources, equity of their use and distribution, and to ensure fulfilment of ecosystem needs;
4. Promote and protect community-based, participatory mechanisms of groundwater management that is adapted to specific locations considering resource enhancement and socio-economic set up;<sup>36</sup>
5. Prevent and mitigate contamination of groundwater resources;
6. Promote and protect good conservation, augmentation (recharge) and management practices; and
7. Protect areas of land that are crucial for the sustainable management of groundwater resources and ensure that high groundwater consuming industries are not located in areas unable to support them.<sup>37</sup>

#### A) LEGAL AND INSTITUTIONAL BASES

The Draft Model Bill draws on the various developments that have taken place in the legal framework since the Government of India proposed the first Model Bill in 1970. In particular, it reflects the following:

1. The principle that water, and groundwater specifically, is a public trust as put forward by the Supreme Court.<sup>38</sup> This applies to groundwater as a resource and not to mechanisms for abstracting it.
2. The recognition of the fundamental right to water by the Supreme Court.<sup>39</sup>
3. The principle of subsidiarity, as explicated in the 73<sup>rd</sup> and 74<sup>th</sup> amendments to the Constitution (Articles 243G and 243W).
4. Protection principles, such as the prevention and precautionary principles, most recently statutorily recognised in the National Green Tribunal Act, 2010 (Section 20).

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<sup>35</sup> cf. Recommendation 8, Ministry of Water Resources, Recommendations of the Symposium on Groundwater Governance: Ownership of Groundwater and its Pricing, 16 November 2006, already recognising the need to reflect equity and the protection of weaker sections.

<sup>36</sup> As called for in Recommendations 7 and 16, Ministry of Water Resources, Recommendations of the Symposium on Groundwater Governance: Ownership of Groundwater and its Pricing, 16 November 2006.

<sup>37</sup> As called for in Recommendation 3, Ministry of Water Resources, Recommendations of the Symposium on Groundwater Governance: Ownership of Groundwater and its Pricing, 16 November 2006.

<sup>38</sup> *State of West Bengal v. Kesoram Industries* (2004) 10 SCC 201 (Supreme Court, 2004).

<sup>39</sup> *Subhash Kumar v. State of Bihar* AIR 1991 SC 420 (Supreme Court, 1991).

The Draft Model Bill also builds on existing laws and schemes and contextualises them to groundwater. This is, for instance, the case of:

1. The Right to Information Act, 2005.
2. The Environmental Impact Assessment Notification, 2006 under the Environment (Protection) Act, 1986.
3. Social audits called for under various schemes and policies of the Government.<sup>40</sup>

### **1. Institutional framework**

The institutional framework proposed in the Draft Model Bill is based on the principle of subsidiarity and framed around existing units of territorial governance. At the same time, in recognition of the fact that aquifer boundaries do not follow administrative boundaries, it provides for mechanisms that ensure that administrative boundaries do not come in the way of effective protection of groundwater aquifers.

The Draft Model Bill is also based on an understanding that duplication of institutions and mechanisms should be avoided to the greatest possible extent. Thus, it provides for an institutional framework devoted to groundwater to ensure appropriate management of groundwater from the local to the state level. At the same time, it provides for collaboration or integration of groundwater to already existing institutions addressing water, such as the Central Groundwater Board. In addition, it provides for existing institutions to support the new local level institutions to ensure that they are not hampered in implementing the legislation by a lack of technical or other expertise.

### **2. A Model Bill adapted to state-specific circumstances**

The Draft Model Bill is based on an understanding that it should be adopted at the state level in a form that suits the specific conditions and needs of that particular state. In addition, it is expected that the Draft Model Bill will be adapted to suit the existing institutional and legal framework of the state to avoid duplication.

#### **B) IMPACTS OF THE DRAFT MODEL BILL**

The Draft Model Bill provides that groundwater is a public trust. This implies that the state at all levels (from the panchayat to the state government) is the custodian of the resource. The new legal status of public trust for groundwater as a resource does not in any way affect the sources used by individuals or communities to access groundwater.

The Draft Model Bill proposes a new legal framework that will ensure effective regulation of large-scale groundwater use. It will have no impact on the overwhelming majority of small farmers' groundwater use whose rights of access will not be affected. Rather, it will contribute to ensure that all farmers (and more broadly groundwater users) benefit from better groundwater availability in the long run by restricting over-exploitation by large users that threatens access by the majority of small users.

The Draft Model Bill is built around the need to regulate unreasonable uses of sources of groundwater that threaten the aquifer to ensure that the resource itself is protected and can provide a sustainable basis for meeting the basic needs of every person for decades to come.

**[The Draft Bill is presented in Annexure 2]**

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<sup>40</sup> eg Total Sanitation Campaign Guidelines, 2011, section 18.

## 8.2 DRAFT NATIONAL WATER FRAMEWORK LAW

### 8.2.1 WHY IS A NATIONAL WATER LAW NECESSARY?

Water, like air, is one of the most basic requirements for life. If a national law is considered necessary on subjects such as the environment, forests, wildlife, biological diversity, etc., a national law on water is even more necessary. Water is as basic as (if not more basic than) those subjects.

Under the Indian Constitution water is primarily a State subject, but it is an increasingly important national concern in the context of:

- (a) the right to water being a part of the fundamental the right to life;
- (b) the perception of a water crisis because of the mounting pressure on a finite resource;
- (c) the inter-use and inter-State conflicts that this leads to, and the need for a national consensus on water-sharing principles, and on the arrangements for minimising conflicts and settling them quickly without resort to adjudication to the extent possible;
- (d) the threat to this vital resource by the massive generation of waste by various uses of water and the severe pollution and contamination caused by it;
- (d) the long-term environmental, ecological and social implications of efforts to augment the availability of water for human use;
- (e) the equity implications of the distribution, use and control of water: equity as between uses; users; areas; sectors; States; countries; and generations;
- (f) the international dimensions of some of India's rivers; and
- (g) the emerging concerns about the impact of climate change on water and the need for appropriate responses at local, national, regional, and global levels.

It is clear that the above considerations cast several responsibilities on the Central Government. Some of these can be dealt with only partially under existing laws such as the Environment (Protection) Act 1986, the Water (Prevention and Control of Pollution) Act 1974, and others. On inter-State rivers there are (i) Entry 56 in the Union List which enables the Central Government to act if Parliament legislates for the purpose, (ii) the River Boards Act 1956 enacted under it (which has remained inoperative), and (iii) the Inter-State Water Disputes Act 1956 enacted under article 262 of the Constitution and amended in 2002. However, inter-State rivers and river valleys are not the same thing as 'water' *per se*, and adjudication is not the only thing that needs to be provided for.

All the aspects enumerated earlier cannot be brought within the ambit of the existing Central laws. Given the concerns set forth above, the need for a national water law is self-evident. Such a law will not preclude the further use of Entry 56, or the re-activation of the River Boards Act, or amendments and improvements to the ISWD Act.

Several States are enacting laws on water and related issues. These can be quite divergent in their perceptions of water. Again, under a number of Projects and Programmes different States are undertaking 'water sector reforms', and as a part of this they have formulated or are formulating State Water Policies. Here again, significant divergences are possible. Some divergences of policy and law may be inevitable and acceptable, but they have to be within reasonable limits set by a broad national consensus on certain basics.

Different State Governments tend to adopt different positions on the rights of different States over the waters of a river basin that straddles more than one State. Such legal divergences tend to render the resolution of inter-State river-water conflicts even more difficult than they already are. A national statement of the general legal position and principles that should govern such cases seems desirable.

Finally, the idea of a national water law is not something unusual or unprecedented. Many countries in the world have national water laws or codes, and some of them (for instance, the South African National Water Act of 1998) are widely regarded as very enlightened. There is also the well-known European Water Framework Directive of 2000. The considerations behind those national or supra-national documents are relevant to India as well, although the form of a water law for India will clearly have to be guided by the nature of the Indian Constitution and the specific needs and circumstances of this country.

It was the recognition of the need for a minimal national consensus on certain basic perceptions, concepts and principles that led to the adoption of the National Water Policy of 1987 and the NWP of 2002. Currently the process of considering further revisions to the National Water Policy is in progress. However, a national water policy has no legal status. A national water law is necessary.

### ***8.2.2 WHAT WILL BE THE NATURE AND SCOPE OF A NATIONAL WATER LAW IN INDIA?***

The proposed national water law is not intended to centralise water management or to change the Centre-State relations in any way. What is proposed is not a Central water management law or a command-and-control law of the usual kind, but a *framework law*, i.e., an umbrella statement of general principles governing the exercise of legislative and/or executive (or devolved) powers by the Centre, the States and the local governance institutions.

No administrative machinery or institutional structure (except for a national water Information system) is envisaged at the Centre under this framework law, and consequently no penal provisions are envisaged. This is not intended to exclude the necessary administrative machinery, institutional structure and penal provisions in State laws within this framework.

However, the law is intended to be justifiable in the sense that the laws passed and the executive actions taken by the Central and State Governments and the devolved functions exercised by PRIs will have to conform to the general principles and priorities laid down in the framework law, and that deviations can be challenged in a court of law.

### ***8.2.3 HOW WILL THE LAW BE ENACTED?***

Given the present constitutional division of legislative powers between the Union and the States, it will be necessary to follow the procedure adopted in the case of the Water (Control and Prevention of Pollution) Act 1974, or more recently in the case of the Dam Safety Act 2010, i.e., a certain number of State assemblies can be persuaded to pass resolutions and then the Centre can enact this law. An Act so passed will be applicable to the States that had passed the resolution and to other States that adopt the Act. There is every reason to believe that most States will adopt the Act, and that the Act will become truly national.

The alternative – a more difficult route – is to wait for water to be moved to the Concurrent List first, and then get this law enacted by Parliament.

The draft proceeds on the assumption that only the first route is available as for now water is not on the Concurrent List.

[The Draft Bill is presented in Annexure 3]

## **8.3 DRAFT MODEL BILL FOR STATE WATER REGULATORY SYSTEM**

The process of deliberation within the Sub Group on the draft of the Model Bill for State Water Regulatory System Act (henceforth referred to as the Draft Model WRS Bill or the Draft Model Bill) started with the discussion on ‘Concerns and Critiques’ related to the conventional design of Independent Regulatory Authority (IRA) in general, and Water Regulatory Authorities in specific. A set of detailed ‘Design Imperatives’, related to the concerns and critiques, emerged from the discussion. These design imperatives were then categorized as substantive, procedural, and institutional design imperatives. The substantive design imperatives yielded the objectives of regulation sought to be achieved (together forming the responses to 'why' and 'what' of water regulation system), while the procedural and institutional design imperatives formed the basis for the design of 'how' and 'who' aspects respectively of the system for water regulation. The substantive design imperatives were further classified into different ‘Areas of Regulation’ in the Draft Model Bill, i.e., those areas of water sector that require regulatory intervention. Second, the procedural design imperatives translated into procedural components of the Bill that specify the processes and procedures for preparation of policy instruments and making decisions based on those. Finally, the institutional design imperatives gave rise to the institutional structure and the concept of institutional transition envisaged in the Bill.

### ***8.3.1 INSTITUTIONAL STRUCTURE ENVISAGED IN THE BILL***

The Draft Model WRS Bill is designed to address the following concerns and critiques related to the functioning of IRAs:

#### **(A) CRITICAL POWERS OF IRAS SUCH AS TARIFF DETERMINATION**

The first set of concerns and critiques stemmed from the authority vested in the IRAs (as per the conventional model) to make critical decisions such as determination of tariff. To be more specific, these concerns are about the ‘selected’ experts - who are not elected and hence, have no political legitimacy - handling the matters (such as tariff) that have very strong social and political implications. The concern is also about the analytical and quasi-judicial - and not political - process followed by IRAs in making such decisions. The bill addresses these concerns by creating three different categories of institutions that have different types of competence and legitimacy.

These three types of agencies will be handling three different functions of governance. It is often argued that there should not be any conflict of interests as on one hand, there is handling the policy-making and execution functions, and, on the other hand, the function of monitoring and regulation. Further, the two agencies, the agency setting policies and the agency conducting regulation adopt different types of processes and procedures for their functioning. While the Independent Expert Authority (IEA) (handling regulation) adopts analytical and quasi-judicial procedure, the agency with political mandate (handling policy-making) adopts the legislative procedures.

## (B) NATURE OF CONVENTIONAL IRAS AS THE ONLY STATE-LEVEL APEX AUTHORITY

The second set of concerns and critiques relates to the nature of conventional IRAs as the only apex authorities at the state-level. The resultant distance and disconnection with the actual water users and ground-conditions suffered by the state agency not only creates alienation but also affects the quality, efficacy, and efficiency of its functioning.

In response to this concern, the Draft Model WRS Bill incorporates the Principle of Subsidiarity, by laying out an optimum way of decentralizing water sector governance to the following four levels: (i) State-level, (ii) River Basin level, (iii) Sub-Basin level, (iv) Local level. At all these four levels of governance, institutions with different structure, compositions, functions, authorities, and roles are provided for in the bill. It is expected that such decentralization can eliminate the problems with the centralized institutional structure envisaged in the conventional model of IRA. However, many fear such decentralization might prove dysfunctional or sub-optimal affecting efficiency and efficacy of governance and performance of the sector, especially because of the lack of capabilities and understanding of issues at the lower level of institutional ladder. The bill brings in and implements the concept of phased institutional transition by providing step-wise, gate-protected process for gradual introduction of the decentralized institutional structure. Another concern over the central, state-level agency is the problems that the water users would face in approaching the agency with their service-related grievances. Further, the large number of service related grievances - which are seen as of repetitive and routine nature - of large number of water users are seen as swamping down the agency with the work load. Such swamping and remoteness of the state-level agency is expected to give rise to high level of discontents among the water-users, affecting the water sector governance system. The bill responds to these concerns by creating a multi-structured state-wide Grievance Redressal System, with connection with the IEA at the state level.

## (C) UNIVERSAL DESIGN OF THE IRAS AND FLEXIBILITY TO THE STATES

The third set of critiques and concerns relates to the universal design of the IRAs, i.e., design based on the 'one shirt fits all' or 'cookie cutter' approach. Such approach is seen as highly inappropriate in view of: (a) the immense diversity of physical (topographic, geomorphic, and agro-climatic) and socio-cultural, political conditions within and across the state, (b) the diversity of policy priorities and political preferences of the governments in different states. The Draft Model Bill addresses these concerns by having a modular structure, from which modules based on the state-specific situation, requirements, priorities of water sector governance, and other different factors could be selected by the state government while preparing and enacting their final draft of the Bill. Additionally, the temporal aspect of the state-specific situation for implementation of the Act, especially for gradual decentralization for governance, is incorporated in the phased approach for institutional transition that is already explained in the previous subsection. This will enable the states to determine the optimal time and duration for transition through the three phases of institutional transition envisaged in the Bill.

## (D) AUTONOMY AND ACCOUNTABILITY OF THE INDEPENDENT AUTHORITIES

The fourth set of concerns and critiques related to the IRAs is two-fold: (a) concern over the autonomy required by the IRA for effective and efficient operation of the independent regulatory mechanism, and (b) concern over the accountability required of such an independent regulatory mechanism in order to ensure clean governance. The Bill addresses this set of concerns by incorporating many mechanisms for ensuring autonomy and accountability of the IRA, in addition to usual mechanisms on the laws creating IRAs. The separation of authority to make 'political' or 'normative' decisions and the authority to make 'technical' or 'predominantly non-normative' decisions have helped bring more clarity in the task of ensuring autonomy and

accountability of IRAs. For example, while the State Water Regulatory and Development Council (SC) is expected to ensure accountability with respect to the ‘normative’ or ‘political’ implications of the decisions of the IEA, for the technical content of its decisions, the IEA will be accountable to technical experts through the mechanism of regular peer reviews.

**(E) ACCOUNTABILITY OF THE AGENCY MAKING POLITICAL DECISIONS**

While the autonomy and accountability is one of the major concerns over the IRA, the accountability of the political institution is one of the major areas of concern that prompted the reform measures, especially establishment of the IRAs. Hence, this original concern cannot be overlooked while addressing the concerns over IRAs. It certainly is accepted that the political decisions cannot be handed over to ‘selected’ experts’ exempted from the political accountability and that the authority to make political decision should be matched only by political accountability. However, the issue of efficacy and efficiency of the mechanisms for ensuring political accountability remains valid. The concern is over the operationalization of the political accountability for which the major instrument is elections of the legislative bodies. The efficacy and efficiency of this episodic and broad-based mechanism for accountability has been questioned by many. The main concern in this regard is dispersal of accountability through this mechanism. This dispersal has two dimensions. First, it is temporal dispersion, which means that the accountability mechanism is available to citizens only in episodic manner, i.e., only once in five years. The second dimension is the substantive dispersal. This means that it is difficult to hold accountable for the decision and actions the state government in the water sector takes, as it handles the governance of tens of departments and a multitude of sectors and issues. The Draft Model Bill responds to the issue of dispersal of accountability and efficacy of accountability of the agency making political decisions by suggesting creation of the State Water Regulatory and Development Council, which is a body with political mandate, but which can be held directly accountable for its political decisions affecting the performance of water sector.

**8.3.2 INSTITUTIONAL CONTENT OF THE BILL**

The institutional structure envisaged in the Bill is shaped by the concerns and critiques included in the previous sub-section, as well as some salient features of the process of governance. The process of governance is seen here as comprising certain core tasks of governance (CTGs). Each of these CTGs requires certain critical qualities on the part of the agency expected to carry out the CTGs. Various governing agencies are envisaged for each of these CTGs due to their qualities in Phase 1, 2, and 3 of the institutional transition envisaged in the Bill. The following table provides in brief the concept of separation of political (normative), expert (predominantly non-normative or non-political), and executive (or implementing) functions and tasks of governance, and how this separation is reflected in the Bill.

**Table: Separation of Normative, Non-Normative, and Executive Tasks of Governance**

<b>Core Task of Governance (CTG)</b>	<b>Qualities Required</b>	<b>Agencies Envisaged in the Bill</b>
Creating normative framework for decision-making by the executive agencies in the form of Law, Rules and Regulations	<ul style="list-style-type: none"> <li>• Political Mandate (to make value/ normative decisions)</li> </ul>	<ul style="list-style-type: none"> <li>• State Legislation and SC (Phase 1 and 2)</li> <li>• RBCs (Phase 2)</li> <li>• SBWCs (Phase 3)</li> </ul>
Creating non-normative framework within the normative framework	<ul style="list-style-type: none"> <li>• Expertise</li> <li>• Independence</li> </ul>	<ul style="list-style-type: none"> <li>• SIWEA (Phase 1 and 2)</li> <li>• BIWEA (Phase 2)</li> <li>• SBUBIWEA (Phase 3)</li> </ul>

<b>Core Task of Governance (CTG)</b>	<b>Qualities Required</b>	<b>Agencies Envisaged in the Bill</b>
Creating protocols or CBRs for processes and procedures of governance	<ul style="list-style-type: none"> <li>• Expertise</li> <li>• Independence</li> </ul>	<ul style="list-style-type: none"> <li>• SIWEA (Phase 1 and 2)</li> <li>• BIWEA (Phase 2)</li> <li>• SBUBIWEA (Phase 3)</li> </ul>
Implementation through making executive decisions and taking actions to implement those	<ul style="list-style-type: none"> <li>• Executive capabilities and mandate</li> </ul>	<ul style="list-style-type: none"> <li>• WRD/ VDC (Phase 1)</li> <li>• RBO/ RBA (Phase 2)</li> <li>• SRBA (Phase 3)</li> </ul>
Ensuring compliance of decisions and actions	<ul style="list-style-type: none"> <li>• Expertise</li> <li>• Independence</li> </ul>	<ul style="list-style-type: none"> <li>• SIWEA (Phase 1 and 2)</li> <li>• BIWEA (Phase 2)</li> <li>• SBUBIWEA (Phase 3)</li> </ul>
Conducting processes for public deliberations	<ul style="list-style-type: none"> <li>• Expertise</li> <li>• Independence</li> </ul>	<ul style="list-style-type: none"> <li>• SIWEA (Phase 1 and 2)</li> <li>• BIWEA (Phase 2)</li> <li>• SBUBIWEA (Phase 3)</li> </ul>

**(A) INSTITUTIONS IN THE FIRST PHASE**

The Draft Model Bill envisages the Water Resources Department (WRD) or Valley Development Corporations (VDCs- as may exist) as the implementing or executive agencies. Two other governing agencies are envisaged by the Bill, as elaborated below:

**(i) State Water Resources Regulatory and Development Council (SC)**

The SC is created despite the existence of the state legislative house (SL), which is the agency having the highest level of political mandate in the state, as it is a body of representatives elected directly by the citizens. Thus, as compared to the SL, the SC has lesser degree of political mandate, first, as it draws from elected representatives from various bodies, and second, because of the presence of a few appointed (unelected) representatives of stakeholders. The rationale of creating the SC, with somewhat lesser degree of political mandate, is to address the problem of dispersed accountability in the case of the SL. The SL is responsible for myriad issues and decisions in numerous sectors at the same time, depriving it of the opportunity, time, and resources necessary for providing undivided and detailed attention to the water sector. This burden of simultaneous responsibility of a wide range of sectors and myriad issues also makes it difficult to hold the members of the SL responsible and accountable for particular decisions in a particular sector. This is coupled with the fact that the effective mechanism available to citizens for extracting accountability viz. elections- has very low frequency and has become blunt. As a result of this, the accountability of SL, as far as the governance of water sector is concerned, gets blunted or dispersed. This dispersed accountability is seen as the major source of problems of governance in the water sector.

Creation of the SC is therefore seen as a mid-way out from the problem of dispersed accountability by bringing in elected representatives from various elected bodies, and also providing the agency with a mandate to handle the water sector alone. This is expected to ensure proper attention being paid to the water sector, as well as focused or clear-cut accountability for governance of water sector.

**(ii) State Water Independent Expert Authority (SIWEA)**

First of all, SIWEA is a purely 'expert agency' with 'non-normative' functions. Second, it is different from a typical 'expert committee' in diverse ways. It is not a committee of part-time experts, but an 'authority' with full-time experts who have certain legal powers and also legal

responsibility and accountability to discharge. As it is an expert agency, no 'political/ socio-demographic' regional balance is sought in its membership. However, adequate representation of all fields of expertise which are relevant for the water sector is essential. For structuring the SIWEA, this has been the prime concern apart from capacity, honesty, and integrity of its members. Effort is made to ensure accountability and independence through various ways. For example, provision of peer review of the orders of the SIWEA by peers in the same field of expertise. Thirdly, the SIWEA, unlike a committee which has to be formed and given a mandate to, can take suo-moto actions. In this sense, it is not limited to being an adjudicatory agency, but becomes an authority charged with protection and promotion of public interest, at its own volition and mandate within the framework provided by the Act.

### **(iii) Hierarchy and Interrelationships amongst the governing agencies**

As mentioned previously, the normative (political), non-normative, and executive decisions have been separately mandated to be made by different agencies. In this sense, no strict 'hierarchical' relationship arises amongst the SIWEA, SC, and WRD (or VDC) in normal circumstances. However, the Act does provide that the SIWEA and the executive agencies operate within the normative framework provided by the Act, the Government (in the form of Rules) and the SC (in the form of Regulations). At the same time, in extra-ordinary circumstances, determination of whether a particular decision is normative or non-normative may give rise to a 'hierarchical' requirement for seamless implementation of the Act. In such a case, the Bill also provides for policy directives by the government, which are envisaged to address such extraordinary circumstances as may arise.

### **(iv) Other Measures for Strengthening Transparency, Accountability, Participation and Capacity Building (TAP-C)**

The other institutions provided for by the Draft Model Bill for strengthening TAP-C are as follows:

1. Public Interest Promotion Office (PIPO),
2. State-wide Grievance Redressal System,
3. Transparency, Accountability, and Participation Ombudsman,
4. Panel of Accredited Stakeholder Representatives

### **(B) INSTITUTIONAL TRANSITION**

One of the major concerns of the IRA model is that the IRAs in current form concentrate decision-making powers in the hands of one agency and that too at the state-level. Though not voiced frequently, concentration of authority in the state level political agencies like the state legislation and the state government are also seen as a matter of concern by many. Another concern/ critique of the current institutional structure in the water sector, is the mismatch between the administrative boundaries and ecological boundaries. The water sector agencies are traditionally organized along administrative boundaries right from the state to the local levels. Considering both these concerns, the institutional transition in three phases is provided for in the Draft Model Bill. The transition is in adherence to the Principle of Subsidiarity for decentralization of governance, which requires devolution of functions to the lowest possible level of governance. The qualifying condition here is the feasibility and optimality of such decentralization. The feasibility pertains to the preparedness of institutions (especially at the lower level) and of stakeholders. So, the transition is seen as gradual and phase-wise, with efforts in each of the successive phases for developing preparedness of both institutions and stakeholders

to transition to the next phase. Constraints of optimality require that some decisions will have to be made at higher level of governance, even after condition of preparedness is achieved. Thus, though sub-basin level agencies are prepared to govern, some functions/ decisions will have to be made at the basin or even at the state level, from the point of view of optimality. In addition to this, the institutional transition attempts to align the ecological boundaries with governance boundaries.

### **8.3.3 SUBSTANTIVE SCOPE AND CONTENT OF THE BILL**

#### **(A) AREAS OF REGULATION**

Regulation Areas are those Areas of the water sector that need regulatory intervention in order to achieve the objectives of Regulation. These Areas of Regulation are those areas within which the Core Regulatory Functions shall be carried out by the WRS to achieve the sectoral objectives. Core Regulatory Functions are the mandatory functions and set of objectives that the state water regulatory system would carry out and achieve.

The following is the list of Areas of Regulation included in the Draft Model Bill

1. Water Access, Extraction, and Use
2. Execution of projects and programs
3. Water Service Provisioning
4. Allocation of Financial and Other Resources to Projects
5. Environmental sustainability
6. Processes and Procedures
7. Disaster management
8. Ensuring Compliance to the Provisions of this Act
9. Private Sector Participation
10. Integrated State Water Plan (ISWP)
11. Climate Change

#### **(B) IRAS, WATER MARKETS, AND PRIVATIZATION**

The fifth set of concerns was related to whether establishment of any independent regulatory mechanism in the water sector would automatically mean it is the harbinger of privatization of water sector, opening the doors of the sector wide for indiscriminate entry and take-over of the sector by private sector. This required that these concerns are addressed while, at the same time, leaving open the option of legitimate and adequately regulated private sector participation open to the state governments as a political decision or priority. To achieve this, the Draft Model WRS Bill includes private sector participation as one of the core regulatory functions of the WRS and provides a way to address the concerns over privatization. Thus, when a state government includes private sector participation as one of the sectorial objectives, the Bill mandates carrying out certain processes and procedures to ensure protection of public interest in the wake of such initiatives.

Additionally, the Bill explicitly mandates that the state government is vested with the ultimate responsibility of provision of water for life and livelihoods to all, irrespective of the means (i.e., even in case of private sector participation in water service provisioning). Further, concerns

regarding water entitlements being used as tools for establishment of water markets has been addressed by inclusion of the principle that water entitlements should be introduced to ensure secured livelihoods.

#### (C) SOCIAL AND ENVIRONMENTAL OBJECTIVES OF THE WATER SECTOR

The draft Bill also addresses concerns over neglect of overall sectoral objectives including socio-cultural and environmental sustainability of the water sector, by mandating consideration of these overall sectoral objectives in all decision-making. This has been supplemented by appropriate representation of experts in the Independent Expert Authorities and procedural requirements for the same. Additionally, the Bill also addresses the requirement of a seamless, competent, and available pool of talent, experience, and expertise, by establishing a prospective path and vision for a career in the state's water regulatory system. For example, an interested individual may start as a Grievance Redressal Officer, gather experience to become a Consultant to the Independent Expert Authority, and then become a Special Advisor to the IEA, and subsequently a member of the IEA. A number of such options are laid out implicitly in the Bill, that achieve the objective of establishing such a seamless, competent, and available pool of talent, experience, and expertise. Further, the contents of the Bill can be considered as (a) procedural content, (b) substantive content, and (c) institutional content. The following sub-sections elaborate on each of these categories of the contents of the Draft Model Bill.

#### (D) MODULAR STRUCTURE AND FLEXIBILITY

The Bill, while laying out the Areas of Regulation, also incorporates a Modular Structure and flexibility for the state to enact the Bill. This is possible through selection of those Areas of Regulation by the states that are in line with the state's priorities, objectives, and the status of water sector development. The module of the Bill related to Processes and Procedures would be then applicable to the selected Areas of Regulation. Such a modular approach was considered necessary and important to avoid a 'one shirt fits all' approach. This element of modular structure and flexibility of the Bill to be adopted by the states, according to their priorities and situation, is dealt with in detail in the separate document on pre-legislative processes.

### ***8.3.4 PROCESSES AND PROCEDURAL ASPECTS ENVISAGED IN THE BILL***

#### (A) PROCESSES AND PROCEDURES

The Draft Model Bill lays out detailed processes to be followed for preparation of Rules, Regulations, CBRs, and Criteria. These processes are based on the principles of Transparency, Accountability, and Participation, and the Bill specifically mandates well defined functions and responsibilities to be carried out by the various agencies established by the Bill. At the same time, truly meaningful, intense, and effective participation in governance requires extending the scope of participatory processes also to procedures for making critical executive decisions in the operations and maintenance of equipment and facility.

These executive decisions are made within the framework laid out by the Rules, Regulations, CBRs, and Criteria. The Procedure for Public Deliberation (PPD) and Procedure for Comprehensive Public Deliberation (PCPD) are designed as the standard procedures to be followed for ensuring participation in preparation and promulgation of the decisions made based on the policy instruments envisaged in the Act (Rules, Regulations, CBRs, and Criteria). As PCPD is more stringent compared to PPD, it is made applicable while making decisions that have direct and wide-ranging impacts on the operation of the water sector (such as tariff determination, allocation of water access entitlements), while the PPD is mandated as a standard minimum requirement for making and promulgation of all decisions.

## (B) POLICY INSTRUMENTS: RULES, REGULATIONS, CBRs, AND CRITERIA

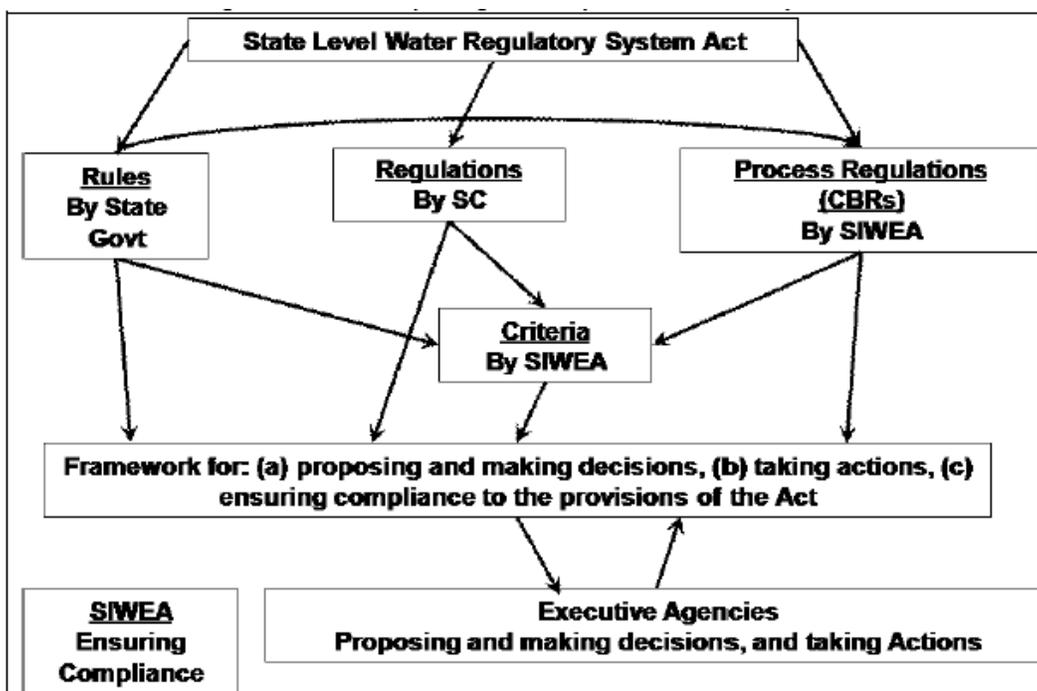
**(i) Rules and Regulations:** In the Draft Model WRS Bill, State Water Resources Regulatory and Development Council (or SC in short) has been created as an agency with political mandate and focused accountability for making value (normative) decisions. Hence, the responsibility of making most of the value decisions is vested with the SC in the form of Regulations. However, considering the ultimate responsibility of the state government regarding the water sector, the state government has been given the authority of making ‘Rules’ especially over administrative and financial matters. The SC is, thereby, provided with a handle to make normative decisions without altering the normative core given by the state government and the SL in the form of the Act.

**(ii) Conduct of Business Regulations (CBRs):** CBRs involve high level of technical decisions as well as processes for making decisions such as preparation of Criteria and making executive decisions based on the CBRs and Criteria. The CBRs would, hence, be prepared by SIWEA within the framework of the Act, Rules, and Regulations. The CBRs would specifically provide step-wise time-lines for making various decisions. In other words, CBRs chiefly deal with the processes of detailing criteria, norms, standards etc. that are used to give effect to the normative framing as well as the techno-economic aspects of decisions.

**(iii) Criteria:** Criteria would provide more specific framework for executive agencies to make decisions. They would largely contain non-normative elements. Criteria, norms, standards etc provide the framework within which the executive agencies are expected to make non-normative and executive decisions. Some of these decisions, which are critical and significant for the execution, would need prior deliberation and approval for its compliance with the Act, Rules, Regulations, CBRs, and Criteria (such as tariff, entitlements). The procedures for seeking and obtaining such approval are specified in the act as the Process of Public Deliberation (PPD) and Process of Comprehensive Public Deliberation (PCPD) as elaborated previously.

### ***8.3.5 INTERRELATIONSHIPS OF POLICY INSTRUMENTS AND HOW THEY ARE EXPECTED TO FUNCTION TOGETHER***

The WRS Act would lay out the overarching framework for all decision-making in the state’s water sector. The Rules made by the state government would specify the administrative, financial, and/or further specific normative aspects of decision-making. Regulations, prepared through the process led by the SC, would further specify the normative framework for the decisions to be made. The process regulations or the Conduct of Business Regulations, prepared by the SIWEA would specify the processes to be carried out for the decision-making. Criteria prepared by the SIWEA would embody all the normative and non normative aspects of the framework within which the executive and implementation decisions would need to be carried out. The executive agencies would make decisions based on the Criteria, as well as the overarching framework provided by the Act, Rules, Regulations, and CBRs. The SIWEA would ensure compliance of the processes and procedures of decision-making and promulgation of decisions, based on the framework specified by the Act, Rules, Regulations, and CBRs. The following figure provides a brief overview of this interrelationship amongst the policy instruments.



[The Draft Bill is presented in Annexure 4]

## 8.4 NATIONAL WATER COMMISSION

During the 12<sup>th</sup> Plan, there is a proposal to set up a National Water Commission (NWC) to monitor compliance with conditionalities of investment and environment clearance given to irrigation projects. At present, there is no appropriate body that can provide a rigorous and credible feedback to sanctioning authorities about compliance with the conditionalities they impose at the time of sanction. A multi-disciplinary, professionally capable and independent NWC would have credibility with both Centre and States and would function on the lines of what has been attempted, for example, in Australia and become a guide for further water resource development in India.

The Drafts of the proposed new Bills, as prepared by the concerned Sub-Groups of the Working Group on Water Governance, are presented in this report. These bills and NWC will, of course, be finalized only after deliberations with the States in the National Development Council.

## Annexure 1(A)

### **Minutes of the First meeting of the Steering Committee on Water Resources and Sanitation for the formulation of the Twelfth Five Year Plan held under the chairmanship of Dr Mihir Shah Member (Water Resources), Planning Commission on 25.11.2010 at 2.00 PM in Committee Room No. 228 Yojana Bhawan.**

The list of participants is at the Annexure.

Senior Adviser (WR) welcomed the Chairman and Members of the Steering Committee (SC) constituted for the formulation of the Twelfth Five Year Plan (TFYP).

2. Initiating the discussion Dr. Mihir Shah, Member (WR) and Chairman Steering Committee stated that the water sector requires special efforts to overcome the challenges facing the country and there is need to avoid the “business as usual” approach. He pointed out that as per the direction of the Prime Minister, the Twelfth Plan document needs to move beyond the stage of just being a policy document. He referred to the preparation of a new National Water Policy being under-taken by the Ministry of Water Resources and desired that inputs of the Working Groups and Steering Committee would be used in the formulation of the new policy. The Planning Commission is adopting a new approach to the TFYP. It is conceived of as an open process based on listening to field experience through public consultations and goes beyond the Government version of issues. The Chair Persons of the Working Group are experts in their respective fields and the ToRs have been comprehensively framed for the consideration of the Working Groups. The Working Group’s recommendations would converge in the Steering Committee and finally be reflected in the TFYP document. Member further stated that the Prime Minister has desired that the Plan document needs to be an essay in persuasion so as to facilitate changes in the working of the Ministries of Government of India and State Governments.

Dr Tushaar Shah Sr. Fellow, IWMI observed that the role of the Planning Commission has changed and welcomed the new approach to the Plan formulation.

He mentioned that the National Water Policy is being reviewed by the Ministry of Water Resources and the Integrated Water Resources Management document prepared by the MOWR is under consideration of the Empowered Group of Ministers headed by Union Minister of Agriculture. The findings/recommendations need to be reflected in 12<sup>th</sup> Plan document.

Secretary Ministry of Water Resources stated that the New National Water Policy is necessitated by the new challenges in the water sector like climate change. The deliberations of the Working Group should be a thinking process on the policy, and how policy formulation and implementation could be carried forward by the States. The Centre should also intervene with incentives to the States for the implementation of policies.

Further, the ToRs of each of the eight Working Groups were taken up for deliberations.

## **I. Working Group on Sustainable Ground Water Management**

3. Member(WR), Planning Commission stated that while groundwater is the largest source for both irrigation and drinking water in the country, there is complete anarchy in both its regulation and management. Some of the available database/modeling used for estimating this resource is being questioned. The understanding of the ground water availability and recharge by the stakeholders, especially farmers, is important. The NASA reports on groundwater exploitation in north Indian States is disturbing. There is a need to have a support structure both at the stake-holder level and at the block level in the State. The network of groundwater observation wells maintained by Central Ground Water Board (CGWB) needs to be reviewed to ascertain its adequacy from the assessment point of view. The CGWB needs to be strengthened through additional expertise and groundwater reforms for its effective management.

Secretary MOWR stated that the Working Group should suggest ways and means to check groundwater pollution caused by overuse of fertilizers and industrial effluents.

4. Chairman, CGWB stated that the preliminary reconnaissance survey of ground water aquifers has been completed. Also augmenting the groundwater source through recharge based on aquifer identification is on the anvil and efforts are on to bring back the over exploited areas to normal. The use pattern of groundwater is such that it is recharged at one place and used at another. CGWB is already addressing the twin issues of quality and quantity of groundwater available to the stake-holders. He also mentioned that surveys have indicated that aquifers are shrinking and replacement can be through use of saline/sea water (through desalination). There is also a need to integrate ground water management with data sharing, prioritizing the use of land and climate. The issues of groundwater should not be seen in isolation.

Secretary, Department of Land resources (DoLR) drew the attention of the committee towards the overexploitation of groundwater in Haryana and Punjab caused by increase in density of tube wells and the absence of regulatory control. Haryana now has in place regulation for boring but there is no such mechanism in Punjab. She cited the Israel model of compulsory solar panel installation for irrigation and water management and suggested that best practices even though costly, must be adopted. Water harvesting also needs to be made compulsory.

5. Himanshu Kulkarni of ACWADAM Pune stated that at present there is no strategy to tackle the groundwater crisis. The following challenges need to be addressed urgently:

- (i) There is a wide gap between the education curriculum(available technology) and practical strategy for ground water management.
- (ii) Aquifer assessment is the key but this is not considered as part of the water resources management.
- (iii) The scales of aquifer mapping are decided on the basis of scales adopted for administrative units.

- (iv) Over emphasis on ground water extraction at the cost of quality issues (30-60% of the areas are qualitatively challenged).
- (v) Legislation on regulation of groundwater has been adopted even without any protocol for implementation.

6. Shri Himanshu Kulkarni also mentioned that after working extensively with farmers at ground level, the two real perceptible threats which have emerged are

- For many stakeholders there is no clear concept of why and how groundwater aquifer is important
- Knowledge vacuum among the stakeholders makes it difficult to take decisions on groundwater management at the local level.

7. Chairman Central Pollution Control Board(CPCB) stated that use of microbial organic fertilizers could be used as a solution to improve the ground water quality. Currently 30% of pollution is from industrial sources and 70% from domestic sources. He suggested that there was urgent need for rejuvenating the tributaries of rivers and use of flood water for recharge of ground water and dilution of contaminants.

Dr. Tushaar Shah observed that it is easier to tackle quality issues from geo-genic contaminants than from non point sources of pollution and even the advanced countries are unable to grapple with it.

8. It was decided that urban ground water issues would have to be separately addressed by the Working Group on Sustainable Ground Water Management.

## **II. Working Group on Major and Medium Irrigation**

9. Member(WR), Planning Commission expressed concern over many issues plaguing the sector like ineffective water use, gap between the irrigation potential created and utilized, large number of ongoing irrigation projects, under performing irrigation systems, poor performance of Accelerated Irrigation Benefit Programme(AIBP), questionable physical achievements reported under Accelerated Irrigation Benefit Programme, manipulation of cost benefit ratios, etc. It was noted that due to inefficiencies in the canal system large private investment in tube wells in the command area of irrigation projects had taken place. There is a need to have new approach for command area development in mega projects like Sardar Sarovar. The Working Group needs to look into the issues of continuation of AIBP with conditionality's and incentives/disincentives. Member(WR) also stated that there is a need to arrive at a better programme design with a revised institutional set up similar to the National Water Commission in Australia. He stated that the institutional issues have to be addressed by the Working Group on Governance.

10. Chairman, Central Water Commission was of the view that AIBP is being criticized more than required. The primary objective of the AIBP is the creation of potential through Major, Medium and Minor Irrigation. Major and Medium irrigation projects contribute to the infrastructure of the country. In many cases agricultural land is being diverted for other uses leading to the irrigation gap. Giving up the

programme would seriously impair the country's ability to increase the irrigated area. States find it difficult to raise their share of 75% and release of funds to them is irregular. As far as bridging the gap of irrigation he suggested for compulsory micro irrigation in lift irrigation command. Senior Adviser, Planning Commission suggested for dovetailing of Command Area Development with AIBP for bridging the last mile connectivity to the farm gate.

Secretary, MOWR stated that instead of concentrating on dams, completion of all types of canals is required from the farmers' angle. Member (WR), Planning Commission stated that water pricing is another major issue which needs to be addressed. He also clarified that the objective of AIBP is not being questioned but emphasis needs to be laid on delivery of water to the farmers fields.

11. Dr Tushhar Shah detailed some specific issues of the Major and Medium Irrigation works. Firstly, in the case of Sardar Sarovar Project in Gujarat, the Gujarat canal command was expected to irrigate 22 lakh ha. but as per remote sensing data it was irrigating only 6 lakh ha. secondly, there is the issue of maintenance. As per Central Water Commission report of 2006 on Major and Medium Irrigation projects less than 1% of the capital cost was incurred on asset maintenance leading to deterioration of infrastructure. The third issue is organization of the irrigation and management department of the States which lacks cutting edge level officers weakening the management of the irrigation structures. Even the basic Management Information System is missing at the field level and this is a major cause of concern. The fourth issue is irrigation water pricing. Water from dams to industries fetches more revenue and irrigation water collection/pricing is becoming secondary leading to non maintenance of structures. The fifth, is the issue of large private investments in canal commands enabling conjunctive use by default, He suggested that the time is ripe for moving from development to management. The Californian example for using the reservoir water for recharge in canal commands was also quoted.

12. Dr Nirmal Sengupta Director, Prof. IGIDR stated that farmers prefer to pay for groundwater than for surface water which is uncertain. He expressed concern over the shifting of irrigation by farmers from tanks to bore wells leading to disuse of surface systems which needs to be looked into.

### **III. Working Group on Rural Domestic Water and Sanitation**

13. Member(WR) stated that in rural domestic water and sanitation a concerted effort was required to be made for providing safe drinking water to the population as well as to create good quality sanitation facilities for all rural households. He further stated that the same aquifer is being used for irrigation as well as drinking water resulting in overstress on groundwater sources. Also habitations which were reported as fully covered, were again falling back into the category of slipped back habitations. This needed to be looked into and management of aquifers was necessary from the standpoint of sustainability.

14. Shri Joe Mediath, Executive Director, Gram Vikas and the Chairperson of the Working Group stated that the terms of reference of the Group were comprehensive. He mentioned that drinking water should be available to the lowest habitation (i.e. even having the population of less than 100 persons) and the responsibility should be vested with the lowest level *panchayat*. Also there should be quality service and metering of water with 24 hours water supply. There was a general feeling that the tubewell water was the best water without having any idea about its quality. As regards rural sanitation, the condition

was pathetic and only 2% of toilets were functioning in Orissa due to inadequate water. Women had to fetch water for toilets from long distances. A mechanism should be devised such that all households including the APL have toilets and bathing facilities for women. Further the Government should not provide grants under TSC but should only incentivize it. He stated that *Dalits* and *Adivasis* were the majority population in the villages and, therefore, the allocations should specifically be made for them.

15. Member (WR), Planning Commission stated that guidelines of the Department insist for a minimum population of 100 before implementation of the rural water supply scheme can be taken up. Joint Secretary, Department of Drinking Water and sanitation clarified that this stipulation has been removed. Joe Mediath stated that problems of LWE cannot be addressed if the basic facilities of drinking water and toilets are not provided. Joint Secretary, Department of Drinking Water and Sanitation stated that under NRDWP 25% allocation to Scheduled Castes and 10% to Scheduled Tribes were earmarked and these were being provided in the budget itself. On query from Member for any suggestions on the ToRs he stated that the Department is preparing a strategy paper for the International Decade on Water Supply and this would be placed before the Working Group. He also stated that cross cutting issues like protecting the water resources, quality and institutional issues would have to be dealt with by the Working Group on Governance.

#### **IV. Working Group on Urban and Industrial Water and Sanitation.**

16. Member(WR), Planning Commission raised the issue of conflict between the cities and rural areas regarding the usage of water resources. He further advocated for instance the Singapore model of using recycled water in the manufacture of semi conductors which requires high water quality. Joint Secretary, Department of Urban Development explained the classification of 423 cities/towns based on the availability of sanitation. The towns are classified as green, blue, black and red depending on various levels of sanitation. About 75% of the ground water in urban areas is polluted. The service level benchmarking has 4 basic parameters laid down by the Ministry of Urban Development and is being followed in 37 cities. There is a scarcity of fresh water in urban areas and investment required to address this issue is assessed to be \$ 1 billion. He suggested that capital investment and rehabilitation should go hand in hand. The issue of non revenue water (NRW) in the urban areas is of great concern, NRW in Delhi being 52% or even more. He suggested the need for identifying the emergent pockets in urban areas for and taking up the same in PPP model for capital investment.

17. Member (WR), Planning Commission stated that PPP in urban water supply needs to be studied in detail for its merits and demerits and a collective decision needs to be taken by the Government in this regard.

Joint Secretary, MOUD stated that PPP would be successful with fair allocation of risks and resources. Primarily drinking water in remote areas, metering to consumers may be attempted on pilot basis in PPP mode. There is a need for price regulation for urban water supply, however, this can be initiated with data collection on revenue recovery and O&M expenses. Member(WR), Planning Commission endorsed the above views and further mentioned that there is a need for water governance which should be duly addressed by the Working Group on "Governance".

## **V. Working Group on Flood Management and region Specific Issues**

18. Member (WR), Planning Commission emphasized the importance of revisiting the old strategies of non structural interventions for flood management and need for taking a holistic view on the suggestions of having flood and non flood alternatives. Dr Nirmal Sengupta, Director, IGIDR stated that flood is an all India phenomenon and complete rethinking is required on floods. Detailed data on flood frequency, actual losses due to flood and indirect impact on the economy need to be collected. The post relief funds provided by Government of India through CRF/NCCF are inadequate. Flood insurance is yet to take off in a big way with Gujarat having 20% flood insurance against all India level of only 12%. Adequate insurance is necessary and the Working Group would require a financial expert to address flood insurance issues. Dr. Sengupta emphasized three main issues namely flood data, flood management and insurance. Other regional specific issues which may be addressed by the Working Group are contamination caused by arsenic, salinity, iron, nitrate etc. and the problem of wet lands.

19. Chairman, Central Water Commission stated that flood prone areas need to be mapped. The dams should have storage for flood cushion. He further cited the example of flood management on the Tehri dam during the recent floods. He advocated both structural and non structural measures such as flood plain zoning and legislation are necessary to combat floods.

## **VI. & VII. Working Group on Water Governance and Data Base Management**

20. Member (WR), Planning Commission indicated that data base management is the major issue in the 21<sup>st</sup> century and the separate working group meant for this purpose should take note. Also the issue whether we need to have National Regulator for water sector and if so, how to interface it with the States need to be addressed by the Group. He also requested Members of the SC to give their suggestions for these two Groups.

## **VIII. Working Group on Water Shed and Minor Irrigation**

21. Member(WR), Planning Commission stated that water shed guidelines are in place and livelihood plans have been integrated in Water Shed activities. National Rainfed Area Authority was created for Water shed management which is looking into these aspects.

22. Shri Deep Joshi, Member NAC stated that Planning Commission was critical of watershed development programmes. One third of the total geographical area of the country is under forest cover and zamindari control, use of forest land for water shed management would require multiple clearances. He also stated that cost norm currently allowed is Rs 14000/ha by the DoLR where as NABARD and DoNER projects have no cost norms. Secretary, DoLR clarified that common guidelines are not treated as frozen and DoLR encourages good suggestions from the States. States are encouraged to Plan the DPR on GIS based maps and this has helped for quicker completion of DPRs. She has stated that the ToR of the Sub Group is basically relating to the implementation of watershed programmes according to the common guidelines. Since State Governments are yet to implement the common guidelines in the field (since they are still in the process of the preparing the DPR), it is too early to assess the implementation of the common guidelines.

23. Member(WR), Planning Commission stated that programmes like RKVY, MGNREGA and watershed programme need to have a common committee at State level to clear the DPRs in order to ensure the livelihood aspect which needs to be addressed through RKVY. Current watershed plans are made at district level and do not involve the community. It is also important to have horticulture and fisheries as livelihood aspect in watershed programmes.

24. Secretary, DoLR suggested inclusion of Members in the Working Group from Ministry of Rural Development (MGNREGA Division), CGWB and Minor Irrigation Wing of Ministry of Water Resources for addressing the issues posed by the Working Group.

25. Summing up, Member (WR), Planning Commission desired that the deliberations of the SC be made available to the Working Groups.

26. The meeting ended with the vote of thanks to the chair.

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Annexure

**List of Steering Committee Members and other who have participated in the first meeting held on Thursday the 25<sup>th</sup> November 2010 in Yojana Bhawan Planning Commission.**

1. Dr Mihir Shah, Member (Water Resources), Planning Commission - In Chair
2. Shri D.V.Singh, Secretary, Ministry of Water Resources, Government of India - Member
3. Smt Anita Chaudhary, Secretary, Department of Land Resources, Government of India - Member
4. Shri A.K.Bajaj, Chairman, Central Water Commission, New Delhi - Member
5. Dr Tushaar Shah , Senior Fellow, IWMI, India - Member
6. Dr Himanshu Kulkarni, Executive Director, ACWADAM, Pune - Member
7. Dr Nirmal Sengupta, Professor, IGIDR, Mumbai - Member
8. Shri Joe Mediath, Executive Director, Gram Vikas, Berhampur - Member
9. Shri Deep Joshi, Member, NAC - Member
10. Dr S.C.Dhiman, Chairman, Central Ground Water Board, New Delhi - Member
11. Prof S.P.Gautham, Chairman, Central Pollution Control Board, New Delhi - Member
12. Shri G.C.Pati, Additional Secretary, Ministry of Agriculture Representing Secretary Ministry of Agriculture - Member
13. Dr Yudhvir Uppal, Senior Adviser(WR), Planning Commission - Member Secretary
14. Shri M.S. Agrawal, Adviser(WR), Planning Commission
15. Shri A.K.Mehta, Joint Secretary, Ministry of Urban Development Representing Secretary Urban Development - Member
16. Shri T.M. Vijay Bhaskar, Joint Secretary, Department of Drinking Water Supply, - Member Representing Secretary Department of Drinking Water Supply
17. Shri Dinesh Chand, Joint Adviser(WR), Planning Commission
18. Shri Avinash Mishra, Deputy Adviser (WR), Planning Commission.
19. Shri Vandana Sharma, Senior Research Officer(WR), Planning Commission
20. Shri A.Muralidharan, Senior Research Officer(WR), Planning Commission
21. Shri Rahul Dubey, Young Professional(WR), Planning Commission
22. Smt Poonam Pandey, Young Professional (WR), Planning Commission.

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## Annexure 1(B)

### **Minutes of the Second meeting of the Steering Committee on Water Resources and Sanitation for the formulation of the Twelfth Five Year Plan held under the chairmanship of Dr. Mihir Shah, Member (Water Resources), Planning Commission on 27.09.2011 in Committee Room No.136, Yojana Bhawan, New Delhi.**

The list of participants is at the Annexure.

1. Member (WR), Planning Commission and Chairman of the Steering Committee on Water Resources and Sanitation for the formulation of the Twelfth Five Year Plan welcomed the participants to the meeting and stated that the objective of the meeting was to take stock of the progress achieved so far by the eight Working Groups and to act as a co-ordinating forum so that ideas emerging from the Working Groups get synchronised coherently to avoid overlapping. He then requested Dr. Himansu Kulkarni, Chairman of the Working Group on Sustainable Ground Water Management to make the presentation on the report of the Group.

#### **I. Working Group on Sustainable Groundwater Management**

2. Dr. Himansu Kulkarni stated that Western World's approach to the groundwater exploitation is similar to crude oil exploitation and they concentrated their research on oil reservoirs. In India, we need to adopt this approach to understand the aquifers, the storehouse of the groundwater. But unfortunately this approach is not given importance it deserves. Despite enormous crisis prevailing on groundwater across the country, the various educational curriculums have only groundwater development and exploration in its syllabi and not its management aspect. The Working Group has a consensus for considering aquifers as resources and understanding them. Also the Group is looking forward to a National Groundwater Management Programme in the Twelfth Five Year Plan that would address the issues of equity, safe and sustainable groundwater development. The Working Group recommendations are on proper assessment of groundwater, aquifer mapping, participatory groundwater management, institutional strengthening and monitoring.

3. On the assessment of groundwater, Dr. Kulkarni informed that current assessment by Central Ground Water Board (CGWB) concentrates on quantity and there is a need to consider the quality aspect as well. The current assessment by CGWB is being carried out once in five years and there is a need for greater frequency in view of imminent climate change and assessment validated through alternative techniques. Ms Sunita Narain, DG Centre for Science and Environment (CSE) desired that there are State and Central level assessments and States' data is difficult to access. There is a need for a single database and States' data need to be captured with seamless integration in a single database. Responding to this, Chairman, CGWB informed that assessment done by the States is actively assisted by the CGWB and the State Principal Secretaries are chairing the assessment committees. He also informed that assessment is not restricted to quantity but also to the quality. All the States data sources have been corroborated in the

on-going assessment and State reports would be released first. The assessment is a dynamic process and data are likely to be available in two months. Member (WR), Planning Commission emphasised that the transparency of data should be highlighted by the Working Group and steps to be taken by the CGWB in this regard should be covered in their recommendations. He also emphasised to evolve the technique for real time data collection and analysis.

4. On the recommendation regarding groundwater mapping, Dr. A Vaidyanathan, former Member, Planning Commission observed that there are about a lakh of groundwater assessment wells in rural areas owned both by States & Centre, however, the numbers of wells in urban areas are not known. Since the country has six to seven hydro-geological settings, same scale for maps would not be helpful for every area. He also advocated separating mapping and monitoring exercises. In his view, mapping in hard rock areas would be very useful. About a dozen of Engineering Colleges could be involved for sampling and in the reliable estimation of extraction of groundwater. He suggested that the surveys and estimations should be repeated every five years.

5. Additional Secretary, Ministry of Water Resources informed that Ministry has already taken up the work of geophysical survey in collaboration with National Geo Physical Institute, Hyderabad in five selected watersheds of the country viz. hard rock area, alluvial, west, south and eastern regions. It is likely to be completed in two years. He also opined that to cover an arable area of 140 m.ha., it is also necessary to use aerial surveys. He also suggested for legal backing for participatory groundwater management. Dr. Vaidhyathan also advocated for legal change for groundwater management since 'Easement Act' enables unrestricted extraction of groundwater. Member (WR) informed that a separate Sub Group of the Working Group on Water Governance is working on a "Draft Model Bill for the Protection, Conservation, Management and Regulation of Ground Water" and this would address the legal aspects on management of groundwater.

6. Chairman, CGWB desired for a separate head of account for capacity building visualising the magnitude of mapping task involved. Chairman, Central Water Commission emphasised for specific funds required for instrumentation part of aquifer mapping and also for identifying the agencies for executing the works.

7. Dr. Kulkarni stated that outlay recommended for the Twelfth Five Year Plan for Groundwater Management by the Working Group is about Rs 10,000 crore and more strategic estimate would peg it between Rs 4000 crore to Rs 7000 crore.

## **II. Working Group on Water database Development and Management**

8. Dr. A Vaidyanathan, Chairman of the Working Group made an oral presentation to the Steering Committee. A review of the Water Resources data scenario in the country by the Working Group indicates gaps in data availability, poor quality, difficulty in their access, silo spreading of data with various organisations in the water sector etc. He emphasised that the data requirements for the water sector should be viewed in the National perspective and as an essential item and States should be supported by the Centre in this regard. He informed the Committee that three types of data were

considered by the Working Group. These are: (i) Basic data on Water Resources (ii) Actual water utilisation data and (iii) Consumptive use of water. The basic data would inter-alia include evaporation measurement, soil moisture, hydro-meteorological related data etc. The current way of data collection lacks quality and it is necessary to use telemetry devices on a wide scale. Also remote sensing backed up with telemetry is fairly accurate for data measurement, retrieval and transmission and hence should be adopted.

9. The Chairman of the Working Group also observed that silo based approach of Central Water Commission and Central Ground Water Board has led to segregation of surface and groundwater data. He advocated for “In-house” research on water data by the institutions like Central Water Commission and Central Ground Water Board which would answer many potential questions. On data access, he emphasised for making available data in public on water levels of 81 important monitored reservoirs. Actual groundwater use and extraction at micro level to be captured by the States using telemetry. The Chairman of the Working Group was not in favour of the scheme on interlinking of rivers.

10. The Chairman of the Working Group suggested for impact evaluation surveys for (a) estimating water utilisation by drinking water, (b) industry and (c) agriculture. He informed that while gross water use data is available, consumptive use data are not available. He suggested for periodical assessment of non-agriculture water use and agriculture water use. He suggested for agriculture surveys on land use, cropping pattern and consumptive use in various agro-climatic zones. He cautioned that Government Departments alone cannot carry out surveys and suggested for forming a network of institutions.

11. The Chairman of the Working Group also appreciated the recent initiative of Water Resources Information System (WRIS) by Central Water Commission and stated that the system should have high quality data analysis capability and also give access to data. They should also comply with National Data Standards. With high quality data, solving the water disputes would be easier and formation of “National Advisory Council on Water Data” chaired by either the Deputy Chairman or Member (WR), Planning Commission was suggested. The Chairman, Central Water Commission who was earlier Co-Chairman of the Working Group brought out the shortage of manpower in data collection efforts.

12. The Twelfth Five Year Plan requirements for development of water data base has been worked by the Working Group to Rs 8000 crore mainly for hardware requirements.

### **III. Central Sector Schemes of Ministry of Water Resources**

13. Based on the preliminary information received from the Ministry of Water Resources, Joint Adviser (WR), made a presentation on the on-going Central Sector Schemes of the Ministry of Water Resources. In the presentation it was suggested that the 15 on-going schemes of the Ministry could be merged and bundled into six major topics and a new scheme on Implementation of National Water Mission can be taken up in the Twelfth Five Year Plan. Additional Secretary, Ministry of Water Resources stated that most of the Working Groups are yet to give their views on the on-going schemes and it would be difficult for him to take a decision regarding the number of schemes, their bunching and continuation. There were discussions on bunching of data collection schemes along with institutions.

Additional Secretary also indicated that the Ministry would prefer to have separate schemes on Flood Forecasting, Flood Management in Border Rivers and Farakka Barrage Project.

14. Member (WR), Planning Commission stated that since the Ministry of Water Resources is to re-work out the proposal and incorporate the suggestions made by the various Working Groups, a separate meeting on the Central Sector Schemes would be convened for taking a decision.

#### **IV. Working Group on Major and Medium Irrigation and Command Area Development**

15. Dr. Tushaar Shah, Chairman of the Working Group on Major and Medium Irrigation and Command Area Development made a presentation on the work done by the Group and the important issues that have emerged out of the discussions. The presentation captured the issues in the sector viz gap between the Irrigation Potential Created (IPC) and Irrigation Potential Utilised (IPU), poor Command Area Development works, low irrigation service fee and low collection, build-neglect-rebuild syndrome, no management capacity building, failure of Participatory Irrigation Management and poor monitoring. It was also brought out that major investments in the sector are taking place in 14 States of the country which account for 95% of the investment, capacity and area. It was also suggested for focussing on ERM (Extension, Renovation and Modernisation) works in 14 states and new works in rest of the States. Collection of service fee, especially through Participatory Irrigation Management (PIM), needs to be incentivised focussing on outcomes rather than the present input form of assistance. It strongly recommended the Phase-I recommendations of the Dr Vaidyanathan Committee, which are: (i) irrigation service fee levied to cover O&M and 1% of the capital stock, (ii) water deliveries on volumetric basis at outlet level and (iii) WUAs to manage distribution below outlet, including the collection of service fee.

16. Dr Vaidyanathan argued for supporting the States through incentives only in specific projects chosen carefully and not across the board to all the projects. Member (WR), Planning Commission stated that the recommendations of the Working Group should be on 'Reforms based' rather than 'Business as Usual' and also for incentivising the narrowing down the gap between the IPC and IPU. Chairman, Central Water Commission cautioned that ERM is a deferred maintenance work and endless cycle of ERM should be avoided. He also stated that the ERM projects need to be properly defined for support by the Centre. Additional Secretary, Ministry of Water Resources agreed that irrigation service fee is a neglected area. He also pointed out that allocation by the Planning Commission for CAD during Eleventh Plan was Rs 1600 crore to Rs 1800 crore against a request of Rs 16000 crore. AIBP and CAD are to be tightly bundled to provide a lined field channel to the farmer. He also advocated the use of pipes instead of field channels. Dr Vaidyanathan cautioned that pipes would not only reduce seepage losses but also reduce the ground water recharge. Additional Secretary, MoWR suggested that distribution should be volumetric and AIBP to have water use efficiency target parameter to avail matching share from the Centre. Dr Tushaar Shah pointed out if one depended more on groundwater for food security, the more difficult it would be to achieve the food security. He stated that the waters stored in dams are to be seen strategically so as to break the above dependence on groundwater by surface water management reforms.

17. Dr Vaidyanathan stated that the issue is not of large dams but of such projects not getting completed due to deep rooted institutional and political problems. He wanted water use efficiency to be

improved in major and medium irrigation commands which is now around 35% and is very low. Chairman, Central Water Commission suggested the lining of canals for efficiency improvement. He also stated that per capita storage in the country is one of the lowest and emphasis should be on building up storages which has helped the country to increase irrigation development rate from 0.4 m.ha to more than one m.ha., and also the precious water flowing unused into sea may be avoided.

18. Summing up, Member (WR) stated that a balanced view would be taken on Major and Medium Irrigation projects with shifting of focus from construction to management through incentivising reforms, avoiding vicious ERM projects and institutional improvement of Irrigation Departments. He also desired that the Working Group may provide strong arguments for storage projects for conserving precious fresh water since overarching priority of Twelfth Five Year Plan would be on 'Health' and 'Education' sectors, which may lead to resource crunch for other sectors.

19. The outlay recommended by the Working Group for States and Centre is Rs 3,05,620 crore, out of which Rs 2,11,060 crore is for the States and Rs 94,560 crore for the Centre.

#### **V. Working Group on Rural Domestic Water and Sanitation**

20. Shri Navin Kumar, Secretary, Ministry of Drinking Water and Sanitation (MoDWS) and Co-Chairman of the Working Group made a presentation on Rural Domestic Water and Sanitation. He stated that while there was fairly good coverage through hand pumps, piped water supply coverage in many States is low. Poor operation and maintenance of water supply systems especially of hand pumps has led to repeated investment and slip-backs of covered habitations. There is a problem of source sustainability in many areas in terms of quantity and quality due to over-dependence on ground water with lesser attention to recharge & conserve it, contamination from sewage and unsafe disposal of liquid & solid wastes.

21. The Working Group recommended that 55 lpcd of water supply to be delivered to at least 55% of the rural population. The Working Group has proposed for participation of the beneficiaries right from the planning stage and village water budgeting with O&M system based on local participation. The Working Group has suggested for Service delivery parameters to be specified and monitored; preference to be given to Integrated Action Plan districts, Scheduled Castes and Scheduled Tribes areas; Integrated Management Information System (IMIS) to be revamped in order to make it more user friendly; holistic aquifer and surface water management approach based on local participation to be adopted; the District Water Vision to be prepared. States will be encouraged to corporatize Public Health Engineering Departments (PHED)/other engineering wings. National Rural Drinking Water Programme (NRDWP) is to focus on funding Piped Water Supply Schemes (PWSS).

22. As regards Sanitation Sector, the Working Group recommended for a well-designed Communication Strategy targeted for community behaviour change, bridging gap between APL and BPL divide by giving incentives to both, incentives for toilet construction to include superstructure needs for privacy & dignity, facilitating micro-credit for toilets through Self Help Groups (SHGs) to supplement available funds, conjoint efforts for provisioning water & sanitation facilities. The Working Group

suggested for 'Open Defecation Free Rural India' by 2017; provision for O&M for sustainability; availability of skilled personnel on hire through skill development under National Rural Livelihood Mission (NRLM), promoting ownership through owner driven construction, preparing pool of masons for keeping out the contractors, focused training of local daily wagers/SHGs for masonry construction; implementation of the programme at the Gram Panchayat (GP) level through identified Village Water & Sanitation Committees (VWSCs)/NGOs to ensure community participation in planning, construction, operation and management; children to be motivated to act as change agents; capacity building of School teachers, ASHA & Anganwadi Workers on hygiene and sanitation; inclusion of sanitation in school curriculum, exploring possibilities of constructing toilets in Anganwadis run in private buildings by MoDWS. The Working Group also suggested for having various technological options for toilets in different hydro-geological regions of the country, which will encourage the users for investment in construction of toilets; encouraging the State Governments to introduce regulations making it obligatory for Panchayati Raj Institutions (PRIs) to ensure that all households in the GP have access to sanitation facilities; making dedicated Monitoring Directorate, social-audit and independent evaluation of programme mandatory for continuous and effective monitoring etc.

23. The Working Group suggested some strategies for convergence of TSC with other programmes. Convergence of Drinking Water and Sanitation along with their integration with Rural Housing, NRDWP and TSC should be administered in the State through a three-tier Governance Structure, a multi-disciplinary Rural Water and Sanitation Management Organisation (RWASMO) at the State level with District Water & Sanitation Mission (DWSM) at District level and Block Resource Centres at block level to be created to take financial and administrative decisions. The Working Group also suggested construction of toilets in households, schools, Anganwadis and community sanitary complexes to be taken up under Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) in convergence with TSC etc. The Secretary, MoDWS mentioned that letters had been issued by the Ministry for convergence of MGNREGS with TSC. It was also stated that many States are asking for additional funding for construction of toilets for APL households.

24. The Member (WR), Planning Commission stated that Drinking Water Supply is to be at centre stage in the Watershed Management. He also stated that all tribal households and the households in sparsely populated and remotely located areas should be considered for the incentives as for BPL households for sanitation. He suggested that a pilot scheme on housing, sanitation and drinking water should be worked out on the pattern of Indira Awas Yojana. He mentioned that at present, the incentive for construction of toilets to only BPL households has hampered the pace of the Total Sanitation Programme. Regarding quality of construction of toilets, it was suggested that a scheme for converging TSC with NRLM with provision of a loan component will help since all SHGs are not strong everywhere and will require loan for strengthening themselves in order to provide better material for construction, etc.

25. A total outlay of between Rs 2,72,377 crore (Rs 1,22,570 crore for Central Plan and Rs 1,49,807 crore for State Plan) to Rs.3,03,165 crore (Rs 1,36,424 crore for Central Plan and Rs 1,66,741 crore for State Plan) has been recommended by the Working Group for the Twelfth Five Year Plan for 'Rural Domestic Water Supply' including the component of NRDWP for lagging States, Special Component for Scheduled Castes & Scheduled Tribes, Support activities, Sustainability etc. The outlay recommended by

the Working Group under TSC is Rs 44,116 crore for Centre and Rs 14,600 crore for States as a matching share as per the present funding pattern.

## **VI. Working Group on Flood Management and Region Specific Issues**

26. Shri S.P. Kakran, Member (RM), Central Water Commission and Co-Chairman of the Working Group, made a presentation on Flood Management and Region Specific Issues. The presentation captured the area liable to floods in the country, which is about 49.185 m.ha. Area likely to be protected till the end of Eleventh Five Year Plan is about 20.4 m.ha. and an expenditure of Rs 1.26 lakh crore has been spent on flood management works since First Five Year Plan (1951-56). The average expenditure per million hectare is estimated as Rs 6000 crore and to cover the balance area of 28.785 m.ha, an investment of Rs 1.82 lakh crore would be required. It is targeted to provide flood protection to 6 m.ha. in the Twelfth Five Year Plan with a proposed outlay of Rs 57435 crore in both Central and in State Plans. The Co-Chairman mentioned that the major impediment in working out the recommendations was the absence of data from the States. Only 16 States and 3 UTs have provided partial information on flood management. He also elaborated on the implementation of Flood Management Programme (FMP), a State Sector Scheme, in the Eleventh Plan. Under the programme, during Eleventh Plan, 410 works from 22 States have been included and an amount of Rs. 2667 crore has been released up to 31.03.2011 and 218 works have been completed. In Twelfth Five Year Plan, the flood management works amounting to Rs 55,000 crore are in pipeline, out of which works of Rs. 10,000 crore are proposed to be included under FMP in Twelfth Five Year Plan. A number of short term measures i.e. controlled flooding, central financial assistance, flood shelters, committed maintenance of flood infrastructure by the States and streamlining the procedures and long term measures i.e. flood plain zoning, Integrated Water Resources Management and flood cushion in dams for flood mitigation were also suggested. It was also proposed to cover 80% of the flood prone area in the country in next 10-12 years. Use of telemetry and modern flood forecasting using satellite based communication were also strongly recommended.

27. Ms Sunita Narain, DG, CSE desired to know about the co-ordination between India Meteorological Department (IMD) and Central Water Commission (CWC) during floods. Member, Central Water Commission informed that IMD and Central Water Commission work closely and share data with an MoU on handshake protocols. On a query on the total number of flood forecasting stations required, Member (RM), Central Water Commission stated that as per the norms, about 4000 stations and 3000 data collection centers are required to be established. Additional Secretary, Ministry of Water Resources stated that medium term forecast by IMD is the key to flood management as current models give a limited response time of 24-48 hrs to States for evacuation. He desired for combining the medium term forecast and physical models for effective flood forecast/ management.

28. There were discussions on effectiveness of embankments as a flood protection measure in the country. Additional Secretary mentioned that most of the assistance by Centre gets allocated for embankments. He suggested for reviewing the efficacy of embankments as an effective flood management intervention alongwith coping up and managing with floods. The Flood Management Programme needs to be restructured after a review by the Ministry. Member (WR), Planning Commission said that 'Business as Usual' in flood sector cannot continue in the Twelfth Five Year Plan

and flood management as subject requires a wide gamut of personnel from both engineering and social sciences backgrounds. Dr Himanshu Kulkarni of ACWADAM was of the view that straight jacketing of the rivers should be based on the actual requirement and flood mitigation measures need to be multi-dimensional with separate budget heads provided for them. Chairman, Central Ground Water Board stated that river jacketing should be the minimum as any rise in river bed level would lead to more floods and suggested for the studies on river morphology and plate tectonics, which would throw light on the river bed rising and subsequent floods. Dr Deep Joshi, Member, National Advisory Council (NAC) stated that encroachments in flood plains enhance the flood vulnerability. He further stated that flood occurrences due to other infrastructural development are also major concern. He suggested for coping and living with floods, wherever flood protection is not fully feasible. Chairman, Central Water Commission informed that so far 38000 km of embankments has been constructed which had played a significant role in flood reduction. He agreed for revisiting the works carried out for evaluating their effectiveness. He also advocated for geo-synthetic embankments which are stronger and effective in severe erosion areas.

29. Member (WR), Planning Commission desired that river dynamics be closely studied before structural interventions are carried out. He also requested the Working Group to provide details and recommendations on other Region Specific issues as outlined in the ToRs for the Group, which are not brought before the Steering Committee.

## **VII. Working Group on Urban and Industrial Water Supply and Sanitation**

30. Ms. Sunita Narain, DG, Centre for Science and Environment and Chairperson of the Working Group delivered a presentation on Urban and Industrial Water Supply and Sanitation for the Twelfth Five Year Plan. She mentioned that cities only focus on water but not on the waste, 80% of the water supplied is discharged as sewage. She suggested that Sewerage system should be the main focus during the Twelfth Five Year Plan.

31. The key findings of the Working Group are: (i) public health implications of unclean water are enormous and unacceptable; (ii) re-allocation of water between existing users – Rural India – and new users will lead to tension and violence and must be avoided; (iii) policy planning is happening today without any real numbers of the use of water in different economic sectors; (iv) the system of estimating demand and supply of water in cities is rudimentary and leads to poor accounting and poorer planning; (v) the length of the pipeline adds to distribution losses and financial costs; (vi) the challenge is to supply water to all – the inequity in water supply within a city must be understood and removed; (vii) Groundwater remains the missing link in city water accounts; (viii) the lack of recognition of the existing role of groundwater in city water supply leads cities to discount the need to provide for recharge; (ix) Cities worry about water but not the waste this water will generate; (x) no national accounts for the excreta we generate or the excreta we treat or do not treat; (xi) the imperative is to provide sanitation to all, but equally to ensure that this facility is hygienic and that it does not add to pollution; (xii) the challenge of sewage generation is simply treated as a temporary infrastructure challenge, without estimating its cost and feasibility; and (xiii) the capital intensity of the current waste system results in the fact that cities can only provide for a few and not for all.

32. Working Group has recommended many solutions to improve the water supply in urban areas of the country. The recommendations are: (i) the scale of investment needed in this sector is enormous, require careful assessment of the total costs of water and sewage sector so that the effort is to ensure that the projects are planned for affordability and sustainability; (ii) Private investment will not be the answer to the infrastructure challenge and PPP will have to be differently conceptualized in this sector; (iii) water and sewage must be paid for but equally important is recovery of costs and sustainability of the resource; legislate and implement; (iv) Future investment in water supply must focus on demand management (reducing water usage); in reducing inter-city inequity and in quality of water supplies; to cut the costs of water supply and distribution losses (v) focus on building, renewing and replenishing local water sources, including groundwater; (vi) future investment in this sector must focus on sewage and join the dots with pollution of rivers and waterways; (vii) to cut pollution, build sewage systems differently and (viii) focus on software and not hardware; (ix) set real and hard targets for affordable recycling and reuse of treated waste water.

33. The Member (WR), Planning Commission stated that these are the basic services which have to be improved and maintained, as otherwise these ultimately affect the health. He mentioned that the success stories/case studies should be included in the report and the gaps in the data/information should also be filled up with their descriptions. He further desired that the guidelines regarding PPP with the clear cut outcomes should be suggested by the Working Group.

34. The following decisions were agreed to:

- (i) Steering Committee to meet for its third meeting after the receipt of full Reports from the Working Groups and the Committee would act as a Coordinating forum on cross cutting issues across Working Groups.
- (ii) Discussion on Review of the Central Sector Schemes of the Ministry of Water Resources to be held after the Ministry finalises the proposal on the ongoing schemes and their outlays. The Planning Commission would examine the proposals in the meeting with the Ministry.
- (iii) Various ideas and the decisions that emerged during the discussions may be quickly incorporated in the respective Working Group reports, which were discussed in the meeting.
- (iv) Discussions on the reports of the remaining Working Groups would be held in the next meeting of the committee.

35. Concluding the meeting Member (WR), Planning Commission thanked the Chairpersons & Co-Chairpersons of the Working Groups and Senior Officers of the Ministries for attending the day-long meeting of the Steering Committee.

**List of participants who attended the Second meeting of the Steering Co-mmittee on Water Resources and Sanitation held on 27.9.2011 in the Planning Commission, Yojana Bhawan, New Delhi**

1. Dr Mihir Shah, Member (Water Resources), Planning Commission - In Chair
2. Dr A. Vaidhyanathan, Former Member, Planning Commission - Member
3. Shri Navin Kumar, Secretary, Ministry of Drinking Water and Sanitation - Member
4. Shri R.C. Jha, Chairman, Central Water Commission, New Delhi - Member
5. Dr. Tushaar Shah , Senior Fellow, IWMI, India - Member
6. Dr. Himanshu Kulkarni, Executive Director, ACWADAM, Pune - Member
7. Shri Deep Joshi, Member, National Advisory Council (NAC) - Member
8. Ms Sunita Narian, Director General, Centre for Science and Environment - Member
9. Dr. S.C. Dhiman, Chairman, Central Ground Water Board, New Delhi - Member
10. Shri Mohan Kumar, Additional Secretary, Ministry of Water Resources representing Secretary, Ministry of Water Resources - Member
11. Shri S.P. Kakran, Member (River Management), Central Water Commission and Co-Chairman, Working Group on Flood Management and Region Specific Issues
12. Smt Savita Anand, Joint Secretary, Department of Land Resources, Government of India representing Secretary, Department of Land Resources - Member
13. Shri M.S. Agrawal, Adviser (WR), Planning Commission - Member Secretary
14. Shri R.K. Tiwari, Deputy Commissioner, Ministry of Agriculture, representing Secretary, Ministry of Agriculture - Member
15. Shri T.M. Vijay Bhaskar, Joint Secretary, Ministry of Drinking Water and Sanitation
16. Shri J.S. Mathur, Joint Secretary, Ministry of Drinking Water and Sanitation
17. Shri D. Sharma, Commissioner (Ganga), Ministry of Water Resources
18. Shri R.D. Singh, Director, National Institute of Hydrology, Roorkee
19. Shri Avinash Mishra, Joint Adviser (WR), Planning Commission
20. Shri C. Lal, Director, Flood Management Planning, Central Water Commission
21. Shri M.K. Sinha, Sr. Joint Commissioner, Ministry of Water Resources
22. Shri L.K. Tenaja, Sr. Joint Commissioner, Ministry of Water Resources
23. Shri S.K. Sinha, Central Ground Water Board, New Delhi
24. Shri V.M. Arora, Director, Department of Land Resources
25. Shri P.K. Jha, Deputy Adviser (WR), Planning Commission
26. Smt Vandana Sharma, Senior Research Officer (WR), Planning Commission
27. Shri A. Muralidharan, Senior Research Officer (WR), Planning Commission
28. Shri Rahul Dubey, Young Professional (WR), Planning Commission

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## Annexure 1(C)

### **Minutes of the Third meeting of the Steering Committee on Water Resources and Sanitation for the formulation of the Twelfth Five Year Plan held under the chairmanship of Dr Mihir Shah, Member (Water Resources), Planning Commission on 20.10.2011 in Committee Room No. 228, Yojana Bhawan, New Delhi.**

The list of participants is at the Annexure.

Member (WR), Planning Commission and Chairman of the Steering Committee on Water Resources and Sanitation for the formulation of the Twelfth Five Year Plan welcomed the participants and stated that the Committee would focus on the works done by the Working Groups on “Water Governance”, “Minor Irrigation & Watershed Management” and “Flood Management & Region Specific Issues”. There would also be a presentation by the Ministry of Water Resources on the proposed outlays for Twelfth Five Year Plan for various Central Sector and State Sector Schemes in Water Resources Sector. He further stated that the Twelfth Five Year Plan outlays for the Ministry of Water Resources, Ministry of Drinking Water and Sanitation and Department of Land Resources are to be firmed up, which would be the major task before the Steering Committee. He then requested Prof. Ramaswamy R. Iyer to make a presentation on the Draft National Water Framework Act prepared by his Sub Group.

#### **I. Working Group on Water Governance – Sub Group on National Water Framework Law**

2. Prof. Ramaswamy R. Iyer made a detailed oral presentation on Draft National Water Framework Act. He explained the necessity for a National Water Law and stated that it was needed for a minimal national consensus on certain basic perceptions, concepts and principles that led to adoption of the National Water Policy of 1987 and that of 2002. He mentioned how the existing legal instruments were inadequate to address various issues in the water sector. He further stated that no change in the powers of the States was proposed in the Draft Act. The Draft Act would be an overarching legal framework to be enacted by Central Government and would not be required to be adopted by the States. Then, he briefly explained various sections of the draft National Water Framework Act.

3. Secretary, Ministry of Water Resources while appreciating the effort, stated that the Draft Act should be in conformity with the existing Acts, Laws, Principles etc. and some minimum standards should be prescribed for the States for implementation and to prevent them from Business As Usual (BAU) scenario. Earlier attempts on prescriptive laws by Centre have not helped and States themselves have acknowledged that they require a strong push from the Centre to make their establishment recognise the critical stage of water development. He quoted an example of the Right to Information (RTI) Act which has been enacted by the Centre and accepted at the State level. Secretary, Ministry of Drinking Water and Sanitation was also of the view that an approach like RTI Act need to be taken. Dr. Himanshu Kulkarni stated that certain negotiable norms should be prescribed in the Draft Act. On query about Centre suggesting prescriptive laws to States, Shri Videh Upadhyay, Senior Lawyer said that it is not in

accordance with the Constitution, however, it could be enacted under “Water (Prevention and Control of Pollution) Act”. Member (WR) stated that the modalities for enacting the Draft Law under the specific provisions of the Constitution or Act of the Parliament need to be worked out. He suggested that the clarifications sought by the Members and various suggestions made need to be incorporated while finalising the Draft Act so as to have a legal justifiable road map which would be agreeable to the States.

## **II. Working Group on Water Governance – Sub Group on Model Bill for the Protection, Conservation, Management and Regulation of Groundwater**

4. Shri Videh Upadhyay, Member of the Sub Group made a presentation on “Draft Model Bill for the Protection, Conservation, Management and Regulation of Groundwater”. It covered specific definitions; mandatory principles for protection, conservation and regulation of groundwater; right to water, legal status and groundwater use; protection zones and security plans; institutional framework; offences and penalties; civil and administrative remedies etc.

5. During discussions, it was pointed out that one term either ‘Basic Water’ or ‘Water for Life’ should be used in both the Draft Bills viz. “Model Bill on Groundwater” and “National Water Framework Act”. It was also pointed out that the quantity of basic water prescribed in the Draft Bill should be the minimum as necessary for maintenance of livelihood. It was also mentioned that the extraction of water has been discussed but how to use the groundwater has not been described in the Draft Bill. There should be a mention about the water to be transported to water stressed or water scarce areas and about allocation of water from groundwater recharge. It was also mentioned that relying on users to regulate the groundwater would remain more as a paper exercise and the Draft Bill is not covering the land use planning aspects. Member (WR) stated that the quality aspects of the groundwater should be mentioned specifically in the Draft Bill. Emphasis should be made on resolving conflicts that would arise between Aquifer Management Groups and PRIs. It was pointed by the members of the Sub Group that the Draft Bill has been drawn extensively from the various existing Acts in vogue to give a harmonised approach avoiding silos.

## **III. Working Group on Water Governance – Sub Group on Water Resources Regulatory Authority**

6. Shri Tejas Pol, Member of the Sub Group made a presentation on the “Draft Model Bill on State Water Regulatory System Act”, which described the key features of the Draft Bill, need for a comprehensive, modular and flexible structure, areas of regulation covered under the Bill and matters yet to be included in the Bill. He also presented brief details of further steps to be taken and documents to accompany the Draft Model Bill, which are yet to be prepared.

7. There were discussions on how to ensure that the Draft Bill would achieve the Subsidiarity principle on the ground given the low capacities of the existing institutions. It was also emphasised that the Draft Bill need not be flexible and some practical difficulties in rolling it on the ground were mentioned. Additional Secretary, Ministry of Water Resources stated that the Ministry would thoroughly study the Draft Bill keeping in view the existing basin level institutions, stakeholder requirements and streamlining of the processes.

8. After discussions, Member (WR) requested the Sub group to come out with (i) An Approach Paper covering experiences of the existing WRRAs in the country and Good Practices followed all over the world; (ii) steps required to make subsidiarity mandatory within a time-frame; and (iii) emphasis on institutional set up upfront in the Draft Bill. He stated that a Management Devolution Index for incentivising grant of funds in all the Centrally Sponsored Schemes is being introduced the Twelfth Five Year Plan.

#### **IV. Working Group on Minor Irrigation and Watershed Development**

9. Shri Deep Joshi, Chairman of the Working Group made a detailed presentation on his Working Group report. He covered rainfed areas and food security key challenges in the implementation of watershed works; and how the works to be reoriented towards the livelihood of rural areas in the Twelfth Five Year Plan. The presentation on Minor Irrigation covered the cost aspects of Minor Irrigation schemes, key recommendations on changes required for funding of Minor Irrigation schemes under Accelerated Irrigation Benefits Programme (AIBP) and the proposed outlays. As regards National Rainfed Area Authority (NRAA), the recommendation focussed on how to make NRAA more effective and outlays it requires for Twelfth Five Year Plan.

10. There were discussions on how non-convergence with other large programmes like MGNREGA is affecting the watershed programme. The quality of DPRs prepared under the new Integrated Watershed Management Programme (IWMP) was questioned indicating the absence of dovetailing the livelihood issues. Under Minor Irrigation, discussions focussed on developing groundwater based schemes only in potential areas, necessity of increasing the cost per hectare for funding the schemes under AIBP and also inclusion of Tiny Minor Irrigation schemes (less than 20 ha) specifically in Tribal areas. Member (WR) stated that there should be convergence of various Watershed Development and Management Schemes and all such schemes should be integrated in one scheme.

#### **V. Working Group on Flood Management and Region Specific Issues**

11. Prof. Nirmal Sengupta, Chairman of the Working Group made a presentation on his Working Group report. The presentation inter-alia covered how the investments so far have performed, misunderstanding in the annual flood loss computation, role of flood management programme in flood management, non-scientific assessment of flood prone area, flood cushion in dams, maintenance of flood protection embankments and the tentative outlays for the Flood Management sector.

12. Secretary, Ministry of Water Resources mentioned that flood mitigation is not the exact mandate of the Ministry of Water Resources. The scales of protection by embankment schemes and river erosion schemes are different and the Ministry makes allocation for the schemes on river management, anti-erosion, drainage etc. There were discussions on embankment as a solution for flood management; how engineering solutions dominate the sector; and the necessity of solutions to long delays in the release of funds for the Flood Management scheme of the Ministry. It was pointed out that the time taken in making available the funds for the flood management scheme is three & half years from the date of occurrence of the flood damage to start of the works.

13. Member (WR) agreed with the Secretary, MoWR's view point and stated that sanctioning of schemes to be brought under the purview of the Ministry instead of Ministry of Finance. He also desired for clear demarcation of roles of different agencies at the Centre namely, Central Water Commission, NDMA and MHA so that response time for mitigation and flood protection can be drastically minimised in the Twelfth Five Year Plan.

#### **VI. Working Group on Sustainable Groundwater Management**

14. Dr. Himanshu Kulkarni, Chairman of the Working Group made a brief presentation on Sustainable Groundwater Management. He mentioned about aquifer mapping activities which inter-alia covered para-hydrogeological structures; augmenting data available; aquifer mapping programme to be linked with minor irrigation/ watershed development programmes etc. He mentioned that an estimate of Rs. 4000 Crore was made for the aquifer mapping activities. Secretary, MoWR stated that the aquifer management should be linked with surface water schemes, watershed management programme etc.

#### **VII. Central Sector Schemes of Ministry of Water Resources**

15. Additional Secretary, Ministry of Water Resources made a comprehensive presentation on the Central and State sector schemes fund requirements for the Twelfth Five Year Plan as well as the new schemes which are likely to be included under the Plan. The outlays required for the programmes were discussed for various on-going and new schemes viz. Accelerated Irrigation Benefits Programme, RRR of water bodies scheme, preparation of aquifer maps for ground water management, Minor Irrigation under Accelerated Irrigation Benefits Programme and food management schemes under Central Sector.

16. Member (WR), Planning Commission stated that the Ministry of Water Resources should come out with very strong reasons for the fund claims of Twelfth Five Year Plan as the focus is likely to be more on 'education' and 'health'. There would be large claims on the limited resources and unless sound reasons are made out, outlays of the magnitude as projected would be difficult to materialise.

17. The following decisions were agreed upon:

- (i) Water is at central stage of the Twelfth Five Year Plan. The Chairpersons and Co-Chairpersons of the Working Groups are to provide a ten-page summary of their Group's report, in a way that: (a) provides an assessment of the programme/situation so far, with a clear delineation of the weaknesses that need to be addressed (b) proposes a road-map for the Twelfth Five Year Plan that seeks to address the weaknesses (c) summarises and justifies the resources required for the Twelfth Plan.
- (ii) The presentation made by the Ministry of Water Resources on the proposed outlays for Twelfth Five Year Plan for various Central Sector and State Sector Schemes in Water Resources Sector may be circulated to all the Chairpersons and Co-Chairpersons of the Working Groups asking for the prioritization of the schemes proposed by the Ministry for taking up them during the Twelfth Plan with full justification. It is necessary to have alternative Plans for the Twelfth Five Year Plan with priority and phasing depending on the outlays likely to be decided.

- (iii) The three Draft Legislations should be revised in light of the discussions made during the meeting of the Steering Committee and submitted to Water Resources Division of the Planning Commission by early November, 2011.
- (iv) As regards Minor Irrigation and Watershed Management, there should be convergence with the programmes of the Ministries of Rural Development, Panchayati Raj, Health & Family Welfare, Women & Child Development, Human Resource Development, etc. on Human Resources skills.
- (v) The next meeting of the Steering Committee is scheduled for 15<sup>th</sup> November, 2011 before which Members are requested to take the follow up actions on the decisions taken in the meeting.

17. The meeting concluded with a vote of thanks to the Chair.

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List of participants who attended the Third meeting of the Steering Committee on “Water Resources and Sanitation” held on 20.10.2011 in the Planning Commission, Yojana Bhawan, New Delhi

1. Dr. Mihir Shah, Member (Water Resources), Planning Commission - In Chair
2. Shri. Dhruv Vijay Singh, Secretary, Ministry of Water Resources - Member
3. Smt. Vilasini Ramachandran, Secretary, M/o Drinking Water & Sanitation - Member
4. Dr. S.C. Dhiman, Chairman, Central Ground Water Board, New Delhi - Member
5. Shri Ramaswamy R. Iyer, Hony. Professor, Centre for Policy Research - Member
6. Shri Deep Joshi, Member, National Advisory Council (NAC) - Member
7. Dr. Himanshu Kulkarni, Executive Director, ACWADAM, Pune - Member
8. Shri Joe Madiath, Executive Director, Gram Vikas - Member
9. Prof. Nirmal Sengupta, Professor (Retd.), IGIDR, Mumbai - Member
10. Shri G. Mohan Kumar, Additional Secretary, Ministry of Water Resources
11. Shri S.P. Kakran, Member (River Management), Central Water Commission and Co-Chairman, Working Group on Flood Management and Region Specific Issues
12. Shri M.E. Haque, Member (WP&P), Central Water Commission and Member Secretary of Working Group on Water Governance
13. Dr. Savita Anand, Joint Secretary, Department of Land Resources, Government of India representing Secretary, Department of Land Resources - Member
14. Shri M.S. Agrawal, Adviser (WR), Planning Commission - Member Secretary
15. Dr. Dinesh Chand, Joint Adviser (PHEE), Ministry of Urban Development, representing Secretary, Ministry of Urban Development - Member
16. Shri R.K. Tiwari, Deputy Commissioner, Ministry of Agriculture, representing Secretary, Ministry of Agriculture - Member
17. Shri R.M. Bhardwaj, Senior Scientist, Central Pollution Control Board, representing Chairman, Central Pollution Control Board - Member
18. Shri J.S. Mathur, Joint Secretary, Ministry of Drinking Water and Sanitation
19. Shri Videh Upadhyay, Senior Lawyer and Member, Sub Group on Model Bill for the Protection, Conservation, Management and Regulation of Groundwater
20. Shri Tejas Pol, Senior Research Associate, PRAYAS, Pune and Member, Sub Group on Water Resources Regulatory Authority
21. Shri Avinash Mishra, Joint Adviser (WR), Planning Commission
22. Shri M.K. Sinha, Senior Joint Commissioner, Ministry of Water Resources
23. Shri P.P. Nagrath, Deputy Secretary, Ministry of Drinking Water and Sanitation
24. Shri P.K. Jha, Deputy Adviser (WR), Planning Commission
25. Smt Vandana Sharma, Senior Research Officer (WR), Planning Commission
26. Shri A. Muralidharan, Senior Research Officer (WR), Planning Commission
27. Shri Mahadevan Ramaswamy
28. Shri Rahul Dubey, Young Professional (WR), Planning Commission

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## Annexure 1(D)

### **Minutes of the Fourth meeting of the Steering Committee on Water Resources and Sanitation for the formulation of the Twelfth Five Year Plan held under the chairmanship of Dr Mihir Shah, Member (Water Resources), Planning Commission on 15.11.2011 in Committee Room No. 122, Yojana Bhawan, New Delhi.**

The list of participants is at Annexure.

Member (WR), Planning Commission and Chairman of the Steering Committee on Water Resources and Sanitation for the formulation of the Twelfth Five Year Plan welcomed the participants and stated that the presentations by all the Working Groups have been made during the last two meetings of the Steering Committee. However, brief presentations by the Chairpersons of the Working Groups on “Urban and Industrial Water Supply and Sanitation” and “Minor Irrigation and Watershed Management” would be made highlighting some important features/recommendations made by these Working Groups. He further stated that the presentations on (i) Hydrology Project; and (ii) Repair, Renovation and Restoration of Water Bodies will also be made by the Ministry of Water Resources as desired by the Members of the Steering Committee. He then requested Shri Deep Joshi and Shri P.S. Vijay Shankar to make a joint presentation on their Working Group.

#### **I. Working Group on Minor Irrigation and Watershed Management**

2. Shri Deep Joshi, Member, National Advisory Council and Chairman of the Working Group on Minor Irrigation and Watershed Management and Shri P.S. Vijay Shankar, Samaj Pragati Sahyog made their joint presentation on Developing Rain-fed Areas and Minor Irrigation. They explained that land and water resources are the key rural livelihood anchors wherein agriculture is the main livelihood and forests are the key supplements.

3. Shri Joshi mentioned that policy focus had been mainly on high potential areas which resulted in Green Revolution and the rain-fed areas remained neglected. Large investments are now available through MGNREGA, RKVY, RADP, NHM, IWMP, MI, BRGF, NRLM, Climate Change Mitigation etc. and institutional framework is also available in Panchayati Raj Institutions. There is a need for convergence of the programmes & investments and development of human resource capacities. A holistic perspective needs to be followed in natural resource management to enable mobilisation and participatory planning. He insisted on three inter connected goals (not sequential but simultaneous): (i) enhancing current livelihood for most people, (ii) enhancing present carrying capacity of natural resource base and (iii) setting in motion future regenerative processes. The Watershed Development Programmes plus rain-fed farming programme should be implemented for integrated development and management of natural resources (groundwater, common land, forests, etc.). The Integrated Watershed Management Programme should be the main vehicle for natural resource management and needs to be further strengthened during the 12<sup>th</sup> Plan. Therefore, it needs to be integrated with the National Rain-fed Farming Programme (NRFP).

4. Shri Joshi further stated that the sustainability and livelihood focus of Watershed Programmes should be enhanced and a legal framework to enable CBOs to play a regulatory role in the use of the resources should be created. There should be minimum support price and procurement of rain-fed area crops. The implementing structure for convergence and quality should be strengthened so that single agency at State and District level, combined with MGNREGA and shifting of the NWPRA staff to Department of Land Resources are required. The data base, know-how and standards for watershed development need to be developed. He mentioned that the allocation for watershed development for the 12<sup>th</sup> Plan, as proposed by the Working Group, was Rs.36,460 crore.

5. Ms. Sunita Narain stated that the Forests Department is also implementing Watershed Development and therefore, the staff and finances of the Forests Department should also be utilised. Additional Secretary, Ministry of Water Resources mentioned that Watershed Development is the key of development and there will be a sea change in the water supply.

6. Shri Vijay Shankar stated that there is a need to view conservation, sustainable resource use and productivity in harmony under National Rain-fed Farming Programme (NRFP) for the 12<sup>th</sup> Plan. There is also a need for building resilience of the farming system along with capacity for adaptation to climatic variability and strengthening support systems for Livestock and Fisheries (preventive health care, feed/fodder, etc.). He suggested strategic action areas under NRFP as: enhancing soil health and productivity; improving rain water productivity (soil moisture management, protective/supplemental irrigation); and revitalizing common pool land and water resources. He further mentioned that NRFP has to be a comprehensive programme and there is a need to develop human resources for handling it.

7. Member (WR) stated that MGNREGA is in the centre of watershed management because it has the largest resource base and there should also be convergence in capacity building under NRAA and watershed development.

## **II. Presentation on Hydrology Project**

8. A brief presentation on the scheme for “Hydrology Project” was made by Shri Narender Kumar, Commissioner (B&B), Ministry of Water Resources (MoWR). Hydrology Project was taken up to develop Hydrological Information System (HIS) by creating facilities and standardized procedures for data collection, compilation, processing and data storage for data use. The implementing agencies under Hydrology Project Phase-I (HP-I) were nine States and six Central Organisations. HP-I was implemented during 1995 to 2003 for Rs. 605.28 crore with funding in the form of loan from International Development Association (IDA). The HIS developed during HP-I had limitations in terms of geographical coverage and analytical uses. To overcome these limitations, Hydrology Project Phase-II (HP-II) was taken up.

9. The objectives of HP-II are to extend and promote sustained and effective use of HIS developed under HP-I by all potential users concerned with Water Resources Planning and Management, both in public and private, thereby contributing to improve productivity and cost effectiveness of water related investments. The implementing agencies under HP-II are eight Central Organisations (two new) and thirteen States (four new). The HP-II was started effectively from April, 2006 for Rs. 631.39 crore with World Bank funding in the form of loan from International Bank of Reconstruction and Development

(IBRD). The components, major consultancies and physical & financial progress under HP-II were also described during the presentation.

10. The performance during the 11<sup>th</sup> Plan has not been in pace as envisaged in the Project Implementation Plan and Mid Term Review. The expenditure incurred by Central Organisations up to March 2011 was Rs 57.88 crore and it was expected that by the end of 11<sup>th</sup> Plan, a total expenditure of Rs 107.88 crore would be incurred against an outlay of Rs. 180 crore. The reasons cited for low expenditure were: (a) delay in placement of three major consultancies, eventually effective starting of the project only after placement of these consultancies; (b) slow procurement due to difficulty by Implementing Agencies in following procurement procedures of World Bank, and (c) shortage of dedicated staff.

11. It was informed that the dates of closing of major consultancies, as per their contracts, were beyond June, 2012 and several essential major/key procurements and activities would be accomplished only during 12<sup>th</sup> Plan period to achieve the Project Development Objective. This necessitated continuation of HP-II in 12<sup>th</sup> Plan. The activities among others include Development of Models for DSS (P) & DSS (RT); Aquifer Mapping at Pilot Study Areas (estimated cost of Rs. 42 crore); Up-gradation of WISDOM (estimated cost of Rs. 4 crore); Up-gradation of GEMS into e-GEMS (estimated cost of Rs. 5 crore); procurement of Model Software for DSS (RT), etc. The total outlay proposed by the MoWR for the scheme in the 12<sup>th</sup> Plan was Rs. 116.67 crore.

12. Ms. Sunita Narain desired to know about the softwares used/developed in HP-I and whether the GEMS were completed? She emphasized that all the data should be available in the public domain. She further mentioned that the project was financed by public funds and some States are charging fee for supplying the data. Therefore, a condition could be imposed for displaying the data in public domain, while releasing funds for the data collection.

13. Member (WP&P), CWC stated that uniform methodology for observations and uniform procedure for compilation of data was required. Data inputs would be utilised in the Water Resources Information System (WRIS). Decision support system (DSS) has been included in HP-II and only after finalization of DSS Models, the data collected will be used. NIH is the nodal agency and taking care of all the difficulties faced. These data are also vetted by CWC and the user agencies such as the States. Member (SML), Central Ground Water Board confirmed that the GEMS were completed. He further mentioned that the CGWB is displaying its data in public domain while Maharashtra has a policy of not placing the data in the public domain. Therefore, it depends on the State Governments.

14. Member (WR) desired to know whether a general/ uniform policy for sharing of data could be evolved and then the States be directed to follow them? He also suggested for framing some kind of guidelines for water pricing.

15. Dr. Himanshu Kulkarni stated that there was no parity in the State Structures in Groundwater. He also mentioned that Maharashtra and Gujarat have separate administrative structure for groundwater, but other States do not have it. However, the data should be available in the public domain.

16. Member (WP&P), CWC stated that earlier, there was a lot of inconsistency in the data. Now, the inconsistency has been reduced after implementing HP-I. A joint action with the help of NRSA,

Hyderabad has been taken up simultaneously. More emphasis will be given to Ganga river basin through indigenous process and not through the World Bank Funding.

17. Member (WR) directed that a brief note on the softwares developed in HP-I and the comparison with HP-II may be prepared by MoWR and circulated to all the members.

### **III. Presentation on Repair, Renovation and Restoration (RRR) of Water Bodies**

18. A brief presentation on the scheme for “Repair, Renovation and Restoration (RRR) of Water Bodies” for 12<sup>th</sup> Plan was made by Shri B.G. Kaushik, Chief Engineer (PPO), Central Water Commission, Ministry of Water Resources. As per the 4<sup>th</sup> Minor Irrigation Census, total number of water bodies in the country were 5.56 lakh, of which 3.02 lakh were public owned and 0.76 lakh (0.63 lakh public owned) water bodies were not in use. The scheme was initially taken up as a pilot scheme namely, “RRR of Water Bodies directly linked to Agriculture”, which was launched during 10<sup>th</sup> Plan as a State Sector Scheme with an outlay of Rs. 300 crore. The work in respect of 1085 numbers of water bodies against the target of 1098 water bodies was completed with a release of central share of Rs.197.3 crore. The scheme of “RRR of Water Bodies with domestic support” was launched during the 11<sup>th</sup> Plan with an outlay of Rs.1250 crore. 2899 numbers of water bodies were taken up and the central share of Rs. 50.82 crore was released upto March 2011. Another scheme of “RRR of Water Bodies with external assistance” was launched during the 11<sup>th</sup> Plan with an outlay of Rs.6000 crore. The proposals for 10,887 numbers of water bodies were received against the target of 23,000 water bodies.

19. An evaluation of the pilot scheme has been done and concurrent evaluation/impact assessment in respect of the schemes for 11<sup>th</sup> Plan is under process. The coverage proposed by the MoWR under the scheme during the 12<sup>th</sup> Plan is: (i) completion of left over works estimated in respect of water bodies taken up during 11<sup>th</sup> Plan; (ii) about 14,400 water bodies to be supported where usage has been considerably reduced (although not gone under complete disuse); and (iii) about 25% of the water bodies gone into disuse i.e. about 15,000 water bodies on need basis. The proposed target is to complete restoration works of all water bodies taken up during 11<sup>th</sup> Plan and restoration of water bodies taken up during 12<sup>th</sup> Plan.

20. The total financial implication proposed by the MoWR for the scheme was Rs. 30,000 crore (Rs. 600 crore for the balance works taken up during 11<sup>th</sup> Plan and Rs. 29,400 crore for the water bodies to be taken up in 12<sup>th</sup> Plan).

21. Shri Deep Joshi stated that the water bodies should be rehabilitated and the people should be involved in their planning and management. He suggested that a mechanism should also be created for their integration and the minimum size of the water body should be 10 hectares instead of 20 hectares. Dr. Tushaar Shah stated that Tamil Nadu is managing large water bodies. Additional Secretary, MoWR mentioned that the MoWR intended to reconceptualise the scheme for more effective implementation. Ms. Sunita Narain stated that the scheme should be reconceptualised, but the upstream aspects should also be kept in view. She further mentioned that all the water bodies were not with Water Resources Departments, rather most of them were with Panchayats. She suggested that the terms such as ‘irrigation’, ‘domestic’, etc. should be removed from the scheme and conditionality and guidelines should be reviewed.

22. Additional Secretary, MoWR stated that Groundwater recharge should be one of the objectives wherein urban areas should also be brought under the scheme and various departments/sectors were required to be brought together.

23. Member (WR) stated that the scheme of RRR of water bodies is presently functioning in isolation without considering the works being carried out under the watershed development programme of the DoLR. He further opined that RRR of water bodies cannot be dealt in isolation and the inflow channel, outflow drainage and also the catchment area treatment is to be synchronized before considering any up-scaling of this scheme. He desired that a note on the scheme may be prepared by the MoWR and sent to the Planning Commission.

#### **IV. Working Group on Urban and Industrial Water Supply and Sanitation**

24. Ms. Sunita Narain, Chairperson of the Working Group made a brief presentation on urban water supply and sanitation. She stated that in the country on the one hand, water scarcity is growing and on the other, water is getting increasingly polluted, which is further increasing the cost of treatment. Further, there is no intra-city equity in supply of water to the people. The huge quantum of water is being lost in the distribution system in cities, which is a serious problem. Therefore, water supply and sewerage in cities should be a key focus area. She further stated that the data for urban water supply, sanitation and sewerage is not available as also the position of intra-city water supply. Therefore, the requisite data needs to be made available for proper planning and designing of the water supply and sewerage systems.

25. Ms. Sunita Narain further stated that providing hygienic, safe and convenient sanitation to all in urban India is the primary goal. All the toilets should be connected with the sewerage system. As per the estimates made by the Central Pollution Control Board (CPCB) in 2009, 70% of the total sewage generated in the cities remains untreated and 41% of the total sewage generated in the cities is from Metro cities only. The challenge of sewage collection and its treatment has not received adequate attention in most of the cities. The sewage generated should be estimated correctly and the sewerage system including full treatment of sewage should be planned accordingly in every water supply project. It would be necessary to do it differently.

26. Ms. Sunita Narain then presented recommendations of the Working Group for Twelfth Five Year Plan. Since the scale of investment in this sector was substantial, the careful assessment of the total costs of water supply and sewerage was required to be made so that the criteria of affordability and sustainability is met in all the projects to be planned. The right to clean water to all should be ensured. The bulk water supply meters for commercial and industrial units should be made mandatory. The local water bodies should be rejuvenated to supply water locally, which will also reduce the cost of water supplied. She apprehended that higher will be the water charges, higher will be the extraction of groundwater leading to its over-exploitation. Therefore, there should be reasonable differential water rates.

27. Ms. Sunita Narain stated that there are a few Public-Private Partnership (PPP) projects for water supply in the country, however, there is no PPP project in sewerage sub-sector. Private sector funding is not coming forth due to lack of cost recovery. Therefore, water and sewage both must be priced. The PPP project should be carefully designed based on firm data. She cited successful example of PPP Project

for 24x7 water supply to Khandwa city, wherein the private company is contributing a mere 10% of the total cost. She also suggested that the decentralised sewage treatment should be planned to avoid transportation cost.

28. Ms. Sunita Narain mentioned that during the 11<sup>th</sup> Plan, 70% of the total funds for Jawaharlal Nehru National Urban Renewable Mission (JNNURM) were for water supply, sewerage and drainage projects. Since the financing for the urban water supply and sewerage during the 12<sup>th</sup> Plan is also to be made through JNNURM, the estimates of outlays for the sector were not made by the Working Group. However, the principles/ideas to be tried out in implementation of the water supply and sewerage projects to arrive at concrete conclusions have been suggested by the Working Group.

29. Member (WR) was in agreement with the Chairperson of the Working Group for making the implementation of sewage treatment and sewerage system, a part of the water supply project under JNNURM funding. He also stated that the principle of equity needs to be translated into a road map.

#### **V. Working Group on Major and Medium Irrigation and Command Area Development**

30. Dr. Tushaar Shah, Chairman of the Working Group made a brief presentation on “Major & Medium Irrigation and Command Area Development”. He stated that there were divergent views about the priority for Major & Medium Irrigation (MMI) projects in Water Resources Sector, however, the Working Group has concluded that MMI Projects are very important from the angle of irrigation potential creation, large storage creation and for drought proofing. Keeping this aspect in view, it was decided by the Working Group that Twelfth Five Year Plan should focus on time bound completion of ongoing projects, full utilization of irrigation potential created, improving water use efficiency and promoting reform measures.

31. Dr. Shah stated that the priority to MMI in various Five Year Plans has led to self sufficiency in food grain production but from Fourth Plan onwards, various States initiated a number of Major and Medium Irrigation projects which have have lead to a large number of projects still incomplete. The building of dams and construction of canals has also been the priority of irrigation engineers and the lack of command area development below the outlet has caused low utilization of created irrigation potential. The poor management of water released for irrigation has also resulted in water logging and salinity problems in some areas.

32. Dr. Shah further stated that the subject of ‘Irrigation Engineering and Management’ should be introduced at undergraduate level for the proper development of skills in the field of irrigation management including project management. The various Water Resources/ Irrigation Departments in the country should also be reoriented with multi-disciplinary approach including the professionals form civil engineering, agriculture engineering, social science etc.

33. Dr. Shah further mentioned that the strategy suggested by the Working Group for the 12<sup>th</sup> Plan include Command Area Development and Water Management, Extension, Renovation and Modernisation (ERM) of MMI projects, improved management practices, conditional central assistance linked to reforms (such as rationalization of water charges, establishment of regulatory mechanism, comprehensive training of project management personnel and adoption of modern management tools etc.). Dr. Shah also suggested the irrigation management reform measures such as: (i) increasing the Operation &

Maintenance funds available to MMI managers on an annual basis; (ii) rationalizing Irrigation Service Fees (ISF) levels; and (iii) incentivizing rationalization of ISF and improving their collection ratio (ISF collected as % of ISF demand).

34. Dr. Shah outlined the changes proposed by the Working Group in Accelerated Irrigation Benefits Programme (AIBP) for MMI projects, which are: (a) Central assistance @ 90% also for projects benefitting desert prone areas; (b) Higher central assistance @ 50% for general category States who implement reform agenda; (c) Condition of 1:1 to be relaxed for ERM projects; (d) New MMI projects to be included for support under AIBP only in exceptional cases; (e) Lift irrigation schemes to have mandatory condition of implementing micro irrigation in certain areas; and (f) Progress in respect of implementation of reform agenda to be part of monitoring.

35. As regards Command Area Development (CAD), it was agreed that CAD should be integrated with project development and the water delivery should be assured from reservoir to farm field instead of upto Sub-Minors. The formation of Water Users' Association (WUA) should be a mandatory activity under the project implementation, where formation of WUAs can be encouraged with the incentive of the 30% bonus of ISF collected to WUAs certified by the independent agency designated by the Central Government. For the better water deliveries, it would be appropriate to adopt volumetric water supply for which some additional bonus could be thought of on ISF collection by WUAs.

36. The Additional Secretary, Ministry of Water Resources mentioned that under National Action Plan on Climate Change, recommendations have been made for formation of National Water Mission which forms various components including creation of storage, improving water use efficiency from presently prevailing 30% to 36% and reduction in Carbon Credits. This will comprise the financial implication of around Rs. 20,000 Crore during 12<sup>th</sup> Plan. The MoWR is of the view that these items should be placed in various sub-components of Water Resources Sector such as MMI&CAD, Minor Irrigation, Flood Control etc. He further requested the Planning Commission to approve the EFC Memo proposed by the MoWR for early implementation of the recommendations of National Water Mission.

37. The Working Group has recommended physical targets of reduction of 10 million hectare (mha) of the gap between IPC and IPU through CAD and creation/restoration of 10.10 mha through MMI (creation of additional irrigation potential of about 7.9 mha and restoration of about 2.2 mha of lost irrigation potential through ERM of MMI projects) for the Twelfth Five Year Plan. An outlay of Rs. 3,41,900 crore has been recommended by the Working Group for the MMI sector (including CAD) of which Rs. 1,33,300 crore would be in the central sector and Rs.2,08,600 crore would be in the state sector for the 12<sup>th</sup> Plan.

## **VI. Proposals of Ministry of Water Resources for 12<sup>th</sup> Plan**

38. The MoWR presented the outlays proposed for 13 numbers of the Central Sector Schemes under Water Resources Sector for 12<sup>th</sup> Plan. The outlay proposed is Rs. 35,125 crore. The Members of the Committee mentioned that the MoWR should concentrate on the implementation of the schemes and utilization of the funds, which as per the performance of the 11<sup>th</sup> Plan so far appeared to be low.

39. Member (WR) stated that the MOWR should give detailed justification for each line item. He further stated that the requirements of the MoWR for the 12<sup>th</sup> Plan would be considered in the context of overall funds availability and subsequent priorities in the Central Plan.

## **VII. Presentation on Reforms in Water Supply and Sanitation Sector in Maharashtra**

40. Smt. Malini V. Shankar, Principal Secretary, Water Supply and Sanitation Deptt., Government of Maharashtra made a presentation on “Reforms in Urban Water Supply in Maharashtra” which also included “Maharashtra Sujal and Nirmal Abhiyan”. She stated that the coverage of water supply network in Maharashtra is poor (particularly in slums), the cost of distribution of water is high and non-revenue water (NRW) is also high whereas the recovery of the costs is poor. The coverage of water supply in urban areas on an average is 48% households within premises, whereas only 28% of households are connected with sewerage network in the State. She mentioned that for sustainable water supply system and changes in the management have been introduced, which include high level investment, improved services, increased citizen satisfaction, higher willingness to pay, levy realistic charges and increase in income.

41. Principal Secretary, WSSD, Maharashtra further stated that the Government of Maharashtra has adopted an initiative namely, “Maharashtra Sujal and Nirmal Abhiyan” (MSNA) for reforms in Urban Water Supply and Sanitation sector. The MSNA approach has been adopted for dealing with water supply, sewerage & sanitation and solid waste altogether. At the first stage, Baseline reforms and capacity building were completed. Thereafter, rehabilitation, expanding coverage and improvement in the services were carried out. Finally, institutional and policy support for moving towards world class cities are being carried out. A Bill on Groundwater which inter-alia includes aquifer mapping has been moved for dealing with regulation, water quality and institutional aspects of the ground water in the State. It has been targeted to have universal coverage; 24x7 water supply in pilot cities; full cost recovery; accountable, autonomous and customer service delivery model and contractual arrangement for service delivery to be in place by 2017. The goal of the State is towards achievement service level benchmark in the sector by 2025.

42. Member (WR) suggested that a road map in this regard may be prepared by the State Government.

## **VIII. Working Group on Rural Domestic Water and Sanitation**

43. Smt. Vilasini Ramachandran, Secretary, Ministry of Drinking Water and Sanitation made a brief presentation on Drinking Water and Sanitation proposals for Twelfth Five Year Plan. She stated that convergence between drinking water supply and sanitation needs to be strengthened by concrete measures to reduce bacteriological contamination. The villages covered with piped water supply will be taken up for coverage to attain open defecation free (ODF) status on priority and vice versa. A part of the Rural Water Supply outlay has been proposed to be set apart for funding integrated projects by States to provide housing, water and sanitation facilities in rural areas at par with urban areas. *Jalsurakshak* (Water) and *Swachchhata Doot* (Sanitation) at *Gram Panchayat* (GP) level needs to be encouraged. Secretary, DWS further stated that the Government of India, through the NRDWP, in the 12<sup>th</sup> Plan, would primarily focus on funding the provision of piped water into the household premises through piped water supply schemes

from the nearest feasible sources or roof-top water harvesting. Handpumps can be implemented by the State Governments from their own resources. For remote, small, tribal, SC habitations, the States can be allowed to spend 5-10% of the overall allocation on handpumps.

44. Secretary, DWS further mentioned that there should be convergence with Provision of Urban amenities in Rural Areas (PURA) and design of schemes for peri-urban areas should factor in the requirements of increasing population and increasing per capita demand in the planning stage itself so as to avoid wasteful expenditure. She further stated that the data base of rural domestic water supply is in bad shape and suggested for coding of the source of water. She also emphasised for restructuring of the data base and evaluation of the status of drinking water projects every two years.

45. Member (WR) stated that presently in most of the States, the Public Health Engineering Department officials visit the sites occasionally and report the data. He suggested that the Gram Panchayat should be involved for reporting the data and the DPR should be based on aquifer mapping. Due attention should be paid to address water quality problems, adequate number of laboratories should be set up and capacity building should necessarily be done. The vulnerable areas in the quality affected water should also be included in the priority areas.

46. Secretary, DWS further stated that a saturation approach needs to be undertaken with creation of Nirmal Grams by covering whole *Gram Panchayats* (GPs) through provisioning of Individual Household Latrines (IHHLs) for every household alongwith institutional and environmental sanitation, to ensure community sanitation outcomes. Districts need to be given flexibility in planning for community outcomes of 'IHHLs and institutional coverage', with focused fund flow to GPs which have achieved identified milestones. Mechanisms should be evolved for identification and restoration of dysfunctional toilets to attain community outcomes, by VWSCs and these should be approved by the Gram Sabhas. Comprehensive region specific information, education and communication (IEC) strategy is required to be finalized for demand generation and sustainability in the districts.

47. Member (WR) stated that the sanitation campaign should be based on entire community. The DPR should be prepared for water supply, sanitation and solid and liquid waste management. For successful sanitation, construction of one bathroom with the toilet should also be considered especially for women and old age persons. The proposal of sanitation should have convergence with National Rural Livelihood Mission (NRLM). A loan component for construction of individual household toilets should also be introduced in the TSC.

#### **IX. Report of the Committee on Restructuring of Centrally Sponsored Schemes**

48. Member (WR) stated that a Sub-Committee under the Chairmanship of Shri B.K. Chaturvedi, Member, Planning Commission was constituted to look into the restructuring of Centrally Sponsored Scheme (CSS) to enhance its flexibility, scale and efficiency. The extracts of the Report of the Committee were circulated in the meeting for reference by the Members. The Committee inter-alia has recommended "Incentive Grant for Additional Allocations", as under:

- (i) 50% of the additional budget allocation of Government of India for the concerned CSS over the previous year will be distributed as incentive grant. For example, if the budget allocation in the previous year was Rs.1,000 crore and in the current is Rs.1,200 crore, then

Rs.1,200 crore minus Rs.1,000 crore equal to Rs.200 crore. Of this, additional grant, 50% or Rs.100 crore will be distributed as incentive grant.

- (ii) The Incentive grants will be given to those States who have:
  - (a) Increased the budget allocation in their States for the concerned scheme as a proportion of the total budget. (50%)
  - (b) Effectively developed funds, functions and functionaries to PRIs/ ULBs/ Other local bodies. This will be ascertained on the basis of a Management Devolution Index. (50%)
- (iii) The incentive grants will be distributed in the same proportion in which they are getting their normal allocations for the concerned year. The entire incentive grant will be distributed only among these States proportionally.
- (iv) The incentive grant in the first year of the Plan (2012-13) will, however, consider only (ii) (a) as criteria for reimbursement of incentives. This will give time to states for formulation of such Management Devolution Index (MDI) by an expert group for different sectors & its updating every year.

49. Member (WR) stated that the Ministry of Drinking Water and Sanitation has first evolved such a Management Devolution Index (MDI) for providing incentive grant to the States in National Rural Drinking Water Programme (NRDWP). He further stated that the MDI is being introduced in all the CSSs during Twelfth Five Year Plan.

50. Member (WR) stated that the Report of the Steering Committee was required to be drafted now. In this regard, the following decisions were agreed upon:

- (1) Each Working Group is to provide a summary of their report which: (i) provides an assessment of the programme/situation so far, with a clear delineation of the weaknesses that need to be addressed; (ii) proposes a road-map for the 12<sup>th</sup> Plan that seeks to address these weaknesses; and (iii) summarises and justifies the resources required for the 12<sup>th</sup> Plan.
- (2) Those drafting the new legislations may provide the write-up that they would like to be included in the report of the Steering Committee, providing both the justification for the new legislation and its essential features.
- (3) The Ministry of Water Resources, Ministry of Drinking Water and Sanitation and Department of Land Resources may send their proposals for allocations/ outlays for 12<sup>th</sup> Plan alongwith the detailed justification for each outlay. Member-Secretary of the Steering Committee to circulate the proposals received from the Ministry/ Department to all Chairs and Co-Chairs of the Working Groups immediately.
- (4) The Chairpersons and Co-Chairpersons of the Working Groups to provide their agreements/modifications alongwith detailed justification for each line item, linking them to key recommendations of their reports in a week's time.

The meeting concluded with a vote of thanks to the Chair.

Annexure

**List of participants who attended the Fourth meeting of the Steering Committee on “Water Resources and Sanitation” held on 15.11.2011 in the Planning Commission, Yojana Bhawan, New Delhi**

1. Dr. Mihir Shah, Member (Water Resources), Planning Commission - In Chair
2. Smt. Vilasini Ramachandran, Secretary, M/o Drinking Water & Sanitation - Member
3. Shri G. Mohan Kumar, Additional Secretary, Ministry of Water Resources representing Secretary, Ministry of Water Resources - Member
4. Shri Ramaswamy R. Iyer, Hony. Professor, Centre for Policy Research - Member
5. Dr. Tushaar Shah, Senior Fellow, IWMI, India - Member
6. Dr. Himanshu Kulkarni, Executive Director, ACWADAM, Pune - Member
7. Shri Deep Joshi, Member, National Advisory Council (NAC) - Member
8. Ms Sunita Narian, Director General, Centre for Science and Environment - Member
9. Shri M.E. Haque, Member (WP&P), Central Water Commission representing Chairman, Central Water Commission - Member
10. Shri Sushil Gupta, Member (SML), Central Ground Water Board, representing Chairman, Central Ground Water Board - Member
11. Smt. Arti Chaudhary, AIG, Department of Land Resources, representing Secretary, Department of Land Resources, Government of India - Member
12. Shri M.S. Agrawal, Adviser (WR), Planning Commission - Member Secretary
13. Dr. Dinesh Chand, Joint Adviser (PHEE), Ministry of Urban Development, representing Secretary, Ministry of Urban Development - Member
14. Shri R.K. Tiwari, Deputy Commissioner, Ministry of Agriculture, representing Secretary, Ministry of Agriculture - Member
15. Dr. R.C. Trivedi, Director, Central Pollution Control Board, representing Chairman, Central Pollution Control Board - Member
16. Smt. Malini V. Shankar, Principal Secretary, Water Supply & Sanitation Department, Government of Maharashtra, Mumbai
17. Shri Narendra Kumar, Commissioner (B&B), Ministry of Water Resources
18. Shri B.G. Kaushik, Chief Engineer (PPO), Central Water Commission
19. Shri V.M. Arora, Director, Department of Land Resources
20. Shri Sujoy Majumdar, Director, Ministry of Drinking Water and Sanitation
21. Shri Vijay Mittal, Director, Ministry of Drinking Water and Sanitation
22. Shri Avinash Mishra, Joint Adviser (WR), Planning Commission
23. Dr C.P. Reddy, Deputy Commissioner, Department of Land Resources
24. Shri P.S. Vijay Shankar, Samaj Pragati Sahayog, Bagli, Distt. Dewas, MadhyaPradesh
25. Shri Videh Upadhyay, Senior Lawyer
26. Shri Tejas Pol, Senior Research Associate, PRAYAS, Pune
27. Shri P.K. Jha, Deputy Adviser (WR), Planning Commission
28. Smt Vandana Sharma, Senior Research Officer (WR), Planning Commission
29. Shri A. Muralidharan, Senior Research Officer (WR), Planning Commission
30. Shri Rahul Dubey, Young Professional (WR), Planning Commission

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## ANNEXURE 2

# DRAFT MODEL BILL FOR THE CONSERVATION, PROTECTION AND REGULATION OF GROUNDWATER

### Preamble

Recognising the unitary nature of water and the integration of surface water and groundwater;

Recognizing that natural resources constitute an integral whole and must be treated as such;

Recognising the need to realise constitutional guarantees linked to groundwater and whereas the Supreme Court of India has recognised the right to water as integral to the right to life; and further specified variously the corresponding duties of the state;

Recognizing the need to strengthen the regulatory powers of gram sabhas, panchayats and municipal bodies related to groundwater in line with Articles 243G and 243W of the Constitution;

Recognizing that diverse conditions and needs require different specific solutions and recognising the need to differentiate rural and urban areas, while providing a single legal framework;

Recognising the need to resolve contestation and conflict not only between users of groundwater but also between different types of uses;

Recognising the common pool nature of groundwater, which has an intricate relationship with rainwater and surface water (through natural recharge) and with surface water (natural discharge);

Acknowledging that various levels of groundwater protection are necessary, the highest priority being given to areas demarcated as groundwater protection zones that need to be established and protected, and that shall be accorded the highest priority in both planning and management:

Be it enacted by the State Legislature in the \_\_\_\_\_ year of the Republic of India, as follows:

### **Chapter 1 – Preliminary**

#### Short Title, Extent and Commencement

- 1 This Act may be called the \_\_\_\_\_ Act for the Protection, Conservation and Regulation of Groundwater, \_\_\_\_\_<sup>41</sup>.
- 2 It extends to whole of the State of \_\_\_\_\_.
- 3 It shall come into force ninety days after its adoption by the state legislature.

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<sup>41</sup> Year of enactment

## **Objectives**

- i. The objectives of this Act are to ensure that groundwater is protected, conserved and regulated so as to:
  - 1 Meet basic human needs and livestock needs;
  - 2 Promote sustainable groundwater use in the public interest, based on a long-term protection of available resources;
  - 3 Ensure that the protection, conservation and regulation of groundwater is integrated with the protection, conservation and regulation of surface water to ensure conjunctive use of surface water and groundwater;
  - 4 Ensure the implementation of the principle of subsidiarity;
  - 5 Protect ecosystems and their biological diversity;
  - 6 Reduce and prevent pollution and degradation of groundwater;
  - 7 Ensure that present and future generations have access to sufficient quantity and quality of basic water; and
  - 8 Ensure protection against gender discrimination and past inequalities in access to water.

## **Definitions**

- In this Act, unless the context otherwise requires:
  - ‘Aquifer’ is a geological formation that stores and transmits water;
  - ‘Appropriate authority’ is the lowest possible public authority, including gram sabhas, gram panchayats, block panchayats, district panchayats, ward sabhas, municipal authorities and the State Government;
  - ‘Artificial recharge area’ includes catchment areas of percolation tanks, recharge ponds, infiltration tanks and all such appropriate measures from where water is harvested for recharge to aquifers.
  - ‘Basic water’ means the basic safe water requirements of each human being for drinking, cooking, bathing, sanitation, personal hygiene and related personal or domestic uses, with an additional requirement for women for their special needs; and includes water required for domestic livestock;
  - ‘Gram Sabha’ refers to the assembly of persons whose names are included in the electoral rolls at the village level;
  - ‘Groundwater’ means water, which exists below the surface in the zone of saturation and can be extracted through wells or any other means or emerges as springs and base flows in streams and rivers;
  - ‘Groundwater Protection Zone 1’ refers to critical natural recharge areas of an aquifer and those areas that require special attention with regard to the artificial recharge of groundwater and shall

include areas at and around natural discharge from the aquifer, specifically in the form of springs, seepages to streams, rivers and wetlands:

Explanation: (i) Areas comprising Groundwater Protection Zone 1 shall not be compromised in any way that will reduce, obliterate and hinder the natural recharge functions of the aquifer.

(ii) Areas comprising Groundwater Protection Zone 1 shall include vulnerable areas that require special attention and regulation, including areas affected by presence of arsenic and fluoride in groundwater and areas where groundwater has suffered saline water ingress.

- ‘Groundwater Protection Zone 2’ refers to areas from which groundwater is extracted through wells and other such groundwater extraction mechanisms, and where problems of groundwater over-extraction or contamination or both are evident on the basis of assessments made from time-to-time.
- ‘Groundwater Security Plan’ means an aquifer-based plan, as prepared under Sections 14-16 of this Act;
- ‘Livelihood’ means an activity or occupation or employment including self-employment that provides sustenance to an individual or family;
- ‘Municipality’ refers to a Municipality, a Municipal Corporation or similar body of local urban governance by any other name;
- ‘Pollutant’ means any solid, liquid or gaseous substance present in such concentration as may be, or tend to be, harmful to groundwater and impacting human and non-human life;
- ‘Rainwater harvesting’ means the technique or system of collection and storage of rainwater, at micro watershed scale, including roof-top harvesting, for future use or for recharge of groundwater;
- ‘Safe yield’ means the amount of water which may be abstracted from an aquifer at a rate that will not reduce the supply to such an extent that it would not be recharged to the original level by the annual natural recharging process of that locality and, as such, rendering such abstraction harmful to the aquifer, quality of the water or environment;
- ‘Ward Sabha’ means a body consisting of persons registered in the electoral rolls relating to a Ward;
- ‘Well’ means any structure sunk for the search or extraction of groundwater, including open wells, dug wells, bore wells, dug-cum-bore wells, tube wells, filter points, collector wells, infiltration galleries, recharge wells, disposal well or any of their combinations or variations.
- Terms not defined in this Act have the meaning assigned to them under other laws.

## **Chapter 2 – Mandatory Principles for Protection, Conservation and Regulation of Groundwater**

### **Non-discrimination and Equity**

- a) Every person shall have access to water without any discrimination, including as to caste, creed, economic status, land ownership, place of birth, race, religion and sex.
- b) In case groundwater forms the only source of water supply in an area, the principle in sub-section (a) specifically extends to groundwater resources.
- The appropriate authority shall ensure equitable distribution and access to groundwater strictly in compliance with priorities prescribed under Section 10 of this Act and in consonance with Section 8 of this Act.
- The appropriate authority shall ensure the sustainable use of available groundwater without compromising the needs of future generations.

### **Subsidiarity and Decentralisation**

7. Conservation, use and regulation of groundwater shall be based on the principle of subsidiarity.
8. The constitutional provisions for decentralisation of powers and functions in urban and rural areas shall be the basic organising principle for conservation, protection and regulation of groundwater.
9. Different conservation, protection and regulation measures may be used in different parts of the state in accordance with the availability of groundwater in a specific aquifer and the nature and type of groundwater catchments.

### **Protection, Precaution and Prior Assessment**

- Groundwater resources (aquifers) shall be protected from such impacts that affect the equity of access and sustainability of the resource.
- Precautionary steps shall be taken by the appropriate authority at all levels and by every user of groundwater to protect it from depletion, deterioration, biological and chemical pollution, as well as to prevent and/or reduce adverse impacts on the environment due to the use of groundwater.
- Effective schemes and measures shall be formulated and implemented to conserve, replenish and recharge groundwater.
- Any single use of groundwater, surface water or land and forest resources or activity in relation to these resources, which is likely to have significant negative impacts on local sources of groundwater shall be subjected to an environmental and social impact assessment, as defined at Section 43 of this Act, and protective, preventive and precautionary measures shall be implemented accordingly.

### **Integrated Approach**

- The protection, conservation and regulation of groundwater shall be undertaken in such a way that it is integrated with the protection, conservation and regulation of surface water resources on a watershed basis, land and forest.

## **Chapter 3 – Right to Water, Legal Status and Groundwater Use**

### **Right to Water**

- Every natural person has the fundamental right to be provided basic water of acceptable quality for leading a healthy and dignified life.

### **Legal Status of Groundwater**

- Groundwater is the common heritage of the people of India held in trust, for the use of all, subject to reasonable restrictions to protect all water and associated ecosystems. In its natural state, it is not amenable to ownership by the state, communities or persons.

Explanation: In this section, groundwater refers to the resource defined by aquifers.

- The state at all levels is the public trustee of groundwater.
- The appropriate authority must ensure that water is protected, used, developed, conserved, managed and regulated in a sustainable and equitable manner, for the benefit of all persons and ecosystems.
- Without limiting sub-section (3), the appropriate authority is responsible for ensuring that water is allocated and used equitably in the public interest, while promoting environmental values.

### **Water Use Prioritisation**

- The appropriate authority shall abide by the water use prioritisation set out in this section while discharging its duties as trustee of groundwater.
- The first priority and charge on groundwater shall be meeting the right to basic water for rural and urban residents, consistent with the objective of sustaining aquifers and ecosystems indispensable to the long-term maintenance of the resource.
- Other priorities will be allocated among primary and secondary uses.
- Primary groundwater uses, besides basic water and ecology mentioned in sub-section (2), shall include in no order of priority:
  - Direct use of groundwater for livelihoods, including agriculture and non-agriculture based livelihoods; and
  - Municipal use, including public facilities for recreation.
- Secondary water uses shall include in no order of priority:
  - Commercial activities, including power generation, industry and large-scale commercial farms;

- Private facilities for recreation; and
- Other purposes.
- The use or appropriation of water for secondary purposes, which is likely to have significant negative impacts on local sources of groundwater, shall be subjected to an environmental and social impact assessment, as provided under Section 43 of this Act.

## **Chapter 4 – Groundwater Protection Zones and Groundwater Security Plans**

### **1. Groundwater Protection Zones**

#### **Demarcation of Groundwater Protection Zones**

4. Groundwater protection zones shall be demarcated in order to:
  - Protect the natural recharge and discharge areas of the aquifer from threats such as physical deterioration, including loss of exposed surface area, change in land-use pattern and causation of chemical and other pollution;
  - Protect the natural identity of the aquifer and the needs of groundwater dependent ecosystems;
  - Protect vulnerable areas that require special attention and regulation, including areas affected by presence of arsenic and fluoride in groundwater and areas where groundwater has suffered saline water ingress;
  - Provide for sufficient quantity and safe quality water required to meet the basic water supply for human and animal needs; and
  - Provide for water for livelihoods.
5. The demarcation of groundwater protection zones shall take into account all the following factors:
  - Existing uses and users of the aquifer;
  - Existing water uses and users in the recharge area(s);
  - Availability and quality of groundwater in the aquifer;
  - Social, environmental and economic implications of the demarcation;
  - The need for the demarcation of such recharge areas into groundwater protection zones in terms of their capacity or need to solve groundwater depletion and/or contamination; and
  - Availability or existence of other options or alternative measures.

#### **Procedure for Demarcation and Notification of Groundwater Protection Zones**

- The State Groundwater Board shall, in consultation with appropriate authorities constituted under this Act, including information and monitoring cells constituted under this Act and supporting institutions

notified under this Act, demarcate natural or artificial recharge areas of an aquifer or aquifers as groundwater protection zones.

- The State Groundwater Board may also consult any other institution or agency to assist with the demarcation of groundwater protection zones.
- The State Groundwater Board may call for technical data and evidence from information and monitoring cells, supporting institutions or any other agencies mandated or obliged under law to maintain such technical data and evidence. The State Groundwater Board may also approach central agencies such as the Central Groundwater Board and Central Water Commission for this purpose.
- The State Groundwater Board shall prepare proposals for the demarcation of groundwater protection zones based on the aquifer-mapping programme that identifies groundwater protection zones, along with their current status.
- In addition to compliance with the provisions of Chapter 10 concerning public consultation and transparency, the proposals for demarcation and declaration of each groundwater protection zone shall be notified to the public and the appropriate institution by a preliminary notice in the Gazette and in at least two local language newspapers having circulation in the area concerned.
- The State Groundwater Board shall submit proposals for demarcation and declaration of each groundwater protection zone to the appropriate authorities – namely gram sabhas, ward sabhas, gram panchayats, block panchayats, district panchayats, municipal authorities and the State Government as the case may be – falling within the geographical limits of each of zone, for discussion and approval, with or without modification.
- If the appropriate authority feels that the proposal of the State Groundwater Board needs revision or is invalid, it shall file a representation before the State Groundwater Board within 30 days from the formal submission of the proposal under sub-section (5) of this section. Consultations will then be held with the State Groundwater Board to come to a final decision within 45 days of the filing of the representation:

Provided that if an amicable final decision is not possible the matter shall be decided by arbitration and the arbitrator shall be appointed by the State Government.

- a) Objections, if any, against the proposed declaration of any area as a groundwater protection zone, shall be made before the appropriate authority within a period of 60 days from the date of publication of the notice.
- b) Any person preferring the objection shall provide the grounds of objection, supported, where possible, by technical data and evidence.
- c) The technical data, requested for filing objections, shall be made available to such persons immediately.
- d) If any delay is caused in providing the requested data/information, the period allowed for filing objection shall be extended in proportion to the delay.
- e) The objections shall be considered by the appropriate authority, which, with the consultation of both parties (the State Government and the objecting party) shall arrive at the final decision.

- f) The final decision shall be binding on both parties.
- g) The appropriate authority shall notify its decision within a period of 45 days from the formal submission of the objection.
- If no objections or representations referred to in sub-sections (6) and (7) have been filed within the period referred to in that sub-section, the appropriate authority shall declare the demarcated area to be a groundwater protection zone.
- Where a proposal to identify a groundwater protection zone has been approved, the State Groundwater Board shall notify the groundwater protection zone in the Gazette.
- a) The notification issued under sub-section (9) above shall be reviewed periodically.
- b) The review shall be due on completion of three years and shall be done before the expiry of five years from the date of notification.
- c) On expiry of the above mentioned period, a fresh review shall be conducted based on a new assessment of the aquifer.
- All the steps prescribed above shall be completed within a period of six months from the date of preparation of the proposal by the State Groundwater Board.

#### **Regulation of Groundwater Protection Zones**

1. Groundwater protection zones will be accorded the highest priority in terms of groundwater protection and regulation.
2. Appropriate authorities shall take all possible measures to conserve and protect groundwater protection zones, in particular in the context of groundwater security plans.
3. Wherever an area has been notified as a Groundwater Protection Zone 1:
  - a) No extraction or use of groundwater, apart from use as basic water, except under special sanction by the appropriate authority, shall be allowed in the Groundwater Protection Zone; and
  - b) Rules regarding, among others, forestation and deforestation, a prohibition of waste disposal of any kind and the banning of any mining lease shall be developed and implemented by the appropriate authority in the manner prescribed.
4. Wherever an area has been notified as a Groundwater Protection Zone 2, a set of rules regarding distance (from structures created or activities taken up to augment and/or protect recharge, including percolation tanks, recharge ponds, and social fencing of natural recharge areas) to new wells, pumping regulation for existing wells as well as other regulatory protocols shall be developed depending upon hydrogeological and socio-economic conditions.
5. The regulation of groundwater protection zones shall incorporate appropriate energy pricing and energy rationing means as additional instruments in areas where abstraction is above the safe yield.

Explanation: This sub-section shall not preclude adoption of appropriate energy pricing and energy rationing means in other areas that the State may prescribe from time to time.

6. Wherever an area has been notified as a Groundwater Protection Zone 2, groundwater shall be allocated and extracted in a regulated manner, so as to maintain the water balance in the concerned aquifers. To achieve this, the appropriate authority, with the help of information and monitoring cells and supporting institutions shall:
  - a) Determine the safe yield of any aquifer coming under the purview of the respective protection zones;
  - b) Require that an aquifer be used on an equitable and sustainable basis, including restricting abstractions so that they do not, individually or collectively, exceed the safe yield of the aquifer; and
  - c) Carry out programmes for the recharge of aquifers:

Provided that where the area suffers from a severe long-term drought, extraction beyond the annual recharge may be allowed for basic water needs on the condition that in subsequent years of adequate rainfall, additional recharge measures shall be taken to compensate the extra withdrawal.

## **2. Groundwater Security Plans**

### **Preparation of Groundwater Security Plans**

1. The appropriate authority shall prepare and oversee the implementation of a Groundwater Security Plan in consultation with elected local bodies and in consultation and coordination with information and monitoring cells and supporting institutions.
2. The Groundwater Security Plan shall be prepared at the lowest possible administrative level, taking into account the fact that where an aquifer does not fall under the jurisdiction of a single gram panchayat, block, district, ward or municipality, the plan must be prepared at the level of the authority under whose jurisdiction the whole aquifer falls:

Provided that where the aquifer extends beyond the boundaries of the State, the State Government shall prepare the Groundwater Security Plan in coordination with other state(s) under whose jurisdiction the aquifer also falls.

3. A groundwater security plan shall be prepared for every aquifer falling partly or entirely under a groundwater protection zone defined in Section 11 of this Act and where an aquifer does not fall under any groundwater protection zone, the appropriate authority may determine necessary measures to be taken, including the preparation and the implementation of groundwater security plans.
4. The Groundwater Security Plan shall be based on scientific maps and database provided by information and monitoring cells and supporting institutions and on a determination of the estimated average annual recharge of groundwater.

### **Content of the Groundwater Security Plan**

1. The aquifer-based Groundwater Security Plan shall provide for groundwater conservation and augmentation measures, socially equitable use and regulation of groundwater, and priorities for conjunctive use of surface and groundwater.

2. The Groundwater Security Plan shall contain, besides a description of groundwater aquifers and catchments, a statement of rights, duties, management responsibilities, priorities of use and tariffs, if any.
3. The Groundwater Security Plan shall incorporate customary rules and practices for protection of groundwater, to the extent that they do not conflict with the mandatory principles under Chapter 2 of this Act and the appropriate authority shall document customary practices as part of the preparation of the Groundwater Security Plan.
4. The Groundwater Security Plan shall be based on the principle that transfers of water outside of the area concerned by the Plan are prohibited, unless the appropriate authority agrees by a three-fourth majority or a decision to this effect is taken by the appropriate authority at the next higher level, where the basic water needs of other panchayats, blocks, districts, wards and municipalities cannot be met without a transfer.
5.
  - a) Where there is more than one micro-watershed within the area under consideration separate sub-plans for each micro-watershed shall be prepared.
  - b) The Groundwater Security Plan prepared by the appropriate authority shall integrate them in a consolidated plan.
  - c) Where micro-watersheds straddle beyond the jurisdiction of the appropriate authority, the Groundwater Security Plan shall be prepared by a committee drawn from the appropriate authorities of each authority under which the micro-watershed is found in proportional number to the extent of area falling under the jurisdiction of each concerned appropriate authority.
  - d) Groundwater security plans shall be integrated at the mili-watershed level and at the macro-watershed level with the assistance of information and monitoring cells and supporting institutions, in consonance with groundwater aquifer boundaries and surface river basin boundaries.
6. The Groundwater Security Plan shall include remedial measures, including:
  - a) Incentives for weaning out water-intensive crops and sanctions against continuing water-intensive crops;
  - b) Incentives for the adoption of water-conserving technologies, such as drip irrigation and sprinklers;
  - c) Setting up artificial recharge structures;
  - d) Promoting the use of energy-efficient pumps;
  - e) Community based sharing of groundwater from a more limited number of wells; and
  - f) Other measures as may be appropriate to the specific aquifer or the situation under which groundwater overexploitation has occurred.

#### **Adoption and Validity of the Groundwater Security Plan**

1.
  - a) The Groundwater Security Plan, formally adopted by the appropriate authority and endorsed by the State Groundwater Advisory Council, shall be binding.

- b) The State Groundwater Advisory Council shall have the responsibility to notify the plan.
  - c) The Groundwater Security Plan shall be binding from the date of notification.
2. The Groundwater Security Plan shall be valid for a period of five years from the date on which it becomes binding. It shall be revalidated or amended after every five years:

Provided that where compelling reasons, such as significant hydrological changes or drought, warrant it, revision or amendment may be made before the expiry of five years.

## **Chapter 5 – Institutional Framework**

### **1. Rural Areas**

#### **1. GRAM PANCHAYAT GROUNDWATER COMMITTEE**

##### Constitution and Membership of the Gram Panchayat Groundwater Committee

- The Gram Sabha shall by resolution, recorded by the Gram Panchayat, elect a Gram Panchayat Groundwater Committee:

Provided that where there exists a village water and sanitation committee under the jurisdiction of the panchayat and the Gram Sabha resolves to vest all the functions and powers of the Gram Panchayat Groundwater Committee under this Act to such village water and sanitation committee, then the latter committee shall be the Gram Panchayat Groundwater Committee under this Act.

- The strength of the committee, the qualifications of the members and the terms and conditions under which they hold office shall be as prescribed by the Gram Sabha.
- In constituting the Gram Panchayat Groundwater Committee, adequate representation shall be given to scheduled castes, tribes and women:

Provided that in places where gram panchayat level watershed and irrigation committees or institutions exist, the Gram Panchayat Groundwater Committee shall include representatives of those committees;

Provided further that the Gram Panchayat Groundwater Committee may also include representatives of community-based groups, such as self-help groups and women's groups.

- Every member of the Gram Panchayat Groundwater Committee shall forthwith be deemed to have vacated her or his office if she or he is recalled through a secret ballot by a majority of more than half of the total number of members constituting the Gram Sabha within the gram panchayat in accordance with the procedure, as may be prescribed:

Provided that any member shall be recalled only on the ground of actions done by the member in violation of the powers, functions, duties and responsibilities of the Gram Panchayat Groundwater Committee;

Provided further that where a member is recalled, the Gram Sabha shall elect another representative in her or his place within a period of sixty days of recall of such member.

### Functions of the Gram Panchayat Groundwater Committee

- The functions of the Gram Panchayat Groundwater Committee shall include:
  - Preparation of the Panchayat Groundwater Security Plan and presentation of the same to the Gram Sabha for approval:

Provided that the Gram Panchayat Groundwater Committee shall ensure, while preparing the Plan, that it complements and is integrated with other water-related plans, such as drinking water security plans that may be required under other laws or government schemes.
  - Implementation of the Panchayat Groundwater Security Plan;
  - Registration of all wells and other sources such as springs within the gram panchayat boundaries used for secondary uses as defined at Section 10 of this Act;
  - Registration of all wells and other water sources such as springs within the gram panchayat boundaries found in areas declared as groundwater protection zones;
  - Collection of information from all source including persons or agencies engaged in activities, such as drilling of tube wells and construction of open wells and to discharge this function the Gram Panchayat Groundwater Committee shall obtain a log from drilling agencies;
  - Granting of permits under Sections 37-40 of this Act; and
  - Regulation of use of groundwater sources within the gram panchayat boundaries, except domestic wells using pumps of 1.5 hp or less.

## **2. BLOCK PANCHAYAT GROUNDWATER COMMITTEE**

### Constitution and Membership of the Block Panchayat Groundwater Committee

- Every block panchayat shall form a Block Panchayat Groundwater Committee.
- The strength of the committee, the qualifications of the members and the terms and conditions under which they holds office shall be as prescribed by the Block Panchayat:
- In constituting the Block Panchayat Groundwater Committee, adequate representation shall be given to scheduled castes, tribes and women:

Provided that in areas where block panchayat level water and sanitation, watershed and irrigation committees or institutions exist, the committee must include representatives of those committees.
- Every member of the Block Panchayat Groundwater Committee shall be liable to be recalled by the Block Panchayat. Recalling shall be made by the Block Panchayat by a resolution passed by the majority of the total membership. Recalling shall be made only on the ground of actions done by the member in violation of the powers, functions, duties and responsibilities of the Block Panchayat Groundwater Committee. Where a member is recalled, the Block Panchayat shall elect another representative in his or her place.

- The Block Panchayat Groundwater Committee shall be assisted by information and monitoring cells and supporting institutions in effective monitoring of groundwater extraction and groundwater quality, protection and recharge of groundwater aquifers.

#### Functions of the Block Panchayat Groundwater Committee

- i. The functions of the Block Panchayat Groundwater Committee shall include:
  - Consolidation of gram panchayat groundwater security plans into a Block Groundwater Security Plan on a mili-watershed and macro-watershed basis, with the assistance of the Block Groundwater Information and Monitoring Cell;
  - Coordination of the planning process between panchayats sharing aquifers where the aquifer boundary does not correspond with boundaries of a single panchayat. In the case of local aquifers, the same would apply to watersheds shared by panchayats, especially watersheds that include multiple aquifers.
  - Monitoring and supervising implementation of gram panchayat groundwater security plans in terms of the block level plan;
  - Advising and recommending changes and modifications of gram panchayat groundwater security plans on the basis of information provided by information and monitoring cells and supporting institutions;
  - Ensuring that the groundwater security plan of a panchayat does not restrict the options of another panchayat;
  - Determining groundwater protection zones straddling more than one panchayat within the territory of the block and adopting norms for their management and regulation;
  - Granting of permits under Section 37-40 of this Act; and
  - Ensuring in times of groundwater scarcity that groundwater security plans do not come in the way of the sharing of available groundwater among panchayats in the block.

## 2. Urban Areas

### 1. WARD GROUNDWATER COMMITTEE

#### Constitution and Membership of the Ward Groundwater Committee

- Every ward of a municipality, where groundwater is extracted for any use, shall form a Ward Groundwater Committee.
- The strength of the committee, the qualifications of the members and the terms and conditions under which they hold office shall be as prescribed by the Ward Sabha:
- The Ward Sabha shall ensure proportional representation for scheduled castes, tribes and women.
- Every member of the Ward Groundwater Committee shall forthwith be deemed to have vacated her or his office if she or he is recalled through a secret ballot by a majority of more than half of the total

number of members constituting the Ward Sabha within the ward in accordance with the procedure, as may be prescribed:

Provided that any member shall be recalled only on the ground of actions done by the member in violation of the powers, functions, duties and responsibilities of the Ward Groundwater Committee;

Provided further that where a member is recalled, the Ward Sabha shall elect another representative in her or his place within a period of sixty days of recall of such member.

#### Functions of the Ward Groundwater Committee

- The functions of the Ward Groundwater Committee shall include:
  - Preparing and overseeing the implementation the Ward Groundwater Security Plan with the consent of the Ward Sabha;
  - Determining groundwater protection zones within the territory of the ward and adopting norms for their management and regulation;
  - Registration of all wells and other sources such as springs within the ward boundaries used for secondary uses as defined at Section 10 of this Act;
  - Registration of all wells and other water sources such as springs within the ward boundaries found in areas declared as groundwater protection zones;
  - Granting of permits under Section 37-40 of this Act; and
  - Regulating the use of groundwater sources within the ward boundaries, except domestic wells using pumps of 1.5 hp or less.

## **2. MUNICIPAL GROUNDWATER COMMITTEE**

#### Constitution and Membership of the Municipal Groundwater Committee

- Every Municipality shall form a Municipal Groundwater Committee.
- The strength of the committee, the qualifications of the members and the terms and conditions under which they holds office shall be as prescribed by the Municipal Council:
- The Municipal Council shall ensure proportional representation for scheduled castes, tribes and women.
- Every member of the Municipal Groundwater Committee shall forthwith be deemed to have vacated her or his office if she or he is recalled through a secret ballot by a majority of more than half of the Municipal Council in accordance with the procedure, as may be prescribed:

Provided that any member shall be recalled only on the ground of actions done by the member in violation of the powers, functions, duties and responsibilities of the Municipal Groundwater Committee;

Provided further that where a member is recalled, the Municipal Council shall elect another representative in her or his place within a period of sixty days of recall of such member.

- The Municipal Groundwater Committee shall work in close coordination with other water-related institutions within the municipality, in particular with the institution providing water and sewerage services, if any.

#### Functions

- The functions of the Municipal Groundwater Committee shall include:
  - Endorsing ward groundwater security plans where they have been prepared;
  - Preparing a consolidated Municipal Groundwater Security Plan based on ward plans for the same, on a mili- and macro-watershed basis;
  - Determination of groundwater protection zones straddling more than one ward within the territory of the municipality and adopting norms for their management and regulation;
  - Granting of permits under Sections 37-40 of this Act; and
  - Coordinating measures taken at the ward level.

### **3. District Groundwater Council and State Groundwater Advisory Council**

#### **1. DISTRICT GROUNDWATER COUNCIL**

##### Constitution and Membership of the District Groundwater Council

- Every district shall form a District Groundwater Council, consisting of one representative from each of the block panchayat groundwater committees and the municipal groundwater committees.
- The strength of the committee, the qualifications of the members and the terms and conditions under which they hold office shall be as prescribed by the District Panchayat:
- The District Panchayat shall ensure proportional representation for scheduled castes, tribes and women.
- Every member of the District Groundwater Committee shall forthwith be deemed to have vacated her or his office if she or he is recalled through a secret ballot by a majority of more than half of the District Panchayat in accordance with the procedure, as may be prescribed:

Provided that any member shall be recalled only on the ground of actions done by the member in violation of the powers, functions, duties and responsibilities of the District Groundwater Committee;

Provided further that where a member is recalled, the District Panchayat shall elect another representative in her or his place within a period of sixty days of recall of such member.

- The District Groundwater Council shall be assisted in its functioning by information and monitoring cells and supporting institutions.

##### Functions of the District Groundwater Council

- The functions of the District Groundwater Council shall include:

- Preparing a consolidated District Groundwater Security Plan based on block and municipal plans for the same, on a macro-watershed basis;
- Reconciling the groundwater security plans of the blocks and municipalities within the district;
- Determining groundwater protection zones straddling more than one block and/or municipality within the territory of the district and adopting norms for their management and regulation;
- Take appropriate measures to foster the transfer of groundwater to panchayats, blocks and municipalities whose groundwater availability is insufficient to meet primary groundwater uses; and
- Coordinating measures taken at the block and municipal level.

## **2. STATE GROUNDWATER ADVISORY COUNCIL**

### Constitution and Membership of the State Groundwater Advisory Council

- i) The State Government shall, by notification, establish, with effect from such date as may be specified in the notification, a Council at the State level to be known as the State Groundwater Advisory Council.
- ii) Where a State Groundwater Authority exists, it shall act as State Groundwater Advisory Council. Where it does not, the State Government shall set up a Council comprising of:
  - 1 One representative of the Central Groundwater Board;
  - 2 One representative of the State Groundwater Board;
  - 3 Member Secretary of the State Pollution Control Board;
  - 4 An officer not below the rank of Chief Engineer of the Irrigation or Water Resources Department;
  - 5 An officer not below the rank of Joint Secretary of the Department of Panchayats and Rural Development;
  - 6 An officer not below the rank of Chief Engineer of the Public Health and Engineering Department or State Water and Sanitation Mission;
  - 7 An officer not below the rank of Joint Secretary of the Department of Industries;
  - 8 Two representatives from gram panchayat groundwater committees;
  - 9 Two representatives from block panchayat groundwater committees;
  - 10 Two representatives from district groundwater councils;
  - 11 Two representatives from ward groundwater committees;
  - 12 Two representatives from municipal groundwater committees; and
  - 13 Two independent experts having experience in hydrogeology, ecology or social science.

- iii) The State Groundwater Advisory Council shall be supported by the State Groundwater Department, the Water Department in the absence of the former or any other department dealing with water resources.

#### Functions

- 1 The State Groundwater Advisory Council shall provide advice and support to all groundwater bodies constituted under this Act.
- 2 The State Groundwater Advisory Council shall in particular:
  - i. Endorse and notify groundwater security plans;
  - ii. Ensure that the conservation and use measures adopted in rural and urban areas do not contradict each other;
  - iii. Determine groundwater protection zones straddling more than one district within the territory of the state and adopting norms for their management and regulation;
  - iv. Maintain and monitor a database on the implementation of block and gram panchayat groundwater security plans;
  - v. Advise and recommend to district councils and municipalities changes and modifications in district and municipal groundwater security plans;
  - vi. Conduct awareness enhancement programmes at the district, block and village levels;
  - vii. Conduct capacity building programmes at the district and block levels;
  - viii. Collect information from groundwater based source creation activities, such as drilling of tube wells or construction of dug wells, with the help of gram panchayat groundwater committees.

#### **4. Information and Monitoring Cells and Supporting Institutions**

##### Constitution of Information and Monitoring Cells

- 1 District groundwater information and monitoring cells, block groundwater information and monitoring cells and municipal groundwater information and monitoring cells shall be constituted to assist and help the appropriate authority for the effective implementation of this Act.
- 2 These cells will draw on existing institutional, scientific and technical capacity at all levels within the state, in particular the State Groundwater Department and its district offices or the State Pollution Control Board and its district offices.

##### Notification of Additional Supporting Institutions

1. The State Government may also notify agencies constituted under law, which the State Government may think suitable to assist and help the appropriate authority for the effective implementation of this Act:

Provided that suitable institutions may include, the State Groundwater Department, the State Pollution Control Board, the Groundwater Department, the Public Health Engineering Department,

the Irrigation Department, the Water Resource Department, the Department of Forests, the State Water and Sanitation Mission, zonal/regional offices of the Central Groundwater Board, block resource centres (National Rural Drinking Water Programme), water user associations and biodiversity management committees.

#### Functions of Supporting Institutions

1. Information and monitoring cells constituted under Section 29 and supporting institutions notified under Section 30 shall be duty-bound to assist and help the appropriate authority as per demands from the appropriate authority from time to time.
2. Information and monitoring cells and supporting institutions shall deliver the required assistance within a reasonable time period, as specified by the appropriate authority:  
  
Provided that information and monitoring cells and supporting institutions may take longer than the time period specified by the appropriate authority on reasonable grounds, subject to the satisfaction of the appropriate authority.
3. The appropriate authority may seek assistance from information and monitoring cells and supporting institutions at the appropriate level for fulfilling its duties and functions under this Act and this may include assistance:
  - For the provision of information on groundwater for planning purposes;
  - For the preparation of groundwater security plans;
  - For the preparation of a format for the registration and details of wells;
  - To assist compliance with groundwater security plans;
  - To assist the process of social and environmental impact assessment;
  - To fix the terms and conditions of permits for extraction of groundwater for various uses;
  - For evaluating the damages caused by any user of groundwater to individuals, property and environment; and
  - For conducting studies and surveys where required.
4. The State Government shall, in a manner specified in Rules, require supporting institutions notified under this Act to:
  - a) Periodically evaluate and monitor groundwater availability and quality, and organise groundwater surveys to ascertain the status of groundwater and the user profile;
  - b) Make an inventory of surface water sources and catchments;
  - c) Prepare, publish and periodically update groundwater and surface water digital maps, including micro- and mili-watershed levels;
  - d) Prepare, publish and periodically update integrated river basin maps, including surface water, groundwater, land and forest resources;

- e) Set up and periodically update a groundwater digital database and a natural resource database management system;
- f) Make available data to appropriate authorities and the public;
- g) Conduct awareness enhancement programmes at the district, block, village, municipal and ward levels;
- h) Undertake capacity building measures to train institutions constituted under this Act;
- i) Mobilize the expertise and resources from any national or international specialized scientific or civil society or other institution for the purpose of enhancing the knowledge, understanding, dissemination and coordination of groundwater related issues relevant to the state; and
- j) Keep a register containing particulars of permits.

## **Chapter 6 – Duties of Groundwater Users, Water Harvesting, Recycling and Reuse, and Waterlogging**

### **Duties of Groundwater Users**

1. Every user of groundwater shall ensure that:
  - a) Groundwater is not wasted, depleted or contaminated and no substance that pollutes groundwater is directly discharged on or into the ground;
  - b) Groundwater is conserved through appropriate agricultural and industrial practices, including by giving priority to using recycled water;
  - c) Measures are taken to replenish or recharge groundwater, including in recharge zones, for instance, through afforestation and reforestation; and
  - d) Rules regarding groundwater protection zones are followed.
2. Whoever uses and manages surface water and land resources in a way that is inconsistent with the Groundwater Security Plan shall phase out such activities, in particular the release of any effluent that contaminates groundwater resources either temporarily or permanently.

### **Water Harvesting and Catchment Conservation**

1. The appropriate authority shall encourage rainwater harvesting and catchment conservation as per geological conditions. It shall undertake all possible steps in integrated natural resources conservation, use and regulation for the augmentation of groundwater resources within its jurisdiction, through integration and convergence of all natural resources related developmental schemes and projects.
2. Notwithstanding anything contained in any other law for the time being in force, the gram panchayat groundwater committee or ward groundwater committee as the case may be, may impose stipulated conditions for providing rooftop rainwater harvesting structures in the building plan of an area of 50 m<sup>2</sup> or more. Such stipulations shall be binding on concerned government agencies sanctioning or

approving building plans. A building number, a tax assessment, and permanent water and electricity connections shall be extended only after compliance of the directions given in this regard.

3. Catchment conservation shall be done by using appropriate groundwater recharge structures or pits depending on the nature of the terrain/soil and condition/geology of the area.

### **Recycling and Re-use of Groundwater**

1. The appropriate authority shall encourage recycling and, in particular, foster re-use of water for non-potable urban, industrial, and agricultural use, as well as augmentation of potable water supplies through indirect reuse.

### **Waterlogging**

1. The appropriate authority shall discourage and prevent such activities that are likely to lead to potential waterlogging of land. It shall undertake all possible regulation for the protection of land against waterlogging within its jurisdiction.
2. The Gram Panchayat Groundwater Committee or Ward Groundwater Committee, as the case may be, may impose stipulated conditions for regulating activities in waterlogged areas that lead to worsening of the waterlogging condition. The gram panchayat/ward sabha, in consultation with the District Groundwater Information and Monitoring Cell, shall take steps to mitigate waterlogging through proper interventions related to soil treatment and land drainage.
3. Waterlogging mitigation measures shall be adopted by using appropriate processes and technologies, in due consultation with appropriate information and monitoring cells.

## **Chapter 7 – Basic Water from Groundwater Sources**

### **Basic Water**

1. Everyone is entitled to the same quantity of basic water regardless of, among others, caste, class, gender, economic status, land ownership and place of residence.
2. The quantity of basic water shall in no case be less than 70 litres per capita per day<sup>42</sup> of groundwater and/or surface water, depending on their respective availability:

Provided that the state shall ensure that gram panchayats and municipalities are progressively able to provide at least 70 litres per capita per day.

3. Every drinking water supply agency extracting groundwater shall comply with the Manual of the Central Public Health and Environmental Engineering Organization, Bureau Indian Standards specifications or standards adopted by the State Government as modified or revised from time to time:

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<sup>42</sup> As provided for under Section 2(2), Ministry of Drinking Water and Sanitation, Strategic Plan 2011-2022 – Ensuring Drinking Water Security in Rural India (2011).

Provided that the Block Groundwater Information and Monitoring Cell or Municipal Groundwater Information and Monitoring Cell shall monitor compliance with these standards;

Provided further that information of these guidelines and standards shall be provided to groundwater committees and local elected bodies at village, block, district, ward and municipal level, and to water supply agencies by the State Groundwater Board, through the district and block level groundwater information and monitoring cells.

4. Where basic water is not provided by any drinking water supply agency, and people depend on groundwater for their basic water requirements, it shall be the duty of the Block Groundwater Information and Monitoring Cell, the District Groundwater Information and Monitoring Cell and the State Groundwater Board to provide information on water quality in accordance with the Manual of the Central Public Health and Environmental Engineering Organization, Bureau Indian Standards specifications or standards adopted by the State Government as modified or revised from time to time, and to suggest appropriate measures to be undertaken at local level for quality improvement to the local appropriate authority:

Provided that the appropriate authority shall take the suggested measures without unreasonable delay, which shall in no case be more than twelve months.

5. The supply of basic water from any groundwater source shall require consultation and concurrence of the Gram Panchayat Groundwater Committee or Ward Groundwater Committee.

## **Chapter 8 – Groundwater for Livelihoods and Irrigation**

### **Groundwater for Livelihoods and Irrigation**

1. Every person is entitled to use groundwater for their livelihood needs.
2. The livelihood pattern and the resultant needs should be incorporated in groundwater security plans.
3. The Groundwater Security Plan shall take into account the availability of water through surface water projects and provide for groundwater for the livelihood needs through an integrated approach:

Provided that in case of severe drought or where the area has been declared a Groundwater Protection Zone 2, limits may be imposed for restricting water use by the appropriate authority.

4. Major or medium irrigation projects using groundwater shall be based on a permit system allocated by the appropriate authority in consonance with the groundwater security plan. The procedure for issuing permits shall be the same as that outlined in Chapter 9.
5. Major or medium irrigation projects using groundwater may be subject to paying a water rate to the panchayat, as determined by the Gram Panchayat Groundwater Committee, to be used for groundwater conservation and augmentation activities.
6. In any area that has been declared a Groundwater Protection Zone 2 and where water intensive cash crops are grown, an undertaking shall be obtained for a change from water-intensive crops and such undertaking must be incorporated in the permit.

7. In the command areas of irrigation systems where water user associations have been established under the law, the said water user associations may levy and collect from the farmer or any other person using groundwater such fees, as they may deem appropriate.

## **Chapter 9 – Industrial, Commercial and Other Bulk Uses of Groundwater**

### **Permits to Abstract Groundwater for Industrial Use or Infrastructure Projects**

- a) No one shall abstract groundwater for industrial use or infrastructure projects without a permit issued by the appropriate authority, as defined in this chapter:

Explanation: Industrial use includes, but is not restricted to groundwater extracting industries, bottling plants and other commercial activities consuming more than 10 kl of groundwater a day and agencies – government or private – responsible for water supply using groundwater.

- b) No permit for industrial, commercial or other bulk uses of groundwater shall be granted in a Groundwater Protection Zone 1 and permits for industrial, commercial or other bulk uses of groundwater in a Groundwater Protection Zone 2 shall be granted only if such uses are in conformity with the provisions of the Groundwater Security Plan in the concerned area.

#### Procedure for Applying for Permits

1. Whoever has been abstracting groundwater for industrial use or infrastructure projects at the time of commencement of this Act, shall apply for a permit within 120 days of the commencement of this Act.
2. If on examination of the application for a permit, it is found to be allowable, a conditional permit may be granted and reasonable time shall be allowed to the holder of permit to comply with the conditions:  
Provided that if the permit is not granted the activity shall be stopped immediately after the denial of the permit.
3. Permits shall be granted by the appropriate authority after obtaining the prior informed consent of the concerned gram or ward sabha.
4. The appropriate authority shall grant or refuse to grant a permit on the basis of a social and environment impact assessment conducted as per the stipulations of Section 43 of this Act:  
Provided that no applicant shall be refused of a permit unless she or he has been given an opportunity to be heard.
5. The appropriate authority shall be helped by information and monitoring cells and supporting institutions and can seek the advice of the State Groundwater Advisory Council.
6. Every application for a permit shall contain such particulars and in such manner accompanied by such fee as may be prescribed.
7. The applicant for a permit shall disclose all relevant information to the appropriate authority regarding the use of and implications on groundwater of the planned activity. Such information shall be provided in good faith.

8. The appropriate authority may seek additional information from the applicant if information submitted under sub-section (6) is found to be insufficient to facilitate the decision making process:  
Provided that the applicant shall provide such additional information within a month;  
Provided further that where the applicant fails or refuses to provide the requested information, the application shall be deemed to be incomplete and liable to be rejected.
9. The decision regarding the grant or refusal of permit shall be intimated by the appropriate authority to the applicant within a reasonable time period and in any case not later than six months from the date of receipt of the application.

#### Terms and Conditions of the Permits

- a) The permit may be granted with terms and conditions as prescribed by the appropriate authority, taking into account the different groundwater requirements of different industries and the specific processes used and such terms and conditions may include but are not restricted to:
  - a) The maximum quantity of water that may be extracted;
  - b) Precautions to prevent contamination of groundwater by mandating existing pollution control standards and measures;
  - c) Details of conservation measures, including rainwater harvesting, to be taken;
  - d) Groundwater recharging measures;
  - e) Recycling a prescribed proportion of the extracted groundwater;
  - f) Treating wastewater to bring it to prescribed standards before it is discharged; and
  - g) Adopting and practising the most water efficient practices and technology.
- b) The permit shall be in accordance with the groundwater security plan in force in the area and with water use prioritisation outlined at Section 10 of this Act.
- c) The permit granted for a specified purpose shall not be used for any purpose other than that for which it has been granted.
- d) The permit holder shall be prohibited from selling, by whatever name or form, groundwater extracted under the permit to someone else for commercial use and/or gain.

#### Cancellation, Transfer and Validity of Permits

1. Non-compliance with the terms and conditions of the permit constitutes a ground for cancelling the permit and compliance shall be monitored by the authority that granted the permit, including the District Groundwater Council and State Groundwater Advisory Council:  
Provided that the authority having granted the permit shall give the permit holder an opportunity to be heard before cancelling any permit.
2. Permits issued under this section shall be inalienable. However, permits granted to a natural person shall be inherited by his or her legal heirs and shall continue to be valid for the remaining period as

long as the legal heirs continue the activities done by the deceased permit holder. Further, on transfer of the property for the benefit for which the permit was granted, the permit shall continue to be valid so long as the nature of the activity continues unaltered by the new owner.

3. The permit shall be valid for a period fixed under the permit. The period of validity for the permit shall in no case exceed five years. However as far as possible the period fixed for the validity of permit shall be for a minimum period of one year. The appropriate authority may suspend the permit for a limited period in situations of emergency and/or request the permit holder to provide basic water from their own sources to nearby habitations in such cases of emergency.
4. Once the validity of the permit has expired, continuation of the permit shall require a fresh application by the permit holder complying with all the conditions of an original application.

#### **Pricing of Industrial Use of Groundwater**

1. Industrial or bulk groundwater use shall be priced and a water rate, as prescribed by the appropriate authority shall be charged.
2. Funds collected under this section shall be used for groundwater conservation and augmentation activities.
3. The groundwater rate charged under sub-section (1) is in addition to the water cess that may be paid under the Water (Prevention and Control of Pollution) Cess Act, 1977.

#### **Mining**

- a) Any person planning reconnaissance, prospecting, general exploration, detailed exploration or mining in respect of any major or minor minerals, including sand mining, shall prepare and file a prospecting plan with the appropriate authority of the area concerned, indicating steps proposed to be taken for the protection of surface and groundwater to minimise the adverse effect of prospecting operations on groundwater and the environment in general.
- b) Any person preparing and filing a prospecting plan under sub-section (1) and any person having undertaken mining operations for a major or minor mineral shall take immediate measures, as prescribed by the appropriate authority of the area concerned, to restore, as far as possible, water regimes and the ecosystem in general in the areas in which prospecting or mining operations have been conducted.
- c) Any person undertaking mining activities shall support groundwater enrichment activities in their watershed and provide drinking water from their own sources to nearby habitations in case of emergency in the manner prescribed by the appropriate authority.

### **Chapter 10 – Social and Environment Impact Assessment, Transparency and Accountability**

#### **Social and Environmental Impact Assessment and Public Consultation**

1. It shall be duty of the appropriate authority to conduct social and environment impact assessments:

Provided that in order to carry out this obligation, the appropriate authority shall enlist the help of information and monitoring cells and supporting institutions, as well as any other agencies which the appropriate authority may think fit, as and when required;

Provided further that in no case the promoter of the project, which is subjected to the social and environment impact assessments, shall be involved in this process.

2. The social and environment impact assessment shall include, but not restricted to, assessment of short-term and cumulative:
  1. Impacts on quality and quantity of groundwater in the concerned area and beyond;
  2. Impacts on agricultural production and its socio-economic impacts;
  3. Impacts on drinking water sources, including public drinking water supply systems in the concerned area and beyond, and its socio-economic impacts;
  4. Impacts on livestock and other living beings; and
  5. Impacts on the ecosystem.
3. There shall be a public hearing on the project, convened by the appropriate authority, in the area where the project is proposed to be implemented:

Provided that the appropriate authority shall provide 60 days pre-hearing notice regarding the conduct of public hearing;

Provided further that the above said notice shall be given through gram or block panchayat offices and/or ward or municipal offices and publication of such notice shall also be made in at least two local language newspapers having circulation in the concerned area.

4. The date of the public hearing under sub-section (3) shall be fixed more than 60 days after the date of publication of the social and environment impact assessment report by the appropriate authority.
5. The social and environment impact assessment report shall be subjected to examination by an expert group constituted for this purpose and the appropriate authority shall ensure the conduct of such examination:

Provided that the expert group constituted under this sub-section shall consist of two non-official scientists, an independent expert on groundwater and an independent environmental expert.

6. The expert group shall give their recommendation to the appropriate authority within 30 days after receiving the copy of the social and environment impact assessment report and report of the public hearing.
7. The requirements of this section are in addition to any other requirements, which may be stipulated by any other law in force.

#### **Duty to Establish Transparency Systems**

1. It shall be the duty of the appropriate authority at all levels to create an effective, appropriate and citizen-friendly transparency regime for the present Act.

2. Access to information as defined in this Act shall extend to all persons.
3. The minimum content, periodicity, and other details of the information to be put out proactively shall be specified by Rules.
4. The transparency regime for provision of information to any person shall include, but shall not be restricted to:
  - a) Proactive mandatory disclosure;
  - b) Inspection of all documents and offices;
  - c) Making accessible the copies of documents, records and samples of material; and
  - d) Ensuring the transparency of the decision-making processes.
5. All requests for information within a district shall be fulfilled within seven days and those outside the district within 15 days:

Provided that any request for information not complied with within the time period specified shall be considered a deemed refusal.

#### **Duties of Proactive Disclosure**

1. Appropriate authorities at all levels shall proactively disclose information.
2. It shall be the duty of the appropriate authority to disseminate the records in such a manner that a layperson can understand the information easily. This obligation shall also include the dissemination of information in a consolidated and summarized form, wherever appropriate.
3. Proactive disclosure shall include, but is not be restricted to:
  1. Reading aloud essential information as per prescribed format and manner specified by the Rules;
  2. Hanging or putting up information on notice boards at the gram panchayat, block, and district levels and the establishment of painted wall boards at prescribed locations and in the prescribed format and manner specified by the Rules;
  3. Publishing of information through newspaper advertisements, press releases, or the printing of leaflets and reports and by making announcements through the audio-visual media, such as, community radio, radio and television; and
  4. Availability of key records on the Internet. There shall be free and open access to the websites related to this Act where, as much of the information as prescribed, including summaries and consolidated information, shall be uploaded regularly.

#### **Social Audits**

- a) Social audits of activities undertaken in pursuance with this Act shall be conducted in every twelve months. It shall be the obligation of the gram sabha or ward sabha, as the case may be, to conduct social audits, as required above, of activities undertaken in pursuance of this Act within the gram panchayat or municipal ward:

Provided that this mandatory social audit may be linked to social audits required under other laws or government schemes and guidelines.

- b) The relevant authorities shall make available all relevant documents including the tender documents, bills, vouchers, copies of sanction orders and other connected papers to the Gram Sabha or Ward Sabha for the purpose of conducting the social audit.
- c) The findings of the audit shall be read out in the gram or ward sabha and shall also be circulated to the State Groundwater Advisory Council and, as appropriate, to the District Groundwater Council or Municipal Groundwater Committee.
- d) The appropriate authority shall encourage independent audits, carried out by civil society or citizens groups.
- e) All social audits shall be universal and open, allowing for ongoing social audit (concurrent) as well as post facto social audits.
- f) The Groundwater Grievance Redressal Officer shall take necessary action on the findings of all social audits, including directions to initiate criminal prosecution.
- g) The Groundwater Grievance Redressal Officer may impose a fine and/or award compensation on the basis of the findings of the social audit, within a reasonable time period and in any case not later than six months.

## **Chapter 11 – Offences, Penalties and Liability**

### **Offences and Penalties**

1. Whoever does any activity, which prejudicially affects the quality of groundwater or availability thereof shall be punished with imprisonment, which may extend to one year and six months or with a fine, which may extend to one lakh rupees or with both.
2. If a user convicted under sub-section (1) repeats the offence, such user shall be punished with a fine for an amount double the maximum prescribed under sub-section (1) in addition to imprisonment that may be prescribed under sub-section (1). If such user holds a valid permit granted under this Act, such permit shall be cancelled with immediate effect.
3. Any supplier of water who supplies or causes to be supplied groundwater which fails to meet the quality standard prescribed under law shall be punished with a fine which may extend to five thousand rupees.
4. Whoever extracts or causes to be extracted groundwater from a groundwater protection zone and fails to comply with instructions or directions given by the appropriate authority under this Act or specified by the Rules shall be punished with imprisonment which shall not be less than six months and which may extend to three years and with a fine which may extend to ten lakhs.
5. Whoever, being an owner of a building liable to be fitted with mechanisms for harvesting rainwater for recharging groundwater as per the requirements under this Act, fails to do so, shall be punished with a fine, which may extend to five thousand rupees. In addition to the penalty imposed on her or

him, she or he shall be required by the Groundwater Grievance Redressal Officer to comply with the requirements of law within a stipulated time. In case of failure on the part of the owner of the building, the appropriate authority shall take steps to install or restore such mechanisms and the expenditure incurred for this shall be collected from the owner as arrears of land revenue or as a judgment debt realisable through execution proceedings initiated before the Groundwater Grievance Redressal Officer.

6. Whoever contravenes any of the provisions of this Act or fails to comply with any order or direction given under this Act or its Rules, for which no penalty has been elsewhere provided in this Act, shall be punishable with imprisonment, which may extend to three months or with fine, which may extend to ten thousand rupees or with both.
7. If an offence punishable under this Act is committed at any time by a company, every person who is in charge of and responsible to the company for the conduct of its business at the time of the commission of the offence and the company shall be deemed to be responsible for the offence and shall be personally liable under the Act. This also includes criminal liability:

Provided that where any offence under this Act has been committed by a company and it is proved that the commission of the offence is with the consent and connivance or attributable to any neglect on the part of any Director, Manager, Secretary or other officer of the company, such Director, Manager, Secretary or other officer shall be deemed to be responsible for that offence and shall be liable to be proceeded against and punished accordingly.

Explanation: For the purpose of this section:

1. 'Company' means any body corporate and includes a firm or other association of individuals; and
2. 'Director' in relation to a firm means the partner in the firm.

#### **Civil and Administrative Remedies**

- a) Whoever violates the Groundwater Security Plan prepared and implemented under this Act shall be liable to be sued. Any act done or any omission to do an act in violation of the Groundwater Security Plan shall be an actionable wrong.
- b) The appropriate authority at the level in which the Groundwater Security Plan is drawn up and monitored shall be the body responsible for initiating and continuing the legal action against the violators.
- c) The appropriate authority shall designate an officer who shall initiate the legal proceedings against the violators of the Groundwater Security Plan.
- d) An application to remedy/rectify the violation shall be preferred before the Groundwater Grievance Redressal Officer having jurisdiction over the area from where the dispute arose.
- e) The appropriate authority may give directions to any person to remedy any violation of rules and regulations or provisions of this Act. It may also impose fines for the violations, remittance of which shall be a condition for restoration of the permit cancelled or suspended.

- f) Nothing under this provision shall bar the exercise of the power of cancellation, suspension, and modification of the permit granted by the appropriate authority by way of an administrative order for violation of the conditions of the permit.
- g) Any person aggrieved by the administrative directions issued against her or him by the appropriate authority may raise a dispute under this Act.
- h) Any individual, group, community, or non-governmental organization, can file a petition before the Groundwater Grievance Redressal Officer seeking remedy against the violation of the Groundwater Security Plan.
- i) No action shall be initiated by any person, other than the designated officer, under this section unless he had served thirty days notice to the concerned authorities for initiation of legal action:

Provided that the Groundwater Grievance Redressal Officer may allow the initiation of legal action without serving the above said notice if she or he is satisfied regarding the urgency of the matter or if she or he is convinced that no purpose is going to be served by issuing such a notice.

- j) The Groundwater Grievance Redressal Officer can issue an injunction against the perpetrator of the violation, or issue a mandatory injunction to compel positive actions to remedy the situation or direct the violator to pay compensation for the violation.
- k) Industrial or commercial users shall be strictly liable for substantial harm to groundwater quantitatively and qualitatively and for the degradation of the land as well as damage caused to public health.

Explanation: Inherently hazardous uses of groundwater include but are not limited to the direct pumping and/or release of potential hazardous effluents into aquifers, extraction of groundwater beyond the specified permit accorded to an industry, and activities destroying the recharge capabilities of areas notified as Groundwater Protection Zone 1.

- l) The Groundwater Grievance Redressal Officer may provide for restitution of property damaged and for restitution of the environment for such area or areas or compensation to victims who suffered health hazards or faces threat to health as well as for the damages caused to the environment as she or he may think fit.
- m) The Groundwater Grievance Redressal Officer may impose a fine for violations of the Groundwater Security Plan or any other provisions of this Act and such fine shall not exceed the amount prescribed as fine under the penal provisions under this Act.
- n) The Groundwater Grievance Redressal Officer may cancel the permit granted in cases of violation of the Groundwater Security Plan or conditions of the permit or suspend it for a specific period in addition to any other order she or he may pass in a petition for rectification of the Groundwater Security Plan violation.
- o) The Decision of the Groundwater Grievance Redressal Officer shall be binding on all parties to the complaint.
- p) No Action shall be initiated before the Groundwater Grievance Redressal Officer unless it is certified that all appropriate measures to settle the dispute by mediation and conciliation have failed. The

manner in which the certificate of failure of mediation and conciliation is to be issued and authenticated shall be provided by Rules.

- q) Nothing contained in this provision shall limit the power of the Groundwater Grievance Redressal Officer to entertain any complaint or application without prior notice being given to the appropriate authority for taking action or without the failure report of the conciliation and mediation if she or he is satisfied that the case requires urgent actions to be taken or that it will not serve any purpose to wait for the completion of the prerequisites mentioned earlier.

### **Cognizance of Offences**

1. Offences under this Act shall be cognizable and triable by a magistrate of first class or by any other judicial forum created/empowered in this behalf.
2. The magistrate may take cognizance of the offence either suo moto or on a complaint filed by the appropriate authority.
3. Any person interested in the matter on her or his personal behalf can initiate prosecution of any person who commits any offence under this Act. Before initiating the prosecution, the person interested shall give one month notice to the appropriate authority intimating her or his intention to initiate prosecution:

Provided that it shall be within the power of the court to allow the person interested in the matter to initiate prosecution against anyone who violated the provisions of this Act without serving the notice mentioned above if the court is satisfied that the matter is of urgent nature or that no useful purpose is going to be served by issuing the above-mentioned notice.

### **Compounding of Offences**

1. Offences prescribed under this chapter, except under Section 47 sub-section (4) may be compounded by the appropriate authority with the permission of the court.
2. On compounding the offences, the conditions laid down under rules for the imposition of fees for compounding shall be complied with.

## **Chapter 12 – Dispute Resolution**

### **Dispute Resolution Avoidance, Mediation and Conciliation**

- a) Every dispute under this Act shall be referred to be settled by mediation or conciliation at the appropriate level, by mediators and conciliators.
- b) Every Panchayat Groundwater Committee or Ward Groundwater Committee shall make available by consensus a list of persons of repute and integrity to act as conciliators and mediators, to be published by the District Panchayat. In order to facilitate the process of mediation and conciliation the state shall publish a list of persons available for acting as mediators and conciliators in every local area.
- c) The settlement reached under this process shall be final and binding and shall be authenticated by the process prescribed under Rules.

- d) Any dispute, which fails to be resolved under the mediation and conciliation shall be referred to the court for adjudication with a statement of failure report.
- e) In case of any grievance of no reference of dispute for adjudication on failure of mediation and conciliation, the aggrieved party may approach the court for permission to file suit for adjudication of the dispute.

#### **Appointment of a Groundwater Grievance Redressal Officer**

1. The State Government shall appoint in every block a Block Groundwater Grievance Redressal Officer and in every municipality a Municipal Groundwater Grievance Redressal Officer. The manner of selection, appointment and conditions of service shall be fixed by Rules formulated by the State Government in this behalf.
2. No one shall be appointed as Groundwater Grievance Redressal Officer unless she or he has experience and qualification in the field of law or hydrogeology or science and technology or social service or management or water policy or human rights or public administration.
3. Every Groundwater Grievance Redressal Officer shall hold office for a term of five years. The Groundwater Grievance Redressal Officer shall be eligible for re-selection for a second term, and shall not be eligible for any further terms.

#### **Disqualification for appointment as Groundwater Grievance Redressal Officer**

1. The Groundwater Grievance Redressal Officer shall not be eligible for appointment if she or he:
  - a) Is a public servant or a non-official holding any office of profit under the government at the time of appointment;
  - b) Has been convicted and sentenced to imprisonment for an offence involving moral turpitude or corruption under the Prevention of Corruption Act, 1988;
  - c) Has been suspended, removed or dismissed from the service of the government or a body corporate owned or controlled by the government; or
  - d) Has, in the opinion of the appropriate authority, such financial or other interest as is likely to affect prejudicially the discharge of his or her functions as a Groundwater Grievance Redressal Officer.
2. The Groundwater Grievance Redressal Officer shall not hold any post under the government or any office of profit receiving remuneration from the state exchequer during the period in which she or he holds the post.

#### **Nyaya Mitra**

1. In every district, there shall be a Nyaya Mitra to assist the Groundwater Grievance Redressal Officer in the discharge of her or his duties.
2. No one shall be appointed as a Nyaya Mitra unless she or he holds a bachelors degree in law, with eligibility to enrol as a lawyer, from a recognised institution or university.

3. The manner of selection, terms of appointment and remuneration of the Nyaya Mitra shall be as prescribed by Rules.

### **Jurisdiction and Procedure**

- a) The Groundwater Grievance Redressal Officer shall have jurisdiction over all complaints arising under this Act, within the territorial jurisdiction for which she or he is appointed.
- b) For the purposes of this section, the Groundwater Grievance Redressal Officer shall have the same powers and obligations as are vested in a civil court under the Code of Civil Procedure, 1908 while trying a suit in respect of the following matters, namely:
  - a. The summoning and enforcing attendance of any defendant or witness and examining the witness on oath;
  - b. The discovery and production of any document or other material object as evidence;
  - c. The reception of evidence on affidavits;
  - d. The requisitioning of the report of the concerned analysis or test from the appropriate laboratory or from any other relevant source;
  - e. Issuing of any commission for the examination of any witness; and
  - f. Any other matter, which may be prescribed.
- c) The Groundwater Grievance Redressal Officer shall pronounce his or her decision in public immediately after finishing the hearing or at any subsequent time, not exceeding fourteen days.
- d) The Decision of the Groundwater Grievance Redressal Officer shall be binding on all parties to the complaint.
- e) Copies of the decision shall be given to the parties immediately free of cost and a copy shall be sent to the concerned Gram Panchayat Groundwater Committee or Ward Groundwater Committee.

### **Appeals**

- a) Appeals from the decisions of the Block Groundwater Grievance Redressal Officer can be preferred to the Gram Nyayalya set up under Section 3 of the Gram Nyayalayas Act, 2008.
- b) Appeals from the decisions of the Municipal Groundwater Grievance Redressal Officer shall lie before the sub-court.

## **Chapter 13 – Miscellaneous**

### **Pre-existing Rights**

1. Pre-existing rights will continue to be valid for a period of one year from the date of commencement of this Act.

2. No compensation is due for any legal or other rights that become extinguished as a result of this legislation.

#### **Drilling Agencies**

1. Drilling agencies must be registered with the District Groundwater Council.
2. Drilling agencies must provide the appropriate authority with full details of the drilling activities planned and undertaken.
3. Drilling agencies must have a hydrogeologist possessing the prescribed qualifications on their payroll.

#### **Funds Collected under this Act**

1. Any fees, cess, penalties or grants received from the government or money received from any other source by way of gift or otherwise shall be set apart in a separate account and shall be used to further the objectives of this Act.

#### **Protection of Action Taken in Good Faith**

- a) No suit, prosecution or other legal proceeding shall lie against the Government or any officer or other employee of the Government or any authority constituted under this Act or any member, officer or other employee of such authority in respect of anything which is done or intended to be done in good faith in pursuance of this Act or the rules made or orders or directions issued thereunder.

#### **Effect of this Act on Other Laws**

- a) Notwithstanding anything contained in any other law for the time being in force, the provisions of this Act shall have precedence and overriding effect.

#### **Power of the State Government to Make Rules**

1. The State Government may, by notification, make rules to carry out the provisions of this Act.
2. Every Rule made under this Act shall be laid before the state legislature during its next session.

#### **Power of Local Authorities to Make Byelaws**

- a) Consistent with the Rules made by the State Government under this Act, local authorities may, by notification, make byelaws to carry out the provisions of this Act.
- b) Every byelaw made by local authorities under this Act shall to be sent for approval and endorsement by the State Legislature. The byelaws will take effect after such endorsement is made by the State Legislature.

#### **Power to Make Regulations**

1. Subject to the provisions of this Act and its Rules, the State Government may make regulations to carry out the purposes of this Act.

### **Power to Remove Difficulties**

1. If any difficulty arises in giving effect to the provisions of this Act, the State Government may, by order, published in the Official Gazette, make such provisions not inconsistent with the provisions of this Act, as may appear to be necessary or expedient for removing the difficulty:

Provided that no order shall be made under this section after the expiry of two years from the date of commencement of this Act.

2. Every order made under this section shall, as soon as may be after it is made, be laid before the State Legislature.

## STATEMENT OF OBJECTS AND REASONS

1. Groundwater is the backbone of India's agriculture and drinking water security in urban and rural areas. It is also important for the industrial sector in a large measure and, if left unregulated, may lead to serious inter-sectoral conflicts. A serious groundwater crisis prevails currently in India due to excessive overdraft and groundwater contamination covering nearly 60 percent of all districts in India and posing a risk to drinking water security of the population, as more than 80 percent of India's drinking water needs are serviced by groundwater resources. In addition to overdraft and biological and chemical contamination, excess groundwater and waterlogging is also a serious problem in many regions, impacting livelihood security of large sections of society.
2. The acute problems relating to groundwater warrant a change in perspective and approach in its use and management. It is necessary to acknowledge the hydrogeological characteristics of groundwater and its integral link to land, vegetation and surface water resources, and perceive it as a 'resource' rather than a 'source'.
3. In acknowledgement of the ubiquity of groundwater and its importance to all sections of society, it is necessary to recognize it as a common pool resource and adopt an aquifer-based approach to its management.
4. The existing legal framework derived from common law principles and judicial interpretation that recognizes private property rights in water is inappropriate for the emerging status, conflicts and dynamics of groundwater.
5. In recent decisions, superior courts in India have affirmed the common property nature of groundwater and have recognized the need to govern this resource under the concept of 'public trust'. Further, existing groundwater law principles and legislation fail to incorporate the many legal principles that have emerged in the rapid development of environmental law.
6. It is imperative to recognise groundwater as a natural resource vital to life, livelihood and environment, and to change the existing legal status of groundwater. Respect for established fundamental rights and application of accepted norms and principles of environmental law is another key change needed to respond to the contemporary challenges. Most importantly, regulation and improvement of groundwater is inevitable to ensure safe and adequate drinking water for everyone and thereby for the realisation of the right to water. Given the highly decentralised way in which groundwater is being used, the regulatory and institutional framework need to apply the principle of decentralisation and participation effectively by replacing the existing centralised licensing mechanism.
7. The Government of India has earlier attempted to recommend a statutory framework to regulate groundwater. The latest version of the existing model bill is the Model Bill to Regulate and Control the Development and Management of Groundwater, 2005. This model bill has failed to take notice of recent legal developments, such as the 73<sup>rd</sup> and 74<sup>th</sup> amendments to the Constitution of India vesting powers to Panchayats and Municipalities in the management of water that includes groundwater. In addition, it has not been widely adopted by states and even where it has, it has not been effectively implemented.

8. A new legal framework with norms, principles, procedures and institutions suitable to address contemporary and imminent challenges is therefore required.
9. The overall objectives of the Model Bill are thus to ensure the qualitative and quantitative sustainability of groundwater resources, equity in groundwater use, not just within users but across uses as well and efficiency in the use of groundwater as a common pool resource, through an appropriate institutional structure and participatory processes.
10. To achieve the above objectives, therefore, the Model Bill for the Conservation, Protection and Regulation of Groundwater, 2011 is hereby enacted.

## ANNEXURE 3

### DRAFT NATIONAL WATER FRAMEWORK BILL

AN ACT to provide a broad overarching national legal framework of general principles on water as a vital and stressed natural resource, under which legislation and executive action on water at all levels of governance, as also water-use and actions relating to water by citizens, their associations and voluntary agencies, public and private institutions and bodies corporate of all kinds, can take place, and for matters connected therewith.

WHEREAS water is essential for the sustenance of life in all its forms; an integral part of the ecological system, sustaining and being sustained by it; a basic requirement for livelihoods; a cleaning agent; a necessary input for economic activity such as agriculture, industry, and commerce; a means of transportation; a means of recreation; an inseparable part of a people's landscape, society, history and culture; and in many cultures a sacred substance, being venerated in some as a divinity;

AND WHEREAS water in all its forms constitutes a hydrological unity, so that human interventions in any one form are likely to have effects on others;

AND WHEREAS water is a finite substance in nature, the same quantum circulating through the hydrological cycle for millennia; and water used for any purpose returns as waste or sewage or residue or effluent, often in unusable form, and sometimes contaminating water sources;

AND WHEREAS freshwater is coming under increasing pressure because of the growth of human population and the processes of urbanisation and economic growth, leading to over-use/depletion, abuse, waste, scarcity, conflicts, pollution, and overall unsustainability of the resource itself and of the ecological system of which it is a part;

AND WHEREAS there are many different perceptions of and perspectives on water among people, States and groups, leading to divergences in approach, policy, doctrine, principle, law and institutional arrangements;

AND WHEREAS having regard to the foregoing it is desirable that there should be a broad national consensus on certain general approaches, concerns, directions, and principles, while leaving room for differences from State to State and from locality to locality, so as to bring about the prudent, wise, equitable, socially just, conflict-free, efficient, and sustainable use of water for a number of purposes;

Be it enacted by Parliament in the \_\_\_\_\_ year of the Republic of India as follows:-

## 1. Short Title, Extent and Commencement

(1) This Act may be called the National Water Framework Act (\_\_\_\_\_ <sup>43</sup>).

(2) It applies in the first instance to the whole of the States of \_\_\_\_\_ and the Union Territories; and it shall apply to such other States as adopt this Act by resolution passed in that behalf under clause (1) of Article 252 of the Constitution.

(3) It shall come into force, at once in the States of \_\_\_\_\_ and in the Union territories, and on the date of adoption in any other State which adopts this Act under clause (1) of Article 252 of the Constitution.

## 2. Definitions

In this Act, unless the context otherwise requires,

“aquifer” means a subsurface layer or layers of geological strata of sufficient porosity and permeability able to hold or transmit water;

“basin State” means a State the territory of which includes any portion of a river basin;

“catchment”, in relation to a river or stream or water body, means the area, the water from which, in the natural course, flows into that river or stream or water body;

“common pool resource” means a natural resource which, by its nature, is such that it is available for use by all the members of a village or other group or community, without exclusions of any kind, and the use of which by any individual or group diminishes the availability for others;

“common property resource” means a resource owned in common by a village or group or community, as distinguished from private ownership or ownership by the state;

“consultative” means “in consultation with the people or the community”;

“corporatisation” means the conversion of a government body or agency into a company or corporation;

“full cost recovery pricing” or “full economic pricing” means pricing a good or service so as to recover all the costs, direct and indirect, including both Operation and Maintenance costs and capital-related costs, involved in the production and/or supply of that good or service, without any concession or subsidisation or under-pricing of any kind;

“good water quality status” means water quality conforming to such standards as may be prescribed for the purpose;

‘groundwater’ means water which exists below the ground surface in the zone of saturation and can be extracted through wells or any other means or emerges as springs and base flows in streams and rivers;

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<sup>43</sup> Year of enactment

“hydrological cycle” means the water cycle from precipitation, through surface runoff or the retention of water in the atmosphere or soil, or seepage or percolation underground, on to evaporation from land and sea or evapo-transpiration from plants, back to precipitation;

“hydrological unity” means the unity constituted by water in all its forms including rainfall, snowfall, snow on mountains, glaciers, atmospheric or soil moisture, groundwater, lakes, ponds and other surface water bodies, rivers and streams, and wetlands;

“livelihood” means an activity or occupation or employment including self-employment that provides sustenance to an individual or family;

“participatory” means “involving the active association and involvement of the people or the community in policy-formulation, project-planning or implementation, or activity, scheme, programme, project or institutional arrangements of any kind”;

“precautionary principle” means the principle that advocates the adoption of a cautious approach, including anticipatory preventive or mitigatory action, towards an activity that holds the possibility of causing harm to human beings or the environment, even if that possibility is not fully established scientifically, with the onus of proving that there will be no such harm resting on the proposer of the activity;

“prescribed” means “prescribed by rules made under this Act, or, in the case of water quality standards, under the Water (Prevention and Control of Pollution) Act 1974”;

“privatisation” means the transfer of a government body or institution or a public enterprise to private ownership, or the transfer of a governmental or public sector activity to a private body;

“public trust” means the doctrine that the state holds natural resources in trust for the community;

“river basin” means the total area within which whatever precipitation or runoff occurs will, except for evaporation, evapotranspiration and seepage into the ground, eventually find its way to the river or one of its tributaries;

“State” with a capital ‘S’ means a State in the Indian Union;

“state” with a lower case ‘s’ means state in the abstract, e.g., state as distinguished from society;

“state at all levels” means the state at the three levels envisaged in the Constitution, namely, the Union, the States and the local level of panchayati raj institutions and nagarpalikas;

“sustainable use” or “sustainability” means the kind and level of use of water or other natural resource that ensures the continued availability of that resource for the present and future generations, without depletion or deterioration or dysfunctionality, and the continued healthy functioning of the related ecological system;

“water as commodity” means water considered as a substance or object that can be traded, bought or sold;

“water as economic good” means water considered as a good that is scarce in relation to wants and needs, can be put to alternative uses, and has an opportunity cost or exchange or marketable value in some uses;

“water as social good” means water used for certain common or social or general purposes and not for the benefit of particular individuals or groups, for instance water for use in public hospitals or public educational institutions or public parks and gardens, or for municipal purposes such as firefighting or street-washing;

“water footprint” means the total volume of water used direct or in the form of goods and services embodying water, by an individual or community or country as a whole, or by an industry or business in its production or other commercial activity;

“water for life” means the water required for human survival, including drinking, cooking, bathing, personal hygiene, sanitation, and related personal or domestic uses, with an addition for women’s special needs; as also the water required for survival by livestock and other animals and birds, and by wildlife;

“water-harvesting” means capturing and conserving rainwater or retarding run-off locally through various small-scale structures either for the direct use of the stored waters or for re-charging groundwater aquifers;

“watershed” means the ridge or line of high land separating two areas such that rainwater falling on one side of the line drains on that side and cannot pass to the other side; by extension, the area bounded by the ridge; generally used to denote a small local area bounded by low ridges, but sometimes also a large area bounded by high hills, including a river-basin; and

“wildlife” means wildlife as defined in The Wildlife (Protection) Act 1972.

### **3. Water: Heritage, Ecology, Equity**

(1) (a) Water is a common natural heritage of humanity and shall be used, protected and preserved as such.

(b) It shall be the duty of the state at all levels, the citizens, and all categories of water-users, to protect, preserve and conserve all water sources, and pass them on to the next generation.

(2) (a) Rivers, water bodies, aquifers and wetlands shall be recognised as ecological systems in themselves and as parts of larger ecological systems, and protected from over-use/depletion, abuse, pollution/ contamination, and degradation.

(b) There shall be minimum interference in existing natural river flows; in the natural state of water bodies and wetlands; and in flood-plains and river-beds which shall be recognised as integral parts of the rivers themselves.

(c) Rivers shall be protected from construction on their flood-plains and sand-mining on their beds.

(d) Where river-flows, water bodies, aquifers, wetlands, flood-plains or river-beds have already been interfered with, efforts shall be made to stop further interference, and reverse the adverse impact of interferences already made, to the utmost extent possible.

(e) The disposal of waste and discharge of pollutants and contaminants into rivers, water bodies and wetlands shall be minimised quickly, and stopped as early as possible.

(3) (a) As water is part of the ecological system and is dependent on its healthy functioning, the protection and preservation of the integrity of that system, its regenerative and assimilative potential, and its ability to provide water, shall have overriding primacy in all policy and action relating to water.

(b) The principle of sustainable use shall govern all categories of water use.

(4) Water shall be recognised as a bounty of nature to be shared by humanity with all other forms of life, with fellow humans of one's own and other groups, villages, States and countries, and with future generations.

(5) Ecological considerations, social justice and equity shall be the prime principles governing water policy, plans and management, having regard to the essentiality of water for life, its importance for livelihoods and economic activity, and its proneness to become the subject of conflict.

#### **4. Water as Sustainer of Life**

(1) Water in its primary aspect as a sustainer of life shall take precedence over water in any other aspect.

(2) Other uses of water, such as agricultural, industrial, commercial, and others, though important, shall not be such as to jeopardise or diminish the role of water as sustainer of life.

#### **5. Water as Common Pool Resource**

Notwithstanding anything contained in any other law, water, that is to say, water in its natural form, such as river, stream, spring, natural surface-water body, aquifer and wetland, is neither state property nor private property but a common pool resource of the community to be managed by the community or by the state for the community.

#### **6. Water as Public Trust**

(1) The state shall hold water in public trust for the people. It shall exercise its legislative and executive powers in relation to water in the capacity of trustee for the people.

(2) The ultimate responsibility of the state as public trustee shall remain even if some of the functions of the state in relation to water are entrusted to any agency, public or private or joint.

## **7. Water as a Scarce Resource**

(1) Having regard to the growing pressure on the finite availability of freshwater in nature, the prime principles governing water-use of all kinds shall be equity, economy, efficiency, minimisation of waste, resource-conservation, and ecological sustainability.

(2) The theft of water from public supply systems, the unauthorised power-driven lifting of water from rivers, lakes and other water bodies and from aquifers, and the pumping of water from river beds, shall be prevented through stringent measures, while ensuring that such measures do not have the effect of impinging on the right to water for life assured in Section 10 of this Act or the social justice provisions of Section 20 of this Act.

(3) It shall be the duty of the state at all levels, the citizens, and all categories of water-users, to endeavour to reduce their water footprint at every level, and thereby the water footprint of India.

## **8. Basin and Aquifer as Guiding Frameworks**

(1) Every water-related activity in any part of a river-basin, or a sub-basin of a large basin, whether it is a large project involving a dam, reservoir and canal system, or a diversion barrage, or a small-scale local water-harvesting structure, or the extraction of groundwater, shall be undertaken with due regard to:

(a) the hydrological and ecological characteristics and features of the basin or sub-basin as a whole;

(b) the land-use appropriate to the relevant area;

(c) the relationship between surface water and groundwater; and

(d) a holistic view of the relationships of all such activities with one another and with the basin or sub-basin as a whole.

(2) The optimal utilisation of waters within a river basin shall be ensured, with due regard to the reasonable present and future needs for life and livelihoods, appropriate economic activity, social justice and equity, and ecological sustainability.

(3) River-flows adequate to preserve and protect a river basin as a hydrological and ecological system shall be maintained.

(4) (a) It is only after ensuring full conformity to the principles stated in sub-sections (1) to (3) of this section, that any inter-basin transfer of waters shall be considered.

(b) Such a transfer, if found necessary, shall be made only with the consent of the parties concerned, and after due consideration of its environmental, ecological, cultural, social and human implications, as determined in an independent, objective and professional manner.

(5) The extraction of groundwater in any manner in any area shall be undertaken with due regard to the hydrogeological and ecological characteristics and features of the aquifer as a whole.

(6) In all water-related activities, due regard shall be had to the relationship between the river-basin or sub-basin and the aquifer.

(7) Appropriate institutional arrangements, as elaborated further in Section 14 below, shall be established to ensure coordination and harmonisation at the basin level, aquifer level and between basin and aquifer.

#### **9. Water-use and Land-Use**

(1) Water-use decisions shall have due regard to the land-use appropriate to the relevant area, and in turn, the proper land-use for an area shall be decided with due regard to the availability of water.

(2) In decisions on land-use for various purposes, due regard shall be had to the protection of water sources, catchments, and drainage paths.

(3) Where water sources, catchments or drainage paths have already been interfered with, efforts shall be made to stop further interference, and reverse the adverse impact of interferences already made, to the utmost extent possible.

#### **10. Right to Water**

(1) Every human being, and livestock or other domestic animal or bird, shall have the right to sufficient and safe water to meet the requirement of water for life.

Note: The quantity and quality of water that is considered sufficient and safe to qualify as water for life shall be as prescribed.

(2) The right to water for life shall take precedence over water rights, if any, for other uses including agricultural, industrial, commercial, municipal, and recreational uses.

(3) In the case of tribal and other communities dependent on traditional natural water sources including rivers, streams, lakes, springs, and others, the right to water for life shall include their right of access to those sources.

(4) The state at all levels shall ensure the realisation of the right to water for life, and monitor and review it periodically, through a participatory and transparent process.

(5) In the case of wildlife, their access to their natural water sources and the natural availability of water to them, shall not be adversely affected by human actions, plans or projects.

#### **11. Priorities in Water Allocations**

(1) In all allocations of water by governments at any level, or by any other duly authorised body or agency or institution, public or private, the first and over-riding priority shall be for water for life, followed by water required for all other uses, viz., water for livelihoods for vulnerable sections, water as a social good, and water for agricultural, industrial, commercial, recreational and other uses.

(2) The *inter se* priorities in allocations for different water-uses other than water for life shall be as determined by the appropriate authorities or agencies with reference to local circumstances such as local climate, land and soil characteristics, water availability, prevalent activities and livelihoods, and the land-uses indicated by those circumstances.

## **12. Water Conflicts: Inter-State River Water Disputes**

(1) Appropriate institutional arrangements, as elaborated further in section 14 below, shall be established at all levels within the State and beyond up to an inter-State river-basin, to obviate and/or resolve emerging inter-State river-water disputes through negotiations, conciliation or mediation, or other such means, at the earliest stages before the disputes become acute, so as to avoid recourse to adjudication as far as possible.

(2) In such efforts, and in the event of adjudication under the Inter-State Water Disputes Act 1956 (as amended in 2002) if it becomes necessary, the following broad principles shall be kept in view.

(a) None of the States in a river-basin owns the river; all of them have use rights.

(b) All basin States in a river system are equal in rights- status, and there is no hierarchy of rights among them, and further, in this context, equality of rights means not equal but equitable shares in the river waters, as stated in sub-section 2 (e) of this Section.

(c) The upper basin-State shall adopt a cautious and minimalist approach to major interventions in inter-State rivers; provide advance information to the lower basin-States about plans for intervention; consult them at all stages on possible impacts; and take care to avoid significant harm or injury to them.

(d) In an inter-State river system, all basin States shall cooperate in good faith in the equitable, prudent and holistic use of the river waters for the benefit of all.

(e) Where a State-wise allocation of the waters of an inter-State river becomes necessary, such allocation shall be governed by the principle of equitable sharing for beneficial uses.

(f) The principle of equitable sharing for beneficial uses implies that the upper basin-State shall respect the legitimate needs and claims of the lower basin-State, and that the latter shall recognise the legitimate needs of the former, and further that the former shall refrain from causing harm to the latter, and the latter shall not seek a veto on upstream uses.

(g) The relevant factors to be considered for equitable sharing in terms of sub-sections (e) and (f) of this section shall include but shall not be limited to:

- (i) geographic, hydrographic, hydrological, hydrogeological, climatic, ecological, and other natural features;
- (ii) the social and economic needs of the basin States concerned;
- (iii) the population dependent on the waters of the inter -State river basin in each basin State;

- (iv) the effects of the use or uses of the waters of the river basin in one basin State upon other basin States;
- (v) existing and potential uses of the waters of the inter-State river basin;
- (vi) the conservation, protection, and economical use of the waters of the inter-State river basin;
- (vii) the availability of appropriate alternatives to the particular planned or existing use;
- (viii) the sustainability of proposed or existing uses; and
- (ix) the minimisation of environmental, social or human impacts of proposed uses.

(h) The weight of each factor mentioned in sub-section (g) above shall be determined in each case in accordance with the relevant circumstances of the case. In determining what is a reasonable and equitable use, all relevant factors are to be considered together and a conclusion reached on the basis of the whole.

(i) The sharing shall be only of water that is available for sharing after the ecological functions of the river are ensured.

(j) In any settlement by agreement or adjudication on an inter-State river waters dispute, the principles and modalities of sharing the waters in a difficult year of low flows shall be clearly laid down.

(k) Adjudication, wherever necessary, shall be pursued with goodwill and a willingness to find an acceptable answer to the dispute, including the possibility of an agreed settlement.

(3) The resolution of inter-State river-water disputes, whether by agreement or by adjudication, is not a one-time settlement but shall be recognized as a continuous process of conformity to the spirit of the settlement, and ensuring this shall be among the responsibilities of the institutional arrangements referred to in sub-section (1) of this section.

(4) Data of all kinds needed for the purposes of sub-sections (1) to (3) of this section shall be freely shared by the States concerned and put in the public domain for the information of all without any restrictions on the grounds of confidentiality or secrecy.

### **13. Water Conflicts: Other Kinds**

(1) All efforts shall be made through appropriate institutional arrangements at all levels to prevent a water-related dispute or conflict from arising between or among different water-uses, or different groups or classes of users, or different areas, and when a dispute or conflict does arise, to settle it through negotiations, conciliation or mediation, or other such means, before the dispute or conflict becomes acute, so as to avoid recourse to litigation as far as possible.

(2) All such efforts shall be guided by the principles and priorities laid down in Sections 4, 10 and 11 of this Act.

(3) Data of all kinds needed for the purposes of sub-sections (1) and (2) of this section shall be freely shared by the authorities concerned and put in the public domain for the information of all without any restrictions on the grounds of confidentiality or secrecy.

(4) The institutional arrangements envisaged in sub-section (1) of this section shall be made at all levels and scales from micro-watersheds to sub-basins or basins or aquifers, on the lines outlined in Section 14 below.

(5) Existing water-related conflicts or disputes shall be reviewed and appropriate action taken in the light of the provisions of this Act.

#### **14. Institutional Arrangements**

(1) The institutional arrangements envisaged in earlier sections for

(a) basin-level, aquifer-level, and basin-aquifer coordination and harmonisation (section 8),

(b) ensuring the right to water for life (section 10),

(c) allocation and priority decisions (section 11),

(d) obviating and resolving inter-state river-water disputes (section 12), and

(e) obviating and resolving other kinds of water-related disputes and conflicts (section 13),

may be several parallel ones or one integrated structure as appropriate.

(2) (a) The institutional arrangements referred to in sub-section (1) of this section, whether several parallel ones or one integrated structure, shall be built from the village or micro-watershed level federating upwards in a nested series to the sub-basin or basin level, with arrangements for inter-State coordination in the case of basins spread over more than one State.

(b) In designing the institutional arrangements, due regard shall be had to harmonising administrative and hydrological divisions.

(3) At every level in the nested structures referred to in sub-section (2) of this section, the institutional arrangements shall be representative of all those concerned including, as appropriate, all categories of water-users, government administrators and technical personnel, and academics and experts outside the Government, and shall be fully participatory.

(4) (a) The institutional arrangements that are adopted shall have equity, social justice, resource-conservation and ecological sustainability, as their overarching concerns, and shall be guided by basin hydrology and ecology in all their decisions.

(b) The principles of transparency and accountability shall be central to the design and implementation of institutional arrangements.

(5) Existing institutional arrangements such as water-users' associations, village watershed committees, pani panchayats, and others, including those which are being planned and those

which have been set up under other laws but are not yet fully operational, shall all be reviewed to ensure conformity to the provisions of sub-sections (1) to (4) of this section and other relevant sections of this Act.

(6) In particular, the need for a State-level Water Resources Regulatory Authority and the nature of the regulation that is envisaged shall be carefully reviewed in the light of sub-sections (1) to (4) of this section, and if such an institution is found necessary, care shall be taken to ensure the following:

- (a) that it is a truly autonomous, professional, inter-disciplinary body, with managerial, professional, mediatory and adjudicatory capabilities built in;
- (b) that it is truly consultative and participatory in its composition and functioning, and that representatives of civil society are associated with it at all levels and at every stage;
- (c) that it is decentralised in its own functioning and is also consistent with the constitutional scheme of democratic decentralisation; and
- (d) that its mandate and functioning are in harmony with the provisions of this Act.

(7) (a) The institutional arrangements shall conform to the principle of subsidiarity, i.e., the principle that decisions shall be taken at the lowest appropriate level.

(b) The appropriate level for decision-making shall be determined with reference to the nature of the decision, the knowledge and expertise needed, and the implications of the decision for other levels.

(8) In establishing institutional arrangements due regard shall be had to the Model Bill for a State-level Water Regulatory System circulated by the Central Government.

### **15. Major Water Projects**

(1) All large projects involving dams or barrages or other structures on rivers to store or divert their waters for irrigation, hydroelectric power generation, flood control, or other purposes, including run-of-the-river projects, shall be guided by a cautious, minimalist approach, and by the precautionary principle as regards their environmental, ecological, social, human and other impacts and consequences.

(2) Strong and exceptional justification shall be needed to permit any proposed interference with the natural flows of rivers by dams, barrages or other structures on the river.

(3) A large project of the kind mentioned in sub-section (1) of this section shall be selected only if, after an assessment of all options available for achieving the objectives in view, such a project is found to be the unique solution or the best of all available options in the given case.

(4) Least environmental impact and no or minimum displacement of people shall be important selection criteria in the decision-making on such projects. The options assessment referred to in

sub-section (3) of this section shall include non-displacing or less-displacing alternatives to a proposed project.

(5) The decision on a project shall be based on the free, informed prior consent of the people likely to be affected by the project in any manner, and also on fully independent, professional, rigorous, comprehensive and objective Environmental Impact Assessment studies, including cumulative Environmental Impact Assessment studies if there are multiple projects on a river system.

(6) The people likely to be displaced or otherwise affected in any manner by a project shall have the first claim on the benefits expected from the project.

(7) The policies and measures of resettlement and/or rehabilitation of people likely to be displaced or otherwise affected in any manner by a project shall be such as to ensure the enhancement or at least the maintenance of their earlier living standards and quality of life.

(8) Construction activity on a project shall proceed *pari passu* with environmental remedial/compensatory/mitigatory actions and resettlement/rehabilitation measures, in the sense that progress on such actions and measures shall determine the pace of construction activity and that the latter shall not proceed ahead of the former.

## **16. Groundwater**

(1) Notwithstanding anything contained in any other law, groundwater, like surface water, shall be regarded as a common pool resource held in public trust by the state.

(2) (a) Groundwater extraction shall be brought under regulation for ensuring equity, resource-conservation, and water quality.

(b) Such regulation may be through various means as appropriate, including control through the electricity tariff, the restriction of the availability of electricity for groundwater-pumping for agricultural use to a certain number of hours, and the community management of groundwater as a common pool resource.

(3) For the purpose of the community management of groundwater, all aquifers shall be mapped and delineated through a participatory effort, drawing upon local, traditional knowledge, modern knowledge including hydrogeology, engineering and satellite imagery, and the social sciences.

(4) Aquifer-users' associations shall be formed for the sustainable management of the aquifers and the conservation of the resource.

(5) The objective of programmes for the artificial recharge of groundwater shall be to offset a part of the depletion that has occurred, and not to provide more water for wasteful use.

(6) In establishing institutional arrangements for groundwater management, due regard shall be had to the Model Bill for the Conservation, Protection, and Regulation of Groundwater circulated by the Central Government.

## **17. Local Water Augmentation and Management**

- (1) Decentralised local rainwater-harvesting and micro-watershed development shall be the preferred route for water augmentation and management, and shall be undertaken wherever technically and socially feasible.
- (2) In undertaking the activities referred to in sub-section (1) of this section, due regard shall be had to the suitability of the location chosen for structures, possible downstream impacts, and harmony with basin hydrology and ecology.
- (3) Such efforts shall be based on local community knowledge and traditional wisdom as well as modern science.
- (4) Customary laws which form part of such traditional wisdom and practices shall be given due recognition by the state, provided they are non-discriminatory.
- (5) Institutional arrangements shall be made and social sanctions used (a) to ensure the prudent, economical, equitable and resource-conserving use of the water harvested by diligent effort by the local community, (b) to avoid or minimise disputes and resolve them when they arise, and (c) to protect the harvested water from appropriation by some to the detriment of others.
- (6) Such local efforts and initiatives shall be inclusive, equitable and non-discriminatory.
- (7) The state at all levels shall formally recognise and encourage local initiatives for rainwater-harvesting and micro-watershed development.
- (8) Effective working relationships shall be established between the informal community institutions for water-related activities and the formal institutions of local governance, i.e., the Panchayati Raj Institutions.

## **18. Water Services: Corporatisation, Privatisation**

- (1) Water supply, being an essential service and a fundamental right, shall be the responsibility of the state.
- (2) If for any reason the state wishes to entrust this responsibility to an autonomous or corporate body, public or private, this shall not affect people's fundamental or human rights in any manner.
- (3) The state's responsibility for ensuring people's right to water shall remain despite corporatisation or privatisation of water services.
- (4) The privatisation of the service, if considered necessary and appropriate, shall not lead to the privatisation of the resource.
- (5) Considerations of profitability shall not override such social conditions and obligations as are imposed on the autonomous or corporate body as a part of the corporatisation or privatisation of water services.

## **19. Water Markets**

(1) Water markets shall not be encouraged to flourish and proliferate in an uncontrolled manner, but may be allowed to function subject to careful regulation in the interests of equity, social justice, resource-conservation and the protection of the aquifer.

(2) In particular, the bottled water and soft drinks industries shall be reviewed to ensure (a) that the need for bottled water is reduced by the better provision of adequate, safe and reliable water supply through public systems; (b) that the industries' draft of raw water from water sources of any kind for processing is not such as to affect adversely the availability of water for life or livelihoods in the community dependent on the water source in question; and (c) that the disposal of process material and waste or reject water does not have an adverse impact on the water source or on the soil in the surrounding area.

## **20. Water Pricing**

(1) The pricing of water shall be based on a differential pricing system in recognition of the multiple roles of water as fundamental right, social good, economic good, and part of history, culture and religion.

(2) (a) Water used for commercial agriculture and for industry or commerce is an economic good, and may be priced on the basis of 'full cost recovery' or full economic pricing, or higher if needed and appropriate in a given case.

(b) Water used for subsistence or vulnerable livelihoods may be priced at such rates as may be considered appropriate in the relevant socio-economic circumstances.

(3) Water as a social good may be priced at such rates as may be considered appropriate.

(4) Water as a fundamental right and a part of the right to life, shall not be denied to anyone on the ground of inability to pay.

(5) For domestic water supply, a graded pricing system may be adopted, with 'full cost recovery' pricing for the middle-income and high-income groups, affordable pricing for those below that level, and a modicum of free supply to the very poor, or alternatively, a minimal quantum of water may be supplied free to all.

(6) There should be prohibitive penalties to discourage profligate use, and the service should be denied beyond a certain limit.

(7) The pollution of water sources and supplies should be severely discouraged through the 'polluter pays' principle, the payment by the polluter being equal to what is required to restore the pre-polluted condition, and it should at the same time be ensured that the principle is not distorted to mean that payment authorises pollution.

(7) Decisions by the State Governments, local bodies (PRIs and nagarpalikas) or other agencies on actual pricing systems and their operation shall be broadly guided by the principles set forth in

sub-sections (1) to (6) of this section, with flexibility for variations in the light of the relevant circumstances.

### **21. Water and Women**

(1) The state at all levels shall take all appropriate steps to protect the rights, interests, and special water and sanitation needs of women.

(2) The access of villages to nearby sources of water shall be improved, making it unnecessary for women to bring water from distant sources.

(3) Women shall be full participants in all water-related institutions at all levels, and their participation in such bodies shall be non-exclusionary, with no reference to title to property or other restrictive criteria.

(4) The state at all levels shall endeavour to enhance the effectiveness of the participation of women in all water -related institutions.

### **22. Water Quality and Pollution**

(1) Subject to the provisions of the Environment (Protection) Act 1986 and Water (Control and Prevention of Pollution) Act 1974, the approach to the prevention and control of pollution and contamination of water sources shall include: (i) reducing water-use in all categories of use; (ii) minimising the generation of waste in all water uses; (iii) recovering, to the extent possible, water for some uses from waste; and (iv) ensuring that nothing that does not meet certain stringent quality standards, to be prescribed, is allowed to enter water sources.

(2) (a) In all water supply systems, rural or urban and public or private, good water quality status, that is to say, water quality conforming to such standards as may be prescribed, shall be achieved throughout the country by (2020).

(b) Water quality in all rivers, streams, surface water bodies, aquifers and other water sources throughout the country, shall be enhanced by (2020) to conform to such standards as may be prescribed.

(c) The health of those rivers, streams, surface water bodies, aquifers and other water sources throughout the country that are heavily polluted and/or contaminated shall be restored by (2020) through special programmes.

### **23. Drought**

(1) The answer to the problems of water-short, arid or drought-prone areas shall be primarily local, and it is only after exploring all local possibilities, or determining that there are no such possibilities, that recourse to water from external sources may be considered.

(2) In drought-prone or arid areas, the pursuit of economic development shall be primarily through routes other than water-intensive industry or agriculture.

## **24. Floods**

(1) In relation to periodical river floods, the emphasis shall shift from structural flood-control measures to the following approach:

- (a) learn to live with periodical river floods and minimise loss and damage;
- (b) ensure that land-use practices are such as to minimise and not aggravate the adverse impact of floods;
- (c) install adequate and timely advance warning systems;
- (d) be ready with disaster avoidance and management plans;
- (e) learn relevant lessons from traditional coping practices;
- (f) if dams are built for flood moderation among other purposes, ensure that a flood cushion is built in and actually maintained;
- (g) as far as possible, refrain from confining a river within embankments; and
- (h) make flood control and embankment projects, if any, subject to the requirement of Environmental Impact Assessment studies under the Environment Protection Act 1986 and the EIA Notifications thereunder.

(2) A vast, well-equipped, technologically advanced network of stations for observing and analysing precipitation and flows and drawing conclusions, and for the instant ('real time') communication of such information and predictions to downstream areas, shall be established by expanding existing facilities and enhancing their quality and technological status.

(3) Timely information is necessary but not enough; it shall be followed by prompt, adequate, equitable, efficient and humane response.

(4) The thrust of the relief programme shall be, not to reduce people to a state of dependence, but to enhance their ability to help themselves.

(5) Potential or actual conflicts in the context of dealing with floods or administering flood-relief measures, arising between upstream and downstream areas within a State, or between upstream and downstream States, shall be obviated or minimised or resolved by consultations in advance, timely sharing of information, and cooperative or joint efforts and institutional arrangements.

(6) Interferences with natural channels and drainage paths that result in the blocking of storm water drainage and cause or aggravate urban floods shall be avoided.

## **25. Climate Change and Water**

While further studies and research may be needed for obtaining detailed, precise and area-specific information on the impact of climate change on water resources, and on the vulnerabilities of certain areas and settlements such as coastal or low-lying areas, anticipatory action for mitigation and adaptation need not wait for those studies, but shall be taken in hand immediately.

## **26. National Water Information System**

- (1) To design and build an excellent, nation-wide, detailed, professional water information system, a National Water Information Agency (NWIA) shall be set up.
- (2) The water information system shall have close linkages with the other related information systems, such as those relating to meteorology, land, forests, agriculture, tribal communities, industries, etc.
- (3) All water-related information shall be open and accessible to all, and shall not be denied to anyone on the grounds of confidentiality or secrecy.

## **27. Existing Water-related Legislation and Reforms**

- (1) All existing water-related laws at the Central and State levels shall be reviewed and amended where necessary to ensure conformity to the provisions of this Act.
- (2) All water-related reforms already initiated and those that are about to be undertaken shall be reviewed in the light of the provisions of this Act and the necessary changes made to ensure conformity to those provisions.

## **28. Compliance, Deviations and Remedies**

- (1) (a) Water-related legislation and/or executive orders or action by the state at all levels, as also water-use and actions relating to water by citizens, their associations and voluntary agencies, public and private institutions and bodies corporate of all kinds, shall conform to the provisions of this Act.  
  
(b) The NWIA referred to in section 26 of this Act shall also monitor the state of compliance with the principles laid down in this Act and submit reports to the state at all levels.
- (2) The state at all levels shall ensure the availability of effective administrative and legal remedies for those whose legal rights under this Act have been violated, and for those who suffer or are under a serious threat of suffering damage arising from programs, plans, projects, or activities relating to water.
- (3) Remedies under this Section shall, as appropriate, provide for preventive measures to obviate damage to persons, property, the environment or the ecological system arising from non-compliance with or deviations from the provisions of this Act; in the event of such non-compliance or deviation, penalties for the same, and/or compensation for the consequences; criminal prosecution of offenders; and any other appropriate remedy in accordance with the provisions of any other law for the time being in force.

## ANNEXURE 4

# DRAFT MODEL BILL FOR STATE WATER REGULATORY SYSTEM

## STATEMENT OF OBJECTS AND REASONS

The object of the Bill is to establish an effective, efficient, decentralized, nested and networked multi-layered water regulatory system, comprising independent authorities of professional experts, government agencies and officials, stakeholders' representatives, and elected representatives, to reform and / or replace existing governance structures, so as to –

1. Ensure that the basic need for water, for life and livelihood for all, is met;
2. Enable equitable, democratic, and socio- economic and environmentally optimum and sustainable use of water resources;
3. Protect and promote public interests in the governance of water sector;
4. Promote and ensure conservation, development and use of ground and surface water in an integrated and conjunctive manner;
5. Provide for efficient use of water resources;
6. Ensure ecological sustainability, keeping in view inter-generational needs;
7. Ensure transparency, participation, and accountability in water governance.

The Model Bill, in determining the governance functions of the regulatory system, adopts a flexible, modular approach to accommodate the variation in development of the water sector in different states. The Bill also adopts an institutional transition model depending on the institutional preparedness at each level.

## PREAMBLE

*An Act to provide for the establishment of a State Water Regulatory System, and for effective streamlining of governance, to ensure meaningful participation of all stakeholders, thus enabling justice and equity for all, environmental sustainability, technical efficacy and efficiency, economic viability, and financial health of the sector, and to formulate rules for matters connected therewith or incidental thereto.*

BE it enacted by the State Legislature in the \_\_\_\_\_ Year of the Republic of India, as follows: -

## **CHAPTER I – PRELIMINARY**

### **Short title, extent and commencement**

1. (1) This Act may be called the [State<sup>44</sup>] Water Regulatory System Act, \_\_\_\_\_<sup>45</sup>.
- (2) It extends to the whole of the State.
- (3) The state government shall notify the entire Act within four weeks of its passage in the state legislative houses.
- (4) This act shall cover all the matters related to ground water, except those related to service-grievance.
- (5) This Act shall cover the matters related to bulk-level water provisioning in the state's water sector.
- (6) This Act shall however be applicable to the retail level of water provisioning in so far as it involves the protection and promotion of public interest and/or environmental and social sustainability.

### **Definitions**

2. In this Act, unless the context otherwise requires, -

“conduct of business regulations” (CBRs) means subordinate legislations prepared by State Independent Water Expert Authority (SIWEA) and ratified by the State Water Resources Development and Regulatory Council (SC) in adherence to the provisions of this Act and shall contain the framework for preparing criteria, and various processes and procedures to give effect to the provisions of this Act.

“criteria” means subordinate legislation prepared by the SIWEA in adherence to the provisions of this Act, and building on the normative framework and non-normative decisions provided by the rules, regulations, and CBRs prepared under this act, which provide elaborate framework comprising normative and non-normative components for executive agencies to make decisions and act on them, in pursuance of this Act.

“Basin” and "sub-basin" shall have same meaning and definition adopted by the state's Water Resource Department, or the department of state government dealing with water resources development.

"First Phase" means the phase which begins immediately after notification of the State Water Regulatory System Act and ends when the state government notifies commencement of the Second Phase."

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<sup>44</sup> Name of the State

<sup>45</sup> Year of enactment

"Institutional Preparedness" would mean preparedness of an institution for institutional transition, or rather for undergoing changes envisaged in the next stage of institutional transition.

"Institutional Transition" means the gradual transition in the institutional creation, determined by the preparedness of the institutions as well as the preparedness of the stakeholders, as prescribed in **Error! Reference source not found.** of this Act;

"local body" refers to local level institutions established by state laws, especially those conforming to the 73rd and 74th Constitutional Amendment Acts;

"mediated extraction of water" means that extraction and/ or usage of water which takes place through a utility, and cannot be effected without a utility;

"normative decisions" means decisions which involve choices, trade-offs between competing demands of different values, or distribution of costs and benefits, which are subjective in nature and are guided by and/ or are dependent on the values – including but not limited to equity, justice, fairness, environmental integrity, economic efficiency – accepted by the society as a whole.

"Normative framework" shall mean the framework defining the boundaries within which the subsequent normative (and subjective) as well as non-normative (and objective) decisions are to be made. This shall be laid by the State Water Resources Development and Regulatory Council (SC) for the purposes of the Act and which shall be within the normative framework defined in this Act. This may partly be explicitly laid down by the SC or may be in the form of the decisions that the SC makes from time to time. It shall be the responsibility of the SC to make explicit the normative basis of its decisions, especially in its interventions modifying SIWEA decisions or suggestions.

"notification" means a notification published in the Official Gazette;

"preparedness of stakeholders" means the state of the stakeholders in which they are equipped with the awareness, vision, available resources, available capabilities, and willingness required to effect and participate effectively in institutional transition.

"principle of balancing authority with competence and legitimacy" means that the authority accorded to any agency in a particular broad area of expertise, such as social, political, engineering, environmental or ecological, economic, or financial, or for conducting a particular task of governance shall be balanced by (a) competence, i.e., knowledge, understanding, skills, and work experience in the said broad area of expertise or required for conducting the said task of governance, and (b) legitimacy in the said area of expertise or required for conducting the said governance task, which is obtained by discharging accountability by the said agency, through effective, efficient, and appropriate mechanisms and process, to appropriate constituencies which can provide the required legitimacy in the said area or for the said task. .

"principle of subsidiarity" means devolution of functions, functionaries, and financial resources to the lowest possible level of governance, without foregoing optimal efficiency, efficacy, and sustainability of governance.

“professional expert” means a person with at least a master’s degree from a recognized university, and is active in practice of the profession through activities like research, academic teaching, training, consultancy, policy-making, planning, designing, development, execution, operation or maintenance of projects, or analysis-based advocacy in the concerned field of expertise for at least four years.

“regulations” means subordinate legislations prepared by the SC in adherence to the provisions of this Act, and shall contain normative and other decisions laying the normative framework for preparing criteria or making decisions and taking actions in pursuance of this Act.

"Regulation Areas" means the areas within governance of the water sector in which the regulatory system is required to intervene.

"Second Phase" means the phase that begins when the state government notifies the commencement of the Second Phase and ends when the state government notifies commencement of the Third Phase.

"Service-Grievance" for the purpose of this Act shall mean any grievance related to the water service provisioning by the WRD/ VDC or any other utility.

“sustainable use” means the use of water in such manner that it preserves the regenerative and assimilative potential of the water system and does not compromise its potential to meet the needs and aspirations of present and future generations.

“third party public interest interveners” refers to individuals, organizations, or non-profit companies intervening and participating in the processes and procedures of the regulatory system in order to protect and promote public interests, but themselves may neither be stakeholders nor representatives of the stakeholders.

“third party auditor” means an independent professional expert or an expert agency having capabilities and resources to undertake audit of the processes, procedures, and performance of a governing agency.

"Third Phase" means the phase which begins when the state government notifies the commencement of the Third Phase.

"unmediated extraction of water" means extraction and/ or usage of water which does not necessarily always need a utility;

“utility” shall mean the agency provisioning water services to the water users, with partial or full private, or public ownership

## **CHAPTER II – PRINCIPLES AND GUIDELINES**

### **Principles**

3. The principles contained herein, shall be fundamental to the water regulatory system of the state –

- (a) decentralized, multi-layered structure of nested and networked institutions with powers and functions allocated on the basis of the principle of subsidiarity;
- (b) transitory approach towards building the water regulatory system such that progress is in step with the institutional preparedness of each level.
- (c) an integrated approach to different water sources, different users and uses, and different forms of infrastructure for water provisioning.
- (d) equitable, sustainable, and efficient use of available water resources
- (e) the ultimate responsibility of ensuring equitable, sustainable and efficient use of water, especially, ensuring safe and sustainable access to water for life and water for subsistence livelihood for the vulnerable and the marginalized shall vest with the Government irrespective of the nature of water service provisioning whether it is private or public
- (f) the precautionary principle shall be adopted with respect to environmental; and social sustainability
- (g) transparency, accountability and public participation at all levels of the water regulatory system

#### **Guidelines**

4. In the functioning of the Water Regulatory System, the following broad guidelines shall be observed –
  - (a) Official representation of stakeholder representatives within regulatory bodies is essential but shall not supplant the procedures for public participation prescribed.
  - (b) Special efforts shall be made to maintain the autonomy of independent agencies set up under the Act.
  - (c) The Water Regulatory System shall recognize and accommodate diversity and location-specificity without compromising the imperatives of coherence and consistency.
  - (d) Preparedness and capacity building of stakeholders/the public is essential to ensure effective public participation
  - (e) The Water Regulatory System shall adopt policy directives and decisions related to governance of the sector, keeping in mind the long gestation period of water resource projects.
  - (f) Gender, social, ecological, cultural and political considerations and objectives shall be treated on par with economic and financial considerations in decisions pertaining to water governance.

- (g) Priority shall be given to improvement of efficiency and reduction of losses and thefts.
- (h) Due respect shall be accorded to traditional and local practices without compromising social equity and environmental integrity.
- (i) Independence and discretion granted to decision-makers / regulators shall be balanced by effective and efficient accountability towards all the stakeholders, especially the weaker sections of society
- (j) The authority to make decisions of a particular type and / or in a particular realm shall be balanced by competence as well as legitimacy (that shall have to flow from effective accountability towards appropriate constituents) in the same realm or to make the particular type of decisions.
- (k) Regulatory discretion and powers shall not be exercised in a manner that leads to disempowerment, usurpation, and displacement of, and nullification of benefits to, the disadvantaged sections of society.

### **CHAPTER III – CORE REGULATORY FUNCTIONS AND OBJECTIVES**

The *Water Regulatory System shall, inter alia*, carry out the core regulatory functions provided in this chapter of the Act, in order to achieve the objectives included hereunder:

#### **5. Water Access, Extraction and Use (Distribution/ Allocation/ Access/ Use)**

- (1) Ensuring equity and justice in extraction, use, sharing, access, distribution, allocation of water, both surface and groundwater, as well as both mediated and unmediated extraction of water during the normal as well as scarcity period, and in view of:
  - a) Fundamental right to water for drinking and sanitation
  - b) Right to water for livelihood
  - c) Other aspects of equity in distribution of water
- (2) Ensuring effective control on unsustainable extraction of ground and surface water
- (3) Ensuring effective regulation for prevention and mitigation of water scarcity and related distress
- (4) Ensuring economically optimal distribution of water resources across sectors and across various types of water users, while adhering to the provisions of this Act and regulations thereof pertaining to needs of social and environmental considerations
- (5) Ensuring sustenance and adequacy of water for economic activities by regulating efficiency of water use for various uses of water

## **6. Water Projects, Programs, and Investments**

- (1) Ensuring public interest, prudence, and appropriateness of processes, and procedures and practices related to capital investments and other expenditures
- (2) Ensuring fair distribution of costs and benefits across different communities and regions while planning, siting and designing water sector projects
- (3) Ensuring quality, timeliness, social equity, environmental sustainability, and technical, economic, and financial rationality in projects for water-resources development and utilization, in their various stages, including, planning and site selection, procurement and purchase of material and equipment, construction and commissioning of project facilities and amenities, operations and maintenance of facilities and amenities
- (4) Ensuring financial health of utilities and of the water sector as a whole
- (5) Ensuring minimum social, cultural, and livelihoods-related adverse impacts on the lives of people affected by the water sector projects
- (6) Ensuring equity and justice in rehabilitation and resettlement of people affected in any manner by water sector projects, following the laws and policies of the central and state governments in this regard
- (7) Ensuring sustenance and adequacy of water for economic activities and other water uses by regulating generation and supply of water
- (8) Ensuring adequate availability of water for ensuring fulfillment of water-related rights and for economic activities by planning and undertaking appropriate projects and programs

## **7. Water Services, including Quantity, Quality, and Timeliness of Supply as well as Water Tariff and Other Charges**

- (1) Ensuring equity, fairness, and justice in provisioning of water services and supply across communities and regions
- (2) Ensuring efficiency and efficacy as well as reduction of all types of losses, in provisioning of water services as well as in metering, billing, and recovery of revenue from services
- (3) Ensuring appropriate, prudent, fair, equitable, and affordable charges and costs for accessing and using water services
- (4) Ensuring setting of and adherence to proper standards for services and supply of water, especially pertaining to quantity, quality, timeliness, handling of grievances, for both, private and public utilities

- (5) Ensuring strict adherence to the terms of contracts related to their entry, continuation, or termination
- (6) Ensuring proper and adequate services during emergencies and distress situation, especially to disadvantaged sections of society
- (7) Ensuring equity and justice in obtaining private sector participation and prevention of adverse implications of such participation on provisioning of services, especially on the weaker and disadvantaged sections of society
- (8) Ensuring operational continuity and sustainability of water services in normal and crisis periods
- (9) Ensuring prudence, efficacy, efficiency, social equity, and protection of public interest in designing and entering into service-related and other contracts
- (10) Ensuring financial sustainability of the water service provision system and thereby of the utility through recovery of costs either through revenue from water charges, cross-subsidy or government subsidy

#### **8. Environmental Considerations and Impact**

- (1) Ensuring conservation of river and aquifer systems especially by ensuring that human activities and interventions do not damage the structure and functioning of the river systems or aquifer systems
- (2) Ensuring that in the case of any such past damage, restoration of ecosystem services from the river and aquifer system is done to the maximum extent possible
- (3) Ensuring that water projects, their operations, and any other human activities, do not cross the threshold of environmental sustainability especially in the matters related to water flow, catchment conservation, and river channels conservation
- (4) Ensuring strict and effective control on quality of surface and subsurface water, protecting it from all sources and causes of water pollution and degradation in water quality
- (5) Ensuring optimum use of ground and surface water through recycling and reuse of treated water, and conjunctive use of water from different sources.
- (6) Ensuring effective, efficient, and comprehensive actions to prevent and to deal with the water related epidemics and other health hazards
- (7) Ensuring mitigation and prevention of impacts of past and future water resources projects, by considering their cumulative impacts through periodic legally binding reviews with true and meaningful public participation

- (8) Ensuring appropriate and timely response to changes and impacts on water systems due to the broader process of climate change, especially through activities aimed at mitigation of impacts
- (9) Ensuring effective control on sand, soil, and other mining in river banks and beds
- (10) Ensuring effective control on encroachments on flood-planes of rivers and river beds and flows due to activities such as building construction and debris dumping

## **9. Processes and Procedures of Governance**

- (1) Ensuring democratic and accountable processes and mechanisms for decision-making that go beyond passive consultation and involve stakeholders right from the stage of setting the agenda
- (2) Ensuring empowerment and preparedness of water users, their associations, Third Party Public Interest Interveners (TPPIIs), and citizens in general, in order to ensure their true, meaningful, and effective participation in decision-making processes
- (3) Creating mechanisms and procedures for participation and protection, legitimization, and strengthening of powers of WUAs and other stakeholder agencies
- (4) Creation and strengthening of mechanisms and procedures for participation in decision-making processes for Third Party Public Interest Interveners (TPPIIs) comprising agencies such as media, NGOs, Civil Society Organizations as well as those indirectly affected by the decisions
- (5) Ensuring full, unrestrained transparency, effective accountability, and true and meaningful participation (TAP) in all decisions, in all processes and procedures, and at all stages of decision making and for all stakeholders, and especially disadvantaged sections of society
- (6) Ensuring that the poor and marginalized section's concerns and demands are promoted, heard and considered in the decision making.
- (7) Ensuring that powers of the decentralized democratic institutions are not trampled, overlooked, or overruled in decision making process

## **10. Water-related Disaster**

- (1) Ensuring all the support needed for measures for mitigation and prevention of disaster-related risks due to water resource projects
- (2) Ensuring effective management of Water-related Disasters, including those rooted in factors related to Climate Change
- (3) Ensuring prevention of disasters due to the factors and causes from water sector, to the maximum extent possible, especially in the cases of droughts, man-made

flooding, and water pollution, by measures such as watershed development and drought proofing

- (4) Ensuring prevention and mitigation of adverse impacts of disasters such as floods, droughts, and water pollution on water services and supply
- (5) Ensuring at least the minimum required water supply in the post-disaster relief camps
- (6) Ensuring speedy restoration of water related services in post-disaster scenario

#### **11. Water Service Privatization**

- (1) Ensuring effective protection of public interest including the interest of the poor and the marginalized sections while privatization of services is undertaken
- (2) Ensuring consistency and continuity in policy for securing private investments
- (3) Ensuring prudence, techno-economic and financial rationality, protection of public interest, and minimum burden on public-owned financial and other resources while drafting and approving entry-level and other contracts and licenses with private parties, especially their revenue models
- (4) Ensuring complete transparency, accountability, and public participation in all processes and procedures for designing, entering, operating, monitoring, assessing, and renewing contracts with private parties
- (5) Ensuring rational water tariff for ensuring cost recovery including adequate but appropriate return on investments, with proper provisions of subsidy and cross-subsidy for the deserving sections of society
- (6) Ensuring equity and justice by preventing adverse implications of private sector participation in provisioning of services

#### **12. Integrated State Water Plan Regulation**

- (1) Ensuring equity and justice in basin-level integrated approach through 'Integrated State Water Plan' and its implementation, though primarily within the administrative boundaries of the state, and hence with the space for coordination across the states
- (2) Ensuring equity and fairness, in an integrated approach, to demands of communities from upstream and downstream locations in the river basins
- (3) Ensuring basin-level integrated approach through 'Integrated State Water Plans' and its implementation
- (4) Ensuring that the water plans that are developed do adequately reflect and cater to the locally prevalent social, political, economic, and physical conditions
- (5) Ensuring that the plans developed are reliable, relevant, and of good quality

- (6) Ensuring that the plans are developed in a time-bound manner with appropriate and adequate processes and procedures for democratic participation
- (7) Ensuring that due processes are adhered to strictly and in time-bound manner while developing and approving the plans

## **CHAPTER IV – STATE WATER RESOURCES DEVELOPMENT AND REGULATORY COUNCIL**

### **Establishment of the State Water Resources Development and Regulatory Council**

**13.** The State Government shall establish the State Water Resources Development and Regulatory Council, hereby known by the term SC, within a period of four months, from the notification of this Act.

### **Composition of the SC**

- 14.** (1) The State Water Resources Development and Regulatory Council shall consist of –
- a) elected representatives from the State Legislative Houses,
  - b) elected representatives from Zilla Parishads (District Councils),
  - c) elected representatives from Taluka / Block /Mandal Panchayats,
  - d) elected representatives from Gram Panchayats,
  - e) elected representatives from Urban Local Bodies,
  - f) state-level representatives of the stakeholder groups, including farmers, industry, and civil society organizations.
- 15.** (1) The number of representatives for each category above shall be as follows-
- (i) The proportion of number of representatives from the State Legislative Houses should not be more than 60% or less than 50% of the total members of the SC.
  - (ii) The proportion of number of representatives from the ULBs and PRIs together should not be more than 30% or less than 20% of the total members of the SC. The proportion of the number of members from the ULBs to that of members from other PRIs (ZPs, TPs, and GPs) should be close to the proportion of rural and urban population in the state. The members of SC from ULBs shall have appropriate representation to members from large/ metro cities, medium, and small towns and cities from the state.
  - (iii) The proportion of number of representatives of the Stakeholders should not be more than 20 % or less than 10% of the total members of the SC.

- (iv) The political parties in the state shall have adequate and appropriate representation in the members of the SC drawn from the State Legislative Houses, PRIs, ULBs, largely reflecting their strength in the respective elected bodies.
- (v) The number of representatives of major stakeholder categories, such as, farmers, industry, and civil society should be approximately the same.
- (vi) The proportion of members in the SC representing various vulnerable sections of society such as SC, ST, and women, shall largely follow the pattern of reservation for these sections in the State Legislative Houses.
- (vii) All the River Basins and regions in the state shall be adequately and appropriately represented in the SC.

(2) The Minister of Water Resources Development of the state shall be the ex-officio chairperson of the State Water Resources Development and Regulatory Council.

(3) The State Government shall establish and provide for a Secretariat to the SC, to be headed by a Secretary, who shall be a senior civil services officer, and shall not have voting right in SC.

(4) The Secretariat, in addition to the administrative staff, shall also have experts from various relevant areas of expertise as full or part-time staff members.

(5) The SC through the Secretariat shall hire services of consultants as and when required, for the effective and efficient functioning of the Council.

(6) The powers, functions, duties, and salaries of the staff and consultants of the SC and the other terms of his/ her office shall be as prescribed in the rules prescribed under this Act.

### **Selection Committee for State Water Resources Development and Regulatory Council**

**16.** (1) The State Government shall notify establishment of a Selection Committee for State Water Resources Development and Regulatory Council (SCSC) within a period of eight weeks, from the notification of this Act, or subsequently within two months of the vacancy to any of the posts of the SC.

(2) The Selection Committee for SC shall consist of

- (a) Chief Minister of the State, as the chairperson of the SCSC.
- (b) Deputy Chief Minister of the State OR a senior leader of the ruling party in the State Legislative Houses.,
- (c) Leader of Opposition in the Legislative Assembly,

- (d) Leader of the Opposition in the Legislative Council OR a senior leader of the second largest opposing party in the State Legislative Houses.
- (e) Secretary, Water Resources Department of the state government, as a non-voting member-secretary.

### **Process of selection of SC**

**17.** SCSC shall adopt systematic and analytically and ethically sound procedure as prescribed by the Rules prepared by the state government. It shall, inter alia, be based on the following provisions hereunder:

- (a) The Water Resources Department shall prepare the list of two candidates for each of the posts in the SC.
- (b) The Selection Committee for SC shall after due deliberation, prepare the list of names as per the provisions in the Act, by consensus to the extent possible, and if not by consensus, by simple majority.
- (c) The Selection Committee may add names of candidates to the list prepared by the Water Resources Department, if it deems necessary.
- (d) The Selection Committee shall ensure that the selected members are fit to be members on the ground of solvency, mental state, criminal record, ethical behaviour, honesty, integrity, and lack of conflict of interests.

**18.** SCSC shall, within one month of completion of the selection process, prepare and submit to the state government a report covering the following points, which shall be tabled before the State Legislative Houses by the state government, and shall be available on the websites of the state government and the Water Resources Department, within one month of its submission:

- (a) Details of the selection process at every stage of the process including the plan of process of selection, the process of collection of information of the candidates, specific criteria applied, and results of assessment based on the criteria.
- (b) Information, data, and analysis considered in the assessment of the candidates,
- (c) Report with detailed reasoning on the final selection of candidates,
- (d) Recommendations on the process of selection, after review and appraisal of the process of selection based on compliance to the rules.

### **Term of Office and Other Conditions of Service for Members of SC**

**19.** (1) The term of the State Water Resources Development and Regulatory Council as a whole shall be coterminous with the term of the State Legislative Assembly.

(2) The term of office for the members of the SC shall be as prescribed by Rules, be prescribed by rules under this Act and shall, inter alia, contain the following -

- (a) The term of the elected representative of the local self-governance bodies shall be coterminous with his/her term in the elected local body in which he/she has the primary membership.
- (b) Any member may resign from his/ her membership of the SC.
- (c) In the case of vacancy of the member from the Local Self-Governance Body, due to closure of the term or resignation, or any other reasons including removal or re-elections, the Chief Administrative Officer of the body shall send in nomination of the new member in consultation with the President/ Chairperson of the body.
- (d) The allowances payable to and the other terms and conditions of service of, the Chairperson and other Members shall be as may be prescribed by the Government.
- (e) Any member of the SC may be suspended or dismissed from his/ her membership by the order of the Chairperson of the SC after the passage of the motion to this effect by the SC by a two-third vote, on the grounds of insolvency, unstable mind, unethical behaviour, dishonesty, or conflict of interest.

### **Powers and Functions of SC**

**20.** The SC shall, inter alia, have the following powers and functions –

- (a) Deliberate on the drafts of the Action Plan for Preparation of Regulations, CBRs, and Criteria (APPRC);
- (b) Provide considered comments and suggestions on the draft Regulations, CBRs, and Criteria, pertaining to the 'normative decisions', in accordance with the provisions of this Act;
- (c) Provide final approval to the APPRCC and the Regulations on the basis of simple majority of the general body of the SC;
- (d) Undertake periodic review of orders and decisions of the SIWEA and the WRD through deliberations in the general body of the SC in order to assess the compliance of the decisions and orders of SIWEA to the normative framework provided in Rules, Regulations, CBRs, and Criteria during periodic review
- (e) Provide advisories to the SIWEA and state WRD based on the deliberations and findings of the review processes;

- (f) Recommend revisions, if and when necessary, based on the deliberations and findings during the periodic review, in the CBRs and Criteria, in consultation with the SIWEA and the state government;
- (g) Recommend and effect revisions in the regulations, if and when necessary, based on the deliberations and findings during the periodic review, in consultation with the SIWEA and the state government.
- (h) Seek advice from the State Advisory Committee while carrying out its functions.
- (i) Seek assistance from various line departments and other agencies of the state government, while carrying out its functions.

**State Advisory Committee (SAC)**

**21.** (1) There shall be a State Advisory Committee (SAC) composed of the following officials of the state government:

- (a) Secretary, Water Resources Department (Chairperson)
  - (b) Secretary, Water Supply and Sanitation Department
  - (c) Secretary, Urban Development Department
  - (d) Secretary, Rural Development or Rural Water Supply Department
  - (e) Secretary, Agriculture Department
  - (f) Member Secretary, State Ground Water Development Authority
- (2) SAC shall provide advice to the SC and SIWEA on technical and other matters, when requested.
- (3) SAC shall be hosted by the Water Resources Department of the state government.

**Annual Reports of the SC**

**22.** (1) The SC shall, within three months after the end of the financial year, prepare its Annual Report. The Annual Report shall, inter-alia, include:

- (a) A summary of the proceedings and/ or minutes of all meetings conducted by the SC; and
- (b) Details of attendance of the members of the SIWEA for all meetings of the SC.

(2) The Annual Report of the SC shall be published on the websites of the SIWEA, the SC, and the WRD within two weeks of its preparation, and shall also be tabled before the State Legislature.

## **CHAPTER V – STATE INDEPENDENT WATER EXPERT AUTHORITY**

### **Establishment of State Independent Water Expert Authority (SIWEA)**

**23.** The state government shall establish a State Independent Water Expert Authority, hereby known by its acronym SIWEA, within four months of notification of this Act.

### **Composition of SIWEA**

**24.** (1) The State Independent Water Expert Authority shall comprise five members, as follows:

1. One professional expert from the field of civil engineering
2. One professional expert from the field of ecology or environmental sciences
3. One professional expert from the field of economics, or accounts and auditing
4. One professional expert from the field of sociology or political sciences, or social sciences
5. One professional expert from the field of geology and hydro-geology.

(2) A Chairperson shall be elected from amongst the members of the SIWEA, by a simple majority, for the term of one year, and shall hold office for not more than two terms.

(3) SIWEA may be assisted by full time and part time consultants and/or special advisors, who shall not have any voting rights.

### **Qualifications of the Members of the State Independent Water Expert Authority**

**25.** A person shall have to follow the following qualifications and conditions for his/ her selection as a member of SIWEA:

(1) A person shall be qualified for appointment as member of the SIWEA if she/he is:

- (a) A person with proven reputation and track record as a professional expert with at least fifteen years of experience in the respective area of expertise.
- (b) A person with demonstrated interest in the water sector issues.
- (c) A person with an indisputable reputation in terms of honesty and integrity.
- (d) A person with academic, research, or policy-level publications of substantial quality and quantity

OR

A person with experience of handling major, extra-ordinary technical responsibilities, preferably at the national or international level

- (2) A person finally selected shall have to declare and shall have to relinquish and terminate all his or her previous engagement or relationships with agencies, establishments, or persons related to the water sector, which might have had or might have conflict of interest with the responsibilities entrusted to him or her as a member of SIWEA.

### **Selection Committee for State Independent Water Expert Authority**

**26.** (1) The State Government shall form 'Selection Committee for State Independent Water Expert Authority' (SCSIWEA) within a period of eight weeks from the notification of this Act, and subsequently, within two months after a post in SIWEA falls vacant.

(2) SCSIWEA shall comprise:

- (a) Retired or Sitting High Court Judge as the Chairperson.
- (b) Representative of the Ministry of Water Resources of the Government of India, nominated by the Secretary of Ministry of Water Resources, Government of India, not below the rank of Joint Secretary, and not from the cadre of the same state for which the SIWEA is being established.

OR

a professional (i.e., technical, economic, or accounts) member of the central-level independent regulatory agency in any of the infrastructure sectors,

OR

a professional (i.e., technical, economic, or accounts) member of the state independent regulatory agency in the infrastructure sector from a state different from the one within the purview of this Act,

- (c) One Senior Professor with at least 15 years of experience from the fields of expertise for which the positions are to be filled, from a central or state-level research or academic institution not within the purview of the state government, and nominated by the Director of the said Institution, with voting rights only for the selection of the post from her/ his own field of expertise.
- (d) Secretary, Water Resources Department of the state government.
- (e) A senior-level officer of at least the rank of deputy secretary of the Water Resources Department of the state government as the Member-Secretary, with no voting rights.

(3) The SCSIWEA shall, within four weeks of its establishment, and after a rigorous assessment, and after interviews of the candidates, recommend names of two candidates for each vacant position of member, in the order of suggested priority to the state government.

- (4) The state government shall select one of the two candidates recommended by the SCSIWEA and notify the appointment of the member, within one month of submission of recommendations by the SCSIWEA.
- (5) The overall process of selection of members of SIWEA shall be carried out within six weeks of establishment of SCSIWEA.
- (6) The SCSIWEA shall, within one month of completion of the selection process, prepare and submit to the state government a report covering the following points, which shall be tabled before the State Legislative Houses by the state government, and shall be available on the websites of the state government and the Water Resources Department, within one month of its submission:
  - (a) Details of the selection process at every stage of the process including the plan of process of selection, the process of collection of information of the candidates, specific criteria applied, and results of assessment based on the criteria.
  - (b) Information, data, and analysis considered in the assessment of the candidates,
  - (c) Report with detailed reasoning on final selection,
  - (d) Recommendations on the process of selection, after review and appraisal of the process of selection based on compliance to the regulations/ norms.
- (7) The members of the SCSIWEA shall be paid appropriate allowances as prescribed by the state government.

**Terms of the Office of Member of State Independent Water Expert Authority**

- 27.** The term of the members of the SIWEA shall be prescribed by the state government by rules under this Act and shall, inter alia, contain the following provisions --
- (1) The term of office of members of the SIWEA shall be for a period of five years.
  - (2) A member may relinquish his/her office by giving in writing to the Government a notice of not less than three months.
  - (3) A member of the SIWEA shall not hold office for more than one term.
  - (4) No member of SIWEA shall hold office after she/ he has attained the age of sixty-five years.
  - (5) A member of the SIWEA shall not take up any work or assignment, with or without any benefit, from any party, which may have anything to do with the functioning of

the institutions created or governed by this law, within the period of two years after relinquishing his/ her office in any manner<sup>46</sup>.

### **Removal of a Member**

**28.** A Member shall not be removed from the office, except in accordance with the provisions contained herein --.

(1) The Governor may by order, remove from office a member on the ground of proven misbehaviour after the State Government has held an inquiry, in accordance with the procedure prescribed in this behalf. ,

(2) If he/ she-

(a) has been adjudged an insolvent;

(b) has been convicted of an offence which, in the opinion of the Appropriate Government, involves moral turpitude;

(c) has become physically or mentally incapable of acting as a Member;

(d) has acquired such financial or other interest as is likely to affect prejudicially his functions as a Member;

(e) has so abused his position as to render his continuance in office prejudicial to the public interest; or

(f) has been guilty of proved misbehaviour:

(3) Provided that no Member shall be removed from his office on any ground specified hereunder unless the Governor of the state, on a reference being made to him in this behalf by the State Government, based on an inquiry, held in accordance with such procedure as may be prescribed by the State Government, reports that the Member ought on such ground or grounds to be removed.

### **Secretariat of SIWEA**

**29.** The SIWEA, with support from the State Government, shall establish a Secretariat with adequate resources.

(1) The Secretariat shall also have experts from various relevant areas of expertise as full or part-time staff members.

(2) The SIWEA through the Secretariat shall hire services of consultants and/ or special advisors as and when required, following the procedures as prescribed by this Act.

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<sup>46</sup> Work or assignment means employment in any capacity under, or agency of, a person engaged in trading, commercial, industrial or financial business in the Water Sector and also includes a director of a company or partner of a firm and also includes setting up practice either independently or as partner of a firm or as an adviser or a consultant.

- (3) The Secretariat, in addition to the administrative staff, shall also have experts from various relevant areas of expertise as full or part-time staff members.
30. The State Government shall depute a senior-level officer from civil services as the Secretary of the SIWEA, who shall not have voting rights in functioning of the SIWEA.
31. The powers, functions, duties, and salaries of the Secretary of SIWEA and the other terms of his/ her office shall be as prescribed by the Act.
32. No Secretary or any other staff of the Secretariat to SIWEA shall hold office after he/ she has attained the age of sixty-five years.

#### **Special Advisors to SIWEA**

33. SIWEA may be assisted by full-time or part-time Special Advisors who shall not have any voting rights, and who shall provide in-house advice on matters that are critical for the mandated responsibilities of SIWEA such as participatory processes and procedures, and quasi-judicial nature of its functioning.
34. The Special Advisors shall be selected according to the provisions contained herein.
35. (1) Special Advisors shall be professional experts, providing in-house expert advice in areas of expertise, which may not be available among the members of the SIWEA.
- (2) The special advisors to SIWEA shall be Professional Experts from the following fields -
1. Law or policy
  2. Participatory communication or social work
  3. Other appropriate field as per the needs and understanding of SIWEA

#### **Qualifications of special advisors to State Independent Water Expert Authority**

36. (1) A person shall be qualified for appointment as a special advisor to SIWEA if she/he is:
- (a) A person with proven reputation and track record as a professional expert with at least ten years of experience in the respective area of expertise.
  - (b) A person with demonstrated interest in the water sector issues.
  - (c) A person with an indisputable reputation in terms of honesty and integrity.
  - (d) A person with academic, research, or policy-level publications of substantial quality and quantity
- (2) A person finally selected shall have to declare and shall have to relinquish and terminate all his or her previous engagement or relationships with agencies, establishments, or persons related to the water sector, which might have had or might

have conflict of interest with the responsibilities entrusted to him or her as a consultant or special advisor to SIWEA.

### **Selection of Special Advisors to SIWEA**

**37.** The selection of special advisors to the SIWEA shall be as per regulations prepared by the SIWEA in this regard and in accordance with the following -

- (1) The Chairperson of the SIWEA shall post the advertisement for the post of special advisors in national-level newspapers and professional magazines.
- (2) The Chairperson of the SIWEA shall set up a Special Advisor Selection Committee (SASC).
- (3) The SASC shall comprise:
  - a. Chairperson of the SIWEA as the chairperson of the SASC,
  - b. Retired or sitting Director of central or state research or academic institution, or Vice-Chancellor of a central or -state university, not from within the appointing state.
  - c. One senior professor from each of the fields for which the post is to be filled, however, the voting right for this member shall be restricted only to the post from his/ her own field of experience and professional expertise.
  - d. Secretary of the SIWEA, as a member-secretary, without voting rights.
- (4) The SASC shall complete the process of selection within four weeks and submit names of the selected candidates to the SIWEA.
- (5) The SIWEA shall complete the process of appointment of special advisors within four weeks of submission of names by the SASC.
- (6) The SASC shall prepare a detailed report on the process of selection of the special advisors and submit the report to SIWEA within four weeks of submission of the names of the selected candidates to the SIWEA.
- (7) The report of SASC shall be tabled before the SC and the state legislative houses by SIWEA within four weeks of its submission.

### **Term of office for the Special Advisors**

**38.** The term of office for the Special advisors shall be governed by the extant regulations prepared by the SIWEA and in accordance with the following -

- (1) Special Advisors shall have contracts for a period of no less than two years, and total contract period of no more than five years.
- (2) Any person appointed as a Special advisor to the SIWEA shall hold office for no more than two terms.

- (3) No Special Advisor to SIWEA shall hold office after he/ she has attained the age of sixty-five years.
- (4) A Special Advisor to SIWEA shall not take up any work or assignment, other than as a member of the SIWEA, with or without any benefit, from any party, which may have anything to do with the functioning of the institutions created or governed by this law, within the period of two years after relinquishing his/ her office in any manner<sup>47</sup>.

### **Consultants to SIWEA**

39. SIWEA may be assisted by consultants who shall be professional experts, providing expert advice and/ or services to SIWEA from outside the SIWEA on as-needed basis.
40. The short-term external consultants shall be hired for short-term assignments or projects, and selected according to the provisions contained herein.
41. The process for selection and appointment of consultants shall be in adherence to the regulations prepared by the SIWEA in this regard and in adherence to the international best practices and standards in this regard.
42. SIWEA shall prepare and publish on its web-site a report on the process of selection and appointment of consultants following the regulations prepared in this regard
43. SIWEA shall prepare and publish on its website the report on adherence and satisfactory performance by the consultant with respect to the terms of reference for every assignment, within the period same as the period of the assignment after the assignment, or within one month if the assignment is shorter than a month.
44. SIWEA shall issue a warning in the case of first instance of unsatisfactory performance by the consultant, and black-list the consultant, both the persons and the agency involved, for the second such instance. The issuance of warning or the black-listing shall be prominently displayed on the website of SIWEA with the names of the person and of the agency involved in the consultancy assignment.

### **Powers and Functions of SIWEA**

45. The powers and functions of SIWEA shall be as under:
  - (1) SIWEA shall for the purposes of making any inquiry or initiating any proceedings under this Act, have the powers as are vested in a civil court, under the Code of Civil Procedure, 1908 in respect of the following matters, namely: -

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<sup>47</sup> Work or assignment means employment in any capacity under, or agency of, a person engaged in trading, commercial, industrial or financial business in the Water Sector and also includes a director of a company or partner of a firm and also includes setting up practice either independently or as partner of a firm or as an adviser or a consultant.

- (a) summoning and enforcing the attendance of any person and examining him/her on oath;
  - (b) discovery and production of any document or other material object producible as evidence;
  - (c) receiving evidence on affidavits;
  - (d) requisitioning of any record;
  - (e) issuing commission for the examination of witnesses;
  - (f) reviewing its decisions, directions and orders;
  - (g) any other matter which may be prescribed.
- (2) SIWEA shall have the powers to pass such interim order in any proceeding, hearing or matter before the SIWEA, as SIWEA may consider appropriate.
- (3) SIWEA may authorize any person, as it deems fit, to represent the interest of the public in the proceedings before it.

**46.** The powers and functions of SIWEA shall, inter alia, include:

- (1) Preparing drafts of APPRCC, Regulations, CBRs, and Criteria, in accordance with the provisions of this Act and the existing Rules;
- (2) Modification of the drafts of the APPRCC, Regulations, CBRs, and Criteria, as per the comments and suggestions from the agencies involved in the processes provided in 0, 0, 0, and 0 respectively to this Act;
- (3) Providing comments on the drafts of the Rules and carrying out its responsibilities with regard to preparation of Rules as elaborated in 0 to this Act;
- (4) Approving the drafts of the CBRs and Criteria prepared as per the processes provided in 0 and 0 respectively to this Act, in adherence to the provisions of this Act and the existing Rules;
- (5) Discharging specific functions in various regulation areas as per the provisions of this Act;
- (6) Issuing orders, to the corresponding agencies, to enforce compliance with the guidelines, principles, rules, regulations, and criteria, to give effect to the letter and spirit of this Act to carry out all the decision-making in a transparent, accountable, and truly meaningful and effective participatory manner.
- (7) Penalizing agencies found defaulting with respect to the provisions of this Act.
- (8) Issuing orders and decisions on the petitions, and/ or applications, and/ or proposals from the governing agencies, stakeholders, and citizens, and TPPIIs in adherence with the relevant provisions in this Act, Rules, Regulations, and

Criteria, and in adherence to the procedures prescribed in sections 75 and 76 to this Act.

- (9) SIWEA shall seek advice from State Advisory Committee from time to time while carrying out its functions and responsibilities.
- (10) SIWEA shall seek assistance and support from the line department and other agencies of the state government while carrying out its duties and functions.

**47.** The decisions of SIWEA shall be made with consensus, to the extent possible; however, in the case of persistent and un-resolvable disagreement, decisions of SIWEA shall be made by simple majority. In the case of a tie, additional efforts shall be made to arrive at consensus or decision by simple majority.

#### **Powers of entry and seizure**

**48.** SIWEA or any officer, not below the rank of a Gazetted Officer specially authorised in this behalf by SIWEA, may enter any building or place where SIWEA has reason to believe that any document relating to the subject matter of the inquiry may be found, and may seize any such document or take extracts or copies there from subject to the provisions of section 100 of the Code of Criminal Procedure, 1973, insofar as it may be applicable.

#### **Delegation**

**49.** SIWEA may, by general or special order in writing, delegate to any Member, Secretary, officer of the SIWEA or any other person subject to such conditions, if any, as may be specified in the order, such of its powers and functions under this Act except the powers accorded by Sections 73, 74, 76, 79, and 83, as it may deem necessary.

#### **Proceedings before SIWEA**

**50.** All proceedings before SIWEA shall be deemed to be judicial proceedings within the meaning of sections 193 and 228 of the Indian Penal Code and SIWEA shall be deemed to be a civil court for the purposes of sections 345 and 346 of the Code of Criminal Procedure, 1973.

#### **Peer Review of the Orders of the SIWEA**

**51.** All orders of the SIWEA shall be reviewed by a panel of peer experts (PPE).

- (1) The Peer Review shall cover all aspects and factors of decisions and orders of SIWEA which do not constitute normative decisions.
- (2) The Peer Review shall cover the entire content of the decisions/ orders including facts and data presented and used, norms, standards, and criteria applied, analysis, argumentation, findings, conclusions, and recommendations.

- 52.** A Selection Committee shall be appointed by the SIWEA for selecting the PPE (SCPPE) to identify and select experts for the peer review of the decisions and orders of the SIWEA.
- 53.** The SCPPE shall consist of:
- (a) One senior professor of the rank of a Dean, Director, or Vice Chancellor of a reputed public academic institution as the chairperson,
  - (b) Two senior professors from reputed public academic institutions
  - (c) One of the members of the SCPPR shall be Professional Expert from each of the fields of Civil Engineering, Ecological Sciences, and Social Sciences respectively.
- 54.** The SCPPE shall select the PPE. The PPE shall consist of Two professional experts each in the areas of Civil Engineering, Environmental Science or Ecology, Social Sciences, Finance and Economics, and Auditing
- 55.** The remuneration to the members of the SCPPE and the PPE shall be as prescribed in the rules.
- 56.** The SCPPE shall prepare and submit to SIWEA and SC a report detailing the process adopted for selection of the PPE with details of the criteria applied for the selection of the PPE and its findings leading to recommendations.
- (a) The report shall be published on the website of the SIWEA within the period of four weeks after its submission.
- 57.** In the case of excessive number of decisions and orders by the SIWEA that is likely to affect the functioning of the PPE, the PPE shall meet and decide on the selection of orders to be reviewed.
- (a) The report on the process and the criteria adopted and the results of the selection of the orders for peer review, with their reasons shall be prepared and submitted to SIWEA and SC within the period of two weeks of the decision being made.
- 58.** The PPE shall review the orders and submit its comments and suggestions to the SIWEA. The SIWEA shall prepare an action-taken-report (ATR) and submit the comments from the PPE along with the ATR to the SC. The SC shall discuss and comment on the ATR and the comments from the PPE. The proceedings of the SC discussing the ATR and the comments, along with the comments and the ATR shall be tabled before the State Legislation.

#### **Annual Reports of SIWEA**

- 59.** The SIWEA shall, within three months from the end of the financial year, prepare its Annual Report.

**60.** The annual report shall, inter-alia, contain:

- (1) A list of the proposals or petitions received, reviewed and orders/ decisions issued by SIWEA;
- (2) A list of all petitions, submissions, and other applications and presentations before the SIWEA;
- (3) Proceedings and/ or minutes of all meetings conducted by the SIWEA

**61.** The Annual Report of the SIWEA shall be published on the websites of the SIWEA, the SC, and the State Water Resources Department, within the four months of the end of the financial year.

### **Establishment of Fund by State Government**

**62.** The state government shall constitute a fund to be called the SIWEA Fund and there shall be credited thereto-

- (a) grants and loans made to the SIWEA by the State Government under section 64;
- (b) all fees received by the SIWEA under section 66;
- (c) all sums received by the SIWEA from such other sources as may be decided upon by the state government.

**63.** The Fund shall be applied for meeting –

- (a) the salary, allowances and other remuneration of Chairperson, Members, Secretary, officers, and other employees of the SIWEA;
- (b) the expenses incurred by SIWEA in discharge of its functions under this Act;
- (c) the expenses on giving effect to the objects of and for purposes authorised by this Act;
- (d) the expenses incurred for operations of the PIPO, the GRS, the TAP Ombudsman, the Special advisors, and consultants to SIWEA

### **Loans and grants from the state government**

**64.** (1) The State Government may after due appropriation made by the State Legislature by law in this behalf, pay to SIWEA by way of grants or loans such sums of money as the State Government may think fit for being utilized for the purposes of this Act:

*Provided* that expenditure in respect of salaries and allowances of the Chairperson and other members shall be charged on the Consolidated Fund of the State.

- (2) SIWEA may spend such sums as it thinks fit for performing the functions under this Act, and such sums shall be treated as expenditure payable out of the grants or loans referred to in sub-section (1) and may also charge fee towards expenditure of SIWEA, as per section 66.

- (3) The government may choose to allocate grants to the SIWEA amounting to the regulatory fee under section 66.

**Budgeted requirement of the SIWEA may be satisfied through fees to the SIWEA**

- 65.** The SIWEA shall every year prepare its budgeted fund requirement in consultation with the SC, providing for discharge of its functions and duties as prescribed in this Act, for operations of the PIPO, TAP Ombudsman, and GRS, for preparation of accounts and audit reports, and for hiring of consultants or special advisors.
- 66.** A regulatory fee amounting to the SIWEA's budgeted fund requirement may be recovered from all water provisioning utilities across the state, considering the following:
- (a) The utilities may choose to recover the regulatory fee from the water users across all user categories.
  - (b) The regulatory fee shall be allocated to water user categories in proportion to the tariff applicable to each water user.
  - (c) Regulatory fee shall be treated as an integral part of the O&M costs of operations of the state's water sector.

**Accounts and audit of SIWEA**

- 67.** The SIWEA shall annually publish and host on its website reports including audited accounts as part of its Annual Report.

**CHAPTER VI – RULES, REGULATIONS, AND CRITERIA**

**Preparation of APPRCC, Rules, Regulations, Conduct of Business Regulations, and Criteria**

- 68.** The SC shall comment on the drafts of the Action Plan for Preparation of Regulations, Conduct of Business Regulations (CBRs), and Criteria (APPRCC), prepared by SIWEA, in adherence to the relevant schedules to this Act.
- 69.** The processes for preparation of APPRCC, Rules, Regulations, Conduct of Business Regulations, and Criteria shall be carried out simultaneously as may be required to adhere to the time line prescribed under various relevant provisions and the schedules of this Act.
- 70.** The SC, with assistance from the SIWEA in preparing and revising the drafts of APPRCC, shall prepare and publish the APPRCC, for all the 'Regulation Areas' covered by the Act, in accordance with the processes and procedures elaborated in 0 to this Act, in such a manner that the process of preparation of the Regulations, CBRs, and Criteria shall be completed within a period of two years after notification of this Act.
- (1) The APPRCC shall be binding for the processes for preparation of Regulations, CBRs, and Criteria.

- (2) The timeline for individual steps in the preparation of Rules, Regulations, CBRs, and Criteria shall be in accordance with the provisions of 0, 0, 0, and 0 respectively to this Act.
- (3) The following steps and components shall be adhered to, in preparation of the APPRCC:
  - (a) The APPRCC shall provide the order of priority and detailed timetable, elaborating all the steps involved and time frame for the processes of preparation of Regulations, CBRs, and Criteria, for all the Regulation Areas covered by this Act.
  - (b) The SC shall use the drafts prepared by the SIWEA for its deliberations.
  - (c) The SIWEA shall prepare drafts of APPRCC in pre-determined time period as prescribed in 0 of this Act.
  - (d) The SIWEA shall conduct public deliberations for APPRCC as per the provisions of this Act.
  - (e) The SC and SIWEA shall follow the provisions of the 0 to this Act.

**71.** The State Government, through Water Resources Department and in consultation with SC and SIWEA, shall prepare and notify Rules necessary for efficient, effective, transparent, participatory, and accountable implementation of this Act.

- (1) The rules shall be prepared through a transparent, accountable, and participatory process and procedures, ensuring:
  - a. Wide publication of the draft Rules on the websites and in printed copies.
  - b. Providing adequate time, not less than three weeks for public to send their comments and suggestions.
  - c. Adhering to the steps included in 0 to this Act.
- (2) The Rules shall, inter alia include provisions for
  - a. The appointment of the Secretary to the SIWEA;
  - b. The location of the head office of the SC and the SIWEA;
  - c. The salary, allowances and other terms and conditions of service of the chairperson and members of the SIWEA, provided that the salary, allowances and other terms and conditions of service of the Members, shall not be varied to their disadvantage after appointment.
  - d. Approval to specify the numbers, nature, and categories of other officers and employees of the SIWEA and the SC.
  - e. Accounts and audit of the SC and the SIWEA.

- f. Allowances and fees payable to Members, Consultants, and other employees of the SC and the SIWEA for attending the meetings of SC and/ or the SIWEA.
  - g. Other terms and conditions of service of the chairperson and members of SC and SIWEA.
- 72.** The SC, with assistance from SIWEA in preparing and revising the drafts of Regulations, shall prepare Regulations, as required by provisions of this Act and as per the time frame prescribed by the APPRCC, following the processes specified in relevant schedules to this Act including 0.
- 73.** The SIWEA, in consultation with SC, WRD, and the public, shall prepare the Conduct of Business Regulations (CBRs), as required by provisions of this Act and the existing Rules, pertaining to various elements of ‘Regulation Areas’ covered by this Act as elaborated in 0, and conducting the process as per the provisions of 0.
- 74.** The SIWEA, in consultation with the SC, the WRD and the public, shall prepare the Criteria, as required by provisions of this Act and the existing Rules, Regulations, and CBRs, pertaining to various elements related to ‘Regulation Areas’ covered by this Act and elaborated in 0, and conducting the process as per the provisions of 0.

## **CHAPTER VII – MAKING AND PROMULGATION OF DECISIONS BASED ON THE RULES, REGULATIONS, CBRS, AND CRITERIA**

- 75.** The making and promulgation of decisions by the SIWEA, WRD, or any executive or implementing agency related to the Regulation Areas shall be carried out, within the framework of the Rules, Regulations, CBRs, and Criteria, and according to the Procedure of Public Deliberation (PPD), elaborated in 0:
- a. Environmental Sustainability
  - b. Allocation of Financial and other Resources
  - c. Selection of members of the SC, the SIWEA and other agencies established under this Act
  - d. Processes And Procedures In Functioning of The Water Sector
  - e. Grievance redressal
  - f. Disaster management
  - g. Appointment of Consultants to SIWEA
  - h. Other Regulation areas adopted by the state government
- 76.** Finalization and promulgation of any decisions by the SIWEA, WRD, or any executive or implementing agency relating to the Regulation Areas shall be carried out, within the framework of the Rules, Regulations, CBRs, and Criteria, and according to the Procedure of Comprehensive Public Deliberation (PCPD), elaborated in 0:

- a. Integrated State Water Plan
- b. Water Access, Extraction, and Use
- c. Execution of projects and programs
- d. Water service provisioning
- e. Private Sector Participation
- f. Ensuring Compliance to the Provisions of this Act

## **CHAPTER VIII – TRANSPARENCY, ACCOUNTABILITY, AND PUBLIC PARTICIPATION**

- 77.** (1) All proceedings, minutes, and operations of the agencies established and governed by this Act, and the documents submitted to and published by these agencies, shall be open to public scrutiny.
- (2) Provided that documents or sections of documents may be kept confidential only if they affect national security or law and order in the country, and only by approval and written explanation, available to the public with the approval by the agency granting the approval for such confidentiality.

## **CHAPTER IX – STATE WIDE GRIEVANCE REDRESSAL SYSTEM**

- 78.** A state-wide Grievance Redressal System (GRS) to resolve the service-grievances of water users shall be established by SIWEA within the period of nine months of the establishment of the SIWEA, in adherence to the procedural steps as specified hereunder.
- (1) The Regulations for establishment and operationalization of the GRS, as required by this Act, shall be prepared following the processes and procedures specified in 0 to this Act, and by adapting mutatis mutandis the processes and procedures of the Consumer Courts.
  - (2) The SIWEA shall, for establishment of the GRS, prepare CBRs as required by this Act, following the processes and procedures specified in 0 to this Act.
  - (3) The CBRs for Grievance Redressal shall, inter alia, include CBRs for the processes and procedures to be carried out by the various agencies in the GRS and the GRS as a whole, with definite responsibilities allocated to various component agencies of the GRS.
  - (4) The GRS shall not replace the existing grievance redressal system of the WRD or VDC as required by the other relevant statutes.
  - (5) GRS shall work as a system parallel to the existing grievance redressal systems of the WRD or VDC for redressal of service-grievances.
- 79.** The SIWEA shall deal with infringement or non-compliance by the constituent bodies of GRS as per the Regulations and CBRs developed by SIWEA in this regard.

**80.** The SIWEA shall appoint one or more full-time Grievance Redressal Officers (GRO) for each Basin in the state.

- (1) The responsibilities of the GRO shall include but not be limited to:
  - a. Attending and facilitating weekly meetings of the Sub Basin Grievance Redressal Committees (SBGRC)
  - b. Being available to disadvantaged stakeholders for support, assistance, and facilitation of redressal of their service grievances.
- (2) The official in-charge of sub-basin level office of VDC/ WRD shall make available one fixed and adequate place, shall extend all the necessary resources, communication and other facilities, and amenities, without any restraint, to the GRO for the discharge of functions of the GRO.

**81.** The Sub-Basin-level Grievance Redressal Committee (SBGRC) shall be established to facilitate the process of redressal of Grievances at the Sub-basin level.

- (1) The SBGRC shall be composed of:
  - a. One officer of the WRD/ RBA/ VDC, not below the rank of section engineer,
  - b. One representative of major categories of water users in the Sub Basin, and
  - c. GRO of the Basin designated to attend the meetings of the specific SBGRC for the period of at least one continuous year
- (2) The SBGRC shall meet on a designated day of each week, which shall be fixed and changed only after adequate advance intimation and publicity.
- (3) The SBGRC shall not fail to meet for two consecutive weeks.
- (4) The GRO on the SBGRC shall prepare and send to the BIWEA, within a period of three weeks after each meeting at the end of every month, a brief monthly report of proceedings of the sitting of the SBGRC, elaborating deliberations and decisions on each complaint, which shall be signed by the other members of the SBGRC in the following meeting of the SBGRC, and the reports shall be uploaded to the websites of BIWEA and SIWEA within two weeks of their submission.

**82.** There shall be at least one, or more Basin Level Grievance Redressal Cells (BGRCs), according to the need for Grievance Redressal in the Basin.

- (1) The BGRCs shall be approachable either through the SBGRC or directly as such.
- (2) Each of the BGRCs shall be composed of:
  - (a) one officer of the WRD, not below the rank of Executive Engineer as non-voting, Member-Secretary,

- (b) one officer of the WRD, not below the rank of Superintendent Engineer,
  - (c) one representative of all user categories extant in the Basin, and
  - (d) one retired District Court Judge as the Chairperson of the BGRC.
- (3) The BGRCs shall function as an arbitrating and an adjudicatory agency, in accordance with procedure prescribed by this Act.
- (4) The Member-Secretary of the BGRC shall prepare a quarterly report within a month of the closure of the quarter and submit it to BIWEA, which shall be available on the websites of BIWEA and SIWEA within two weeks of its submission.
- 83.** At least one, or more if necessary, State-Level Grievance Redressal Forums (SGFs) shall be established as the appellate authority to the BGRCs.
- (1) The SGF shall be approachable only by appealing against the decisions of the BGRCs.
- (2) The SGF shall be composed of:
- (a) the retired judge of the high court as its Chairperson,
  - (b) One retired or serving officer of the WRD on deputation not below the rank of chief engineer,
  - (c) One state-level representative representing water users of major water user categories
- (3) The SIWEA shall be the apex appellate authority for the SGFs.
- (4) The Member-Secretary of the SGF shall prepare a quarterly report within a month of the closure of the quarter and submit it to BIWEA, which shall be available on the websites of BIWEA and SIWEA within two weeks of its submission.

## **CHAPTER X – PUBLIC INTEREST PROMOTION OFFICE (PIPO)**

- 84.** A PIPO shall be established by the SIWEA, within a period of four months after establishment of the SIWEA
- 85.** PIPO shall be headed by the Committee of Eminent Persons (CEP) appointed by the state government, in consultation with the SC and SIWEA, in adherence of the rules, regulations, and CBRs prepared in this regard under this act
- (1) The CEP shall be composed of the following members:
- (a) Retired High-Court Judge as the Chairperson,
  - (b) Retired Secretary of the state government,
  - (c) Eminent state-level functionary or senior member of civil society

- (2) The members of the CEP shall have eminent stature, demonstrated interest, and understanding of the issues in the water sector and public participation
  - (3) The members of the CEP shall not have any relationship with any of the agency in the water sector that may create the conflict of interest with the office of PIPO or may affect discharging of their duty as members of the CEP of PIPO.
  - (4) The CEP shall preside over the functioning of the PIPO and shall be involved in all major policy and other non-executive decisions of PIPO.
- 86.** The PIPO shall be established and governed by the regulations and CBRs in this regard, while adhering to the following conditions:
- (1) PIPO shall have a separate Secretariat within SIWEA, headed by the Director of the PIPO.
  - (2) The regular and routine operation and working of PIPO shall be handled by the Director, who shall not be a serving government official or an official on short term deputation.
  - (3) The term of office of the Director of PIPO shall be five years.
  - (4) The Director of PIPO shall have qualifications as follows:
    - (a) A master's degree in any relevant field, such as engineering, economics, ecology, environmental sciences, and social work,
    - (b) Five years of professional experience in any of the relevant field, and
    - (c) Demonstrated interest in consumer protection or protection and promotion of public interest.
  - (5) The remuneration to the Director of PIPO shall be at the level of not below the director of a state government department.
  - (6) The Director of PIPO shall be assisted by a three-member team of experts, having professional qualifications and experience of at least three years in the legal, technical, and economic aspects of the water sector.
- 87.** (1) The primary responsibility of the PIPO shall be to protect and promote Public Interest by
- (a) taking necessary actions and carrying out activities on its own or at the request of stakeholders from disadvantaged sections, an organization representing these stakeholders, or TPPIIs.
  - (b) facilitating, supporting, and assisting actions and activities of stakeholders or TPPIIs.
  - (c) Taking actions and steps necessary to ensure and enhance the preparedness of stakeholders.

- (2) The PIPO shall proactively intervene in regulatory processes and procedures in order to protect and promote Public Interest in all regulatory affairs, including the functioning of the SC, in the following manner -
  - (a) Conduct research and analysis;
  - (b) Represent public interest in the processes and procedures for preparation or revision of rules, regulations, CBRs, and criteria;
  - (c) Intervene in regulatory proceedings in order to protect and promote Public Interest before the SC and the SIWEA pertaining to different regulation areas at the request of disadvantaged stakeholders or TPPIIs, or in a suo-moto manner,
  - (d) Take *suo moto* cognizance of adverse implications of regulatory decisions or actions to Public Interest and undertaking regulatory interventions to protect Public Interest.
- (3) The PIPO shall facilitate participation of stakeholders, by
  - (a) Conducting awareness programs and preparing material for these,
  - (b) Conducting training sessions and workshops for disadvantaged stakeholders, organizations representing them, or TPPIIs.
- (4) The PIPO shall develop a mechanism to provide financial, human, and analytical support to organizations of stakeholders and TPPIIs.
- (5) At least one percent (1%) of the SIWEA's budget shall be allocated to the PIPO.
- (6) The head of the PIPO Secretariat shall prepare a quarterly report of the activities of PIPO which shall be submitted to the Secretariat of SIWEA and shall be available on the SIWEA's website within three weeks of closure of each quarter.

**Panel of Accredited Stakeholder Representatives (ASRs)**

- 88.** The SIWEA shall establish a panel of Accredited Stakeholder Representatives (ASRs), representing different stakeholders.
- (1) The panel of ASRs shall consist of one or more representatives of farmers, industries, PRIs, urban local bodies, and other major stakeholders of the state water sector.
  - (2) The panel of ASRs shall include representatives of the TPPIIs that are interested in protecting Public Interest in the affairs of the state's water sector.
  - (3) The ASRs shall be automatically party to all procedures and processes before the SIWEA.
  - (4) The ASRs shall be informed of all decisions and actions of all governing agencies in the water sector of the state.

- (5) The payment to the ASRs for the purpose of discharging their responsibility under this Act, and for the purpose of reimbursing their expenses for travelling and attending meetings shall be as prescribed in the conduct of business regulations.

### **Transparency, Accountability, Participation Ombudsman (TAPO)**

**89.** The SIWEA shall appoint a retired High Court Judge, as the TAP Ombudsman.

- (1) The TAP Ombudsman shall hear all grievances related to adherence to the provisions of this Act, as well as provisions in the rules, regulations, CBRs, and Criteria which relate to Transparency, Accountability, and Public Participation.

### **Rules, Regulations, and CBRs for operations of PIPO, ASR, GRS, and TAPO**

**90.** The SIWEA shall prepare Regulations and CBRs, in adherence to the provisions of this Act, and in adherence to the processes and procedures prescribed by this Act for preparation of Regulations and CBRs, including Schedules, for establishment and conduct of operations of the PIPO, ASRP, GRS, and the TAP Ombudsman.

## **CHAPTER XI – INSTITUTIONAL TRANSITION**

### **Nature of Transition**

**91.** (1) In order to adhere to the Principle of Subsidiarity and to avoid the danger of sub-optimality in governance due to premature or excessive delegation, a process of gradual institutional transition shall be followed.

(2) Provided that no decisions made in the First and/ or the Second Phase of institutional transition shall be irrevocable, insofar as such decisions affected, affect, or may affect in the future, principles of equity, justice, and subsidiarity, ecological and social sustainability, and economic optimality<sup>48</sup>.

**92.** The SWC and SIWEA shall lead the process of institutional transition according to Schedule 1 of the Act and as outlined below -

- (1) There shall be three phases in this transition, viz. First Phase, Second Phase, and Third Phase.

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<sup>48</sup> There is a danger that certain decisions could be taken by the SC in the first Phase in an irreversible manner, which will effectively present a *fait accompli* to RBCs and SBWCs in the subsequent Phases, encroaching upon their rights and autonomy. This is especially true in the case of allocation of entitlements and decisions on investments that would be made in the first Phase. Special care needs to be taken to insert provisions in the relevant Regulations so that such irreversible decisions will be prevented (for example, entitlements, which are usufruct rights, should be open to review after a certain period, say 3 to 5 years. Similarly, the decision on investments and the returns on investments should be preferably front-loaded, and should not place heavy burden in the latter Phases.

While making tradeoffs compromising ecological considerations, precautionary principles should be strictly adhered to, obviating the choices that pose known or unknown threats in the future.

- (2) There shall be processes for ensuring preparedness for transition to the next phase during the First and the Second Phases; these processes for ensuring preparedness shall be followed, monitored and assessed as per the provisions of this Act and the relevant Schedules.
- (3) The SC, based on the reports of assessment of preparedness, shall approve transition to the next Phase, and request to the state government to notify the transition to the next Phase.
- (4) The state government, based on the approval and request from the SC, shall notify the transition to the next phase.
- (5) The SC shall be ultimately responsible for ensuring that the institutional transition takes place in the predetermined manner, and within the time frame set in the Action Plan for Transition (APT) prepared in adherence to the relevant regulations.
- (6) The SC shall be ultimately responsible during the institutional transition for ensuring compliance by other agencies set up and / or governed under this Act to the normative frameworks provided in the Act, Rules, Regulations, and Criteria.
- (7) The SIWEA shall be responsible for preparing drafts of the plans and reports related to the institutional transition, and for monitoring of the processes for the institutional transition.
- (8) The state government and its departments and agencies shall provide full cooperation and assistance to SC and SIWEA for the smooth institutional transition elaborated in this Act.
- (9) There shall be regular annual review of the process of Institutional Transition, as envisaged by this Act.

### **Establishment and Operationalization of Second Phase of Water Regulatory System**

#### **Commencement of Second Phase**

**93.** The Second Phase of Institutional Transition shall be initiated in adherence to the relevant provisions of 0, and in the following manner -

- (1) The Second Phase shall commence after the state government notifies commencement of the Second Phase.
- (2) The Second Phase shall continue until the state government notifies commencement of the Third Phase.
- (3) In the Second Phase, the River Basin Council, Basin Independent Water Expert Authority, and River Basin Agency shall be established for each river basin in the state.

### **River Basin Council (RBC)**

**94.** The RBC shall be established for each of the River Basins in the state at the beginning of the Transition to the Second Phase, in accordance with the relevant provisions of 0.

**95.** The RBC shall comprise –

- (1) members of the state legislative houses from the basin, provided at least 50% of the voters from his/ her constituency reside in the basin, but the total number of these members not exceeding 25% of the total members of the RBC.
- (2) members of the ZP from the basin, provided at least 50% of the voters from his/ her constituency reside in the basin, but the total number of these members not exceeding 35% of the members of the RBC shall comprise such eligible ZP members
- (3) members of the Taluka Panchayat from the basin, provided at least 50% of the voters from his/ her constituency reside in the basin, but the total number of these members not exceeding 25% of the total members of the RBC shall comprise such eligible TP members
- (4) members of the Gram Panchayat from the basin, provided at least 50% of the voters from his/ her constituency reside in the basin, but the total number of these members not exceeding 10% of the members of the RBC shall comprise such eligible members of the GP)
- (5) Representatives of stakeholder groups, viz., farmers, industries, and Civil Society Organizations, in equal proportion for each stakeholder group, and together the representatives from all stakeholder groups shall form between 10% and 20% of the total strength of the RBC.
- (6) Proportional representation for SC, ST, women and other sections of the society as provided for in the 73rd and 74th Amendment to the Constitution of India. .
- (7) There shall be proportional representation in the RBC to all sub-basins in the River Basin.

**96.** The total number of members of the RBC for each river basin of the state shall be decided by the SC, in consultation with the state government and SIWEA and adhering to the Regulations for RBC, approved by the state legislative houses, as per the provisions of relevant schedules, including 0, of this Act and before the commencement of the Second Phase.

- (1) The powers, functions, and jurisdiction as well as the processes and procedures for the operationalization of RBCs shall be as articulated in Regulations for RBCs prepared by the SC in consultation with the state government and the SIWEA before commencement of Second Phase.
- (2) The members of RBC from each sub-basin shall form the Sub-basin-level Committees of RBC (SCRBCs). These committees shall assist the RBC by providing specific inputs on the issues related to the particular sub-basins.

### **River Basin Agencies (RBAs)**

**97.** The River Basin Agencies (RBAs) shall be executive or implementing agencies in each river basin of the state which may emerge from transformation of the existing Valley Development Corporations (VDCs) in the state, or from the basin-level offices of the state WRD, until the RBAs are formed by the state governments the VDCs or the basin-level offices of WRD shall act as the executive or implementing agencies in place of RBAs.

- (1) The structure, powers, functions and jurisdiction of the RBAs as well as processes and procedures for their operationalization shall be articulated in Regulations for RBAs prepared by the SC in consultation with the state government, approved by the state legislative houses, and as per the processes stipulated in the 0 of this Act and before the commencement of the Second Phase.
- (2) The nature and extent of independence of the RBAs from WRD shall be articulated in the Regulations for the RBAs<sup>49</sup>.

**98.** There shall be a Sub-basin level office of RBA (SRBA).

### **Establishment of Basin (Level) Independent Water Expert Authorities (BIWEAs)**

**99.** There shall be a BIWEA for each of the river basins in the state.

- (1) The BIWEA shall be a three- or five-member body, depending on the size and/ or requirement of operations of the water sector, in the concerned basin.
- (2) The provisions of this Act relating to composition, powers, functions, jurisdiction, processes and procedures followed for operationalization and operations of the SIWEA shall be applicable to the BIWEA mutatis mutandis, and elaborated in the Regulations for the BIWEA.
- (3) The Regulations for the BIWEA shall be drafted by the SIWEA, deliberated on, made changes if necessary to, and approved by the SC, and passed by the state legislature before the commencement of the next Phase of Institutional Transition.
- (4) The BIWEA shall work with the RBAs and RBCs in the basin to govern primarily the basin or lower level water issues while the SIWEA, SC, and WRD shall work together primarily to govern the state level water sector issues.
- (5) The Regulations for RBCs, RBAs, and BIWEA shall delineate and distribute responsibilities in a clean and internally consistent manner, among the RBCs, RBAs, and BIWEA acknowledging and integrating the principles of balancing authority with efficiency, accountability, and competence.

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<sup>49</sup> The structure and functioning of RBAs shall be based on the report of the Planning Commission's Sub Group on Water Governance.

- (6) The decisions by the BIWEA on basin level issues and matters shall be final but can be challenged in the court of law or in the SIWEA on legal grounds.
  - (7) The expenditure of the BIWEA shall be supported from the SIWEA Fund, in adherence to the provisions in Regulations for the BIWEA prepared by the SIWEA as per the relevant processes and procedures for preparation of Regulations as prescribed in this Act.
  - (8) The state government, WRD, VDCs, RBCs shall extend all cooperation to the BIWEA necessary for its efficient and effective functioning.
- 100.** The powers and functions of BIWEA shall be as prescribed in the Regulations for BIWEA, prepared by SIWEA in adherence to provisions of this Act.
- 101.** The processes for selection, term of office, and removal of members of SIWEA, preparation of annual reports, accounts, and audits of SIWEA shall be applicable mutatis mutandis to BIWEA, and shall be prescribed by the Regulations for BIWEA to that effect.

#### **Regulations for RBCs, RBAs, and BIWEA to follow Principle of Balanced Authority**

- 102.** The Regulations for RBCs, RBAs, and BIWEA shall delineate and distribute responsibilities in a clean and internally consistent manner, among the RBCs, RBAs, and BIWEA acknowledging and integrating the principle of Balancing Authority with Efficiency, Accountability, and Competence.

#### **Establishment and Operationalization of Third Phase of Water Regulatory System**

##### **Commencement of Third Phase**

- 103.** The Third Phase of Institutional Transition shall be initiated in adherence to the relevant provisions of 0, and in the following manner:
- (1) The Third Phase shall commence after the state government notifies commencement of the Third Phase, after the due processes in adherence to the provisions of this Act have been carried out.
  - (2) In the Third Phase, the Sub-Basin Water Councils, Sub-Basin Unit of BIWEA, and SRBAs shall be established.

##### **Establishment of Sub-basin Level Unit of the BIWEA (SBUBIWEA)**

- 104.** There may be a sub-basin level unit of the BIWEA, for each of the sub-basins in the state.
- (1) The SBUBIWEA shall comprise:
    - (a) A civil/ irrigation/ environmental engineer with at least three years of experience, or retired engineer from the WRD

(b) A geological or hydro-geological expert with a master's level degree in geology or hydrogeology with at least three years of professional experience, if groundwater is included in the purview of this Act.

- 105.** The terms and conditions of appointment, termination, continuation, and salaries and benefits of the SBUBIWEA members shall be decided by the SIWEA in consultation with SC and the state government in the form of regulations for the SBUBIWEA.
- 106.** The powers and functions of SBUBIWEA shall be as prescribed in the Regulations for SBUBIWEA, prepared by SIWEA in adherence to provisions of this Act.
- 107.** The expenditure of the SBUBIWEA shall be supported by the SIWEA Fund, in adherence to the provisions in Regulations for the BIWEA prepared by the SIWEA as per the relevant processes and procedures for preparation of Regulations as prescribed in this Act.

#### **Establishment of Sub-basin Level Water Council (SBWC)**

**108.** There shall be a Sub-Basin Level Water Council (SBWC) in each of the sub basins of the state, established following the relevant provisions of 0 of this Act.

(1) The SBWC shall consist of:

- (a) members of the state legislature from the sub-basin, provided at least 50% of the voters from his/ her constituency reside in the sub-basin, the total number of such members not exceeding 20% of the total members of the SBWC
- (b) members of the ZP from the sub-basin, provided at least 50% of the voters from his/ her constituency reside in the sub-basin, but not more than 30% of the members of the SBWC shall comprise such eligible ZP members
- (c) members of the Taluka Panchayat from the sub-basin, provided at least 50% of the voters from his/ her constituency reside in the sub-basin, but not more than 20% of the total members of the SBWC shall comprise such eligible TP members
- (d) members of the Gram Panchayat from the sub-basin, provided at least 50% of the voters from his/ her constituency reside in the sub-basin, but not more than 20% of the members of the SBWC shall comprise such eligible members of the GP
- (e) Representatives of local water user categories, viz. farmers, industries, as well as Civil Society Organizations, in equal proportion for all these categories, and together the representatives from all these categories shall form between 10% and 20% of the total strength of the SBWC.)
- (f) The total number of members of the SBWC shall be decided by the RBC in consultation with the state government, and articulated in the Regulations for SBWC.

- (g) Reservation for SC, ST, women, and other sections of the society shall be on the same lines as those for the state legislative houses and other reservations applicable in the state for women and disadvantaged sections of the society.

#### **Sub-basin office of RBAs (SRBAs)**

- 109.** The SRBAs, in each of the sub-basins in the Third Phase, shall be subsidiary to the RBA or its office at the sub-basin level.

#### **Regulations for SBWCs, SRBAs, and SBUBIWEA to follow Principle of Balanced Authority**

- 110.** The Regulations for SBWCs, SRBAs, and SBUBIWEA shall delineate and distribute responsibilities in a clean and internally consistent manner, among the SBWCs, SRBAs, and SBUBIWEA acknowledging and integrating the principle of Balancing Authority with Efficiency, Accountability, and Competence.

### **CHAPTER XII – MISCELLANEOUS**

#### **Other Issues**

- 111.** All provisions of the extant Disaster Management Acts with relation to water-related disasters shall be applicable so far as they are consistent with the guidelines, principles, rules, regulations, and criteria prescribed to give effect to the provisions of this Act.

#### **Cognizance of other relevant Laws and Statutes**

- 112.** The provisions of this Act shall be interpreted, operationalized, and implemented in the view of the following -
- (1) The provisions of this Act and the schedules to this Act shall be interpreted, operationalized, and implemented within the broader framework prescribed by the National Water Framework Law, if any.
  - (2) The state WRS shall support, strengthen, and complement the implementation of the Protection, Conservation, Management and Regulation of Groundwater Act.
  - (3) The state WRS shall support, strengthen, and complement the implementation of the Disaster Management and Participatory Irrigation Management Acts applicable in the state.

#### **Responsibility of provision of water always with the government**

- 113.** Notwithstanding anything contained in any Act, Policy, Government Resolutions, or Standing Orders, or any other resolution made by any governing agency in any jurisdiction within the State, the ultimate responsibility of ensuring secured and sustainable access to water for sustenance of life of human beings and flora and fauna, and of life-supporting livelihood to all members of public, especially the marginalized, and/ or under-represented, and/ or poor, and/ or vulnerable sections of the society, and/

or those sections of the society that may become vulnerable under varying circumstances, shall always be vested with the Government; such responsibility being discharged by the Government in adherence to the provisions of this Act.

**Power of the state government to issue directives**

**114.** In order to protect and promote public interest, the state government may issue directives to the SC, RBC, or SBWC, with regard to 'normative decisions' involved in forming or revising Regulations, through a decision of the state cabinet of ministers, not inconsistent with this Act, provided:

- (1) Such directives are accompanied by written rationale provided simultaneously with the directive.
- (2) That such directives do not affect the techno-economic efficiency, social equity and justice, and environmental sustainability of the water provisioning system.
- (3) That the financial and economic implications of such directives shall be borne by the state government, and compensated to the relevant agencies within four weeks of issue of such directives.

**115.** In order to protect and promote public interest, the state government may issue directives to the SIWEA or BIWEA with regard to 'normative' or other decisions involved in forming or revising CBRs or Criteria, through a decision of the state cabinet of ministers provided:

- (1) Such directives are accompanied by a written rationale provided simultaneously with the directive.
- (2) That such directives do not affect the techno-economic efficiency, social equity and justice, and environmental sustainability of the water provisioning system.
- (3) That the financial and economic implications of such directives shall be borne by the state government, and compensated to the relevant agencies within four weeks of issue of such directives.

**Schedule 1**

**DETAILS OF INSTITUTIONAL TRANSITION**

**The Process of Transition to the Second Phase**

- 1) The process of institutional transition from the First/ Immediate Phase to the Second/ Second phase (referred to as Phase Transition in this section) shall be undertaken in the following manner:

- i. Finalization of the details and approval of the Action Plan for Transition to Phase 2 (AFTP2) of Institutional Transition by following the process elaborated in this Act.
- ii. The work on preparation of the APT for the Second Phase shall start within one year of notification of this Act.
- iii. The finalization and approval of the AFTP2 shall be completed within twenty-four months after the notification of this Act.
- iv. The process of making and implementing the decision on Phase Transition shall include the following steps:
  - a. A discussion on the recommendation for effecting Phase Transition within the SC.
  - b. Ratification and approval of the recommendation by SC by a two third majority.
  - c. A submission of the approval from the SC for the Phase Transition to the state government with a request to notify the phase transition.
  - d. Tabling of PVR, and the summary report on the ratification and approval by SC before the state legislative houses.
- v. The State Government, based on the PVR and the approval by SC, shall notify the Transition to Second Phase, thus bringing into effect the relevant provisions of this Act for the Second phase.

### **Second phase**

- 2) Changes in the institutional structures and regulatory processes in the Second Phase shall be conducted in the following manner:
  - i. The functions of SC shall be transferred or devolved, to the extent feasible, to the River Basin Councils (RBCs), which shall be the agency, with a mandate to make 'normative' decisions.
  - ii. The functions to be devolved to the RBC are to be decided and detailed out through a separate set of regulations, viz., 'Regulations for Detailing the Institutional Transition to the Second Phase', which shall be prepared after a detailed process of deliberations including public hearings.
  - iii. The Regulations for the Second phase shall be in adherence to the elements prescribed in this Act.
  - iv. The scope and functions of SIWEA shall also be decentralized to the Basin level agency. The details of this transition shall also be provided in viz., 'Regulations for Detailing the Institutional Transition to the Second Phase'.

- v. Executive functions shall also be decentralized to the basin level, by creating River Basin Agencies (RBAs). The offices of the WRD at the Basin level and below shall be organized along the basin boundaries and RBAs shall be created as the semi-autonomous executive agencies under the state-level WRD.
- vi. The details of the decentralization of functions to RBAs and the autonomy of RBAs shall be provided in 'Regulations for Detailing the Institutional Transition to the Second Phase'. (The law shall provide some imperatives in this regard. In addition, the relevant recommendations from the report of the Working Group of the Planning Commission on Water Governance shall also be considered.)
- vii. The RBA shall have units or offices at the level Sub-Basin or below.

### **The Process of Transition to the Third Phase**

- 3) The process of institutional transition from the Second to the Third Phase shall be undertaken in the following manner:
  - i. Finalization of the details and approval of the Action Plan for Transition to Third Phase (AFTP3) of Institutional Transition following the process elaborated in this Act.
  - ii. The work on preparation of the AFTP3 shall start at the end of the first year of implementation of the Second phase.
  - iii. The finalization and approval of the APT shall be completed within twenty-four months after commencement of the Second phase.
  - iv. The process of making and implementing the decision on Phase Transition, shall include the following steps:
    - a. A discussion on the recommendation for effecting Phase Transition within SC.
    - b. Ratification and approval of the recommendation by SC by a two-third majority.
    - c. A submission of the approval to the state government with a request to notify the Phase Transition.
    - d. Tabling of the PVR, and of the summary report on the SC ratification, before the state legislature.
  - v. The State Government shall notify the Phase Transition, thus bringing into effect the relevant provisions of this Act for the Third phase.

### **Third Phase**

- 4) Devolution of functions, responsibilities, and powers of various agencies to the lower levels of governance in the Third phase shall be conducted in the following manner:

- i. The functions of RBC shall be transferred or devolved, to the extent feasible, to Sub-Basin Water Councils (SBWCs), which shall be a type of agency, which has 'political' mandate of making 'normative' decisions.
  - ii. The functions to be devolved to the SBWC are to be decided and detailed out through a separate set of regulations, viz., 'Regulations for Detailing the Institutional Transition to the Third Phase', which shall be prepared by SC after detailed process of deliberations including public hearings.
  - iii. The SIWEA or BIWEA shall also be decentralized to the Sub-Basin level. The details of this transition shall also be provided in viz., 'Regulations for Detailing the Institutional Transition to the Third Phase'.
  - iv. The devolution of the SIWEA or BIWEA shall be affected by creating Sub-Basin level units of the SIWEA or BIWEA, as may be the case.
  - v. The structure and status of the executive agencies shall remain the same as in the case of the Second Phase.
- 5) The details of the APTs for each of the phase transitions (i.e., from the first to second, and from second to third) mentioned in sections 93 and 103 respectively, among other things, shall include:
- i. The details pertaining to the institutional design in the next Phase, including details of the functions, authorities or powers, and jurisdictions of various agencies.
  - ii. The details related to the approximate timing of the phase transition on the basis of the preparedness of institutional structure and stakeholders.
  - iii. The details pertaining to the process and criteria for assessing and determining institutional preparedness (or preparedness of various agencies) and preparedness of stakeholders.
  - iv. The details pertaining to the details of nature, type, frequency, scope, and depth of the measures for ensuring institutional preparedness and preparedness of stakeholders.
  - v. The details pertaining to the responsibilities and time-bound targets of different agencies, and provision of resources and capabilities needed by these agencies.
  - vi. The details pertaining to annual assessment of the performance by various agencies in implementing the APT. These details would include: details of the process and procedures for the assessment, clear division of tasks and responsibilities of implementation of various measures as well as of reporting data on performance, accountability relationships and mechanisms, system of incentives and disincentives for ensuring timely, efficient and effective implementation, formats and mechanisms for information collection and analysis of information collected, rating system for

- assessment of performance of agencies, and appointment of third-party auditors by the SC.
- vii. The details pertaining to preparation of the Annual Assessment Report on the Performance of Implementation of Transition Measures (AARPITM)
  - viii. The details pertaining to the consideration of the AARPITM by SC and preparation of the ATR on the AARPITM by SC.
  - ix. The details pertaining to the tabling before the State Legislature and publication on the web of AARPITM and ATR on AARPITM by the SC.)
- 6) Implementation of the APT, especially the measures for Institutional Preparedness and Stakeholders' Preparedness shall ensure the following elements:
- i. Practical and effective efforts for creating awareness and building commitment of all the stakeholders involved and functionaries of agencies involved.
  - ii. Timely provisioning of the resources (human and financial, and other) required.
  - iii. Timely, efficient, and effective steps for building capabilities of the Institutions and the Stakeholders.
- 7) Preparation by Third-Party Auditor (TPA) of the AARPITM, which shall contain, among other things, following details:
- i. Information on the Targets set for each task and responsibilities for each of the agency involved
  - ii. Quantitative assessment of the targets set
  - iii. Quality of the performance of agencies in achieving the targets
  - iv. Agency-wise rating of performance
  - v. Lessons in the form of Best Practices
  - vi. Lessons from the limitations and failures of the agencies.
- 8) ATR by SC on each of the AARPITM prepared by TPA, which shall include, among other things, the following elements:
- i. Comments on the scope, coverage, and quality of the AARPITM
  - ii. Acknowledgement of Good Performance, advisories to the bad performance, and censures against the habitual bad performing agencies
  - iii. Concrete Suggestions to various agencies for future performance
  - iv. Measures to ensure timely, efficient, and effective implementation for APT.

- 9) The web publication and tabling before the State Legislature of the ATR by SC along with the AARPITM by TPA, which shall include:
  - i. Putting the AARPITM on the official websites of SC and SIWEA within a week of its receipt from the TPA.
  - ii. Sending to the state government the ATR and AARPITM for tabling within one week of the finalization of the ATR within the period of ten weeks after receipt of the AARPITM.
  - iii. Publication of the ATR on the websites of SC and SIWEA within a week's time after sending the ATR to the state government.
- 10) Preparation of the 'Preparedness Validation Report' (PVR), which, among other things, shall include:
  - i. Status Report on the Achievement of the Predetermined Qualitative and Quantitative targets of Preparedness, which shall contain: Targets, Achievements, Shortfall/ Over-achievement/ Failure, and Agencies Responsible.
  - ii. Diagnosis of shortfall and Failures: Finding Causal factors (Target-wise and Agency-wise)
  - iii. Prescriptions: Specific and Detailed Suggestions to address the Causal factors underlying shortfalls and failures.
  - iv. Recommendations on Implementation of Phase Transition.
- 11) Processing and Finalization of the 'Preparedness Validation Report' (PVR)
  - i. Preparation of the PVR by Third Party Auditors (TPA) every year after expiry of the period for preparation for the Phase Transition envisaged in the relevant regulations.
  - ii. Presentation of the PVR to the SIWEA and to the WRD for their comments on the recommendations about the phase transition.
  - iii. Presentation to the SC (along with comments from the SIWEA and the WRD) and detailed deliberation by SC on the PVR and especially on the recommendations about the phase transition.
  - iv. Web-publication of the PVR along with the comments from SIWEA and WRD as well as the summary of the deliberations in SC.

## **Schedule 2**

### **PROCESS FOR PREPARATION OF 'ACTION PLAN FOR PREPARATION OF RULES, REGULATIONS, CBRS, AND CRITERIA' (APPRCC)**

1. The SIWEA shall prepare and submit the first draft of the APPRCC to the SC within three weeks from the establishment of SIWEA.
2. The SC shall provide comments and suggestions on the first draft of the APPRCC within six weeks from the submission of the first draft of the APPRCC.
3. The SIWEA shall revise the first draft considering and incorporating the suggestions of SC and publish the Revised Draft of the APPRCC within three weeks of receipt of comments from the SC, on the website of the SIWEA, and in the form of printed copies at all the Taluka offices of the WRD. The SIWEA shall publish a notice in at least six leading dailies of the state, among them at least three in the local vernacular language, and for each language covering the entire geographical extent of the state, announcing the publication of the Revised Draft of the APPRCC.
4. SIWEA shall provide a time period of at least two weeks for receiving comments and suggestions from stakeholders, third parties, and the public, on the Revised Draft of the APPRCC.
5. Considering the comments and suggestions from the public, the SIWEA shall prepare second revised draft of the APPRCC and share it with the SC within a period of three weeks.
6. SC shall prepare the draft in consultation with the SIWEA within six weeks of receipt of the second revised draft from the SIWEA.
7. The final draft of the APPRCC shall be published on the website of the SIWEA, the WRD, and the state government, and shall also be published in the newspapers as per provision 3 of this Schedule, within one week of finalization of the APPRCC.

## **Schedule 3**

### **PROCESS FOR PREPARATION OF RULES**

1. The State Water Resources Department (WRD), after consulting with SC and SIWEA, shall prepare the First Draft of the Rules within twenty-four weeks of the notification of this Act.
2. The WRD shall seek comments on the First Draft of the Rules from the SC and the SIWEA.
3. The WRD, within one week of preparation of the First Draft of the Rules shall arrange to publish the First Draft on its website, and on the websites of the SIWEA and of the state

government, and make available printed copies of the First Draft of the Rules at the offices of WRD at all taluka places, and invite public comments on the First Draft.

4. A period of three weeks shall be provided for the public to comment on the First Draft of the Rules. The public comments shall be accepted through either speed post, registered post, in person, in e-mail, courier, or fax, or any other form to arrange for the written comments to reach the SIWEA.
5. Within two weeks of end of the period provided to the public for comments on the First Draft, the WRD shall prepare and arrange to have published on its website, and on the websites of the SIWEA and the state government, and circulate at the offices of WRD at all taluka places a report on the comments and suggestions received from the public on the First Draft of the Rules.
6. The WRD shall within three weeks of the publication of the report on public comments and suggestions prepare a Revised Draft of the Rules based on the comments and suggestions from the SC, the SIWEA, and the public. The WRD shall arrange for the Government to receive the Revised Draft of the Rules within seven days of the preparation of the Revised Draft of the Rules.
7. The Government shall, within four weeks of receipt of the Revised Draft of the Rules, after effecting incorporation of necessary changes to the revised draft in consultation with SC, WRD, and SIWEA, approve the Revised Draft of the Rules.
8. The Government-approved Final Draft of the Rules shall be tabled before the State Legislature (SL), within forty-five weeks after notification of this Act.

#### **Schedule 4**

##### **PROCESS FOR PREPARATION OF REGULATIONS**

1. The SIWEA shall, within a period of thirty-six weeks and within the framework of this Act and of the Rules, if prepared, prescribed therein, prepare the First Draft of the Regulations. The SIWEA shall arrange for the SC to receive the First Draft of the Regulations within one week of the preparation of the First Draft of the Regulations.
2. The SC shall discuss in its meeting specially held within three weeks of the receipt of the First Draft of the Regulations, the First Draft of the Regulations.
3. The Drafting Committee (or the Secretariat) of the SC, within two weeks of the meeting of the SC to discuss the First Draft of the Regulations, shall in consultation with the SIWEA, prepare the Revised Draft of the Regulations, by incorporating the comments and suggestions raised during the discussion in the meeting of the SC.
4. The SIWEA shall, within two weeks of its preparation, arrange to have the Revised Draft of the Regulations published on the website of the WRD and of the State Government

and of the SIWEA, and in the form of printed copies at all the Taluka offices of the WRD. The SIWEA shall publish a notice in at least six leading dailies of the state, among them at least three in the local vernacular language, and for each language covering the entire geographical extent of the state, announcing the publication of the Revised Draft of the Regulations.

5. The SIWEA shall provide a period of twelve weeks after the preparation of the Revised Draft of the Regulations, for public to comment on the Revised Draft of the Regulations. The public comments shall be invited through public hearings and also in written form. The public hearings shall be carried out at all Regional Headquarters of the state, or at an adequate number of places to provide an opportunity to public from all areas of the state to attend the hearings, whichever is more. In addition to oral submissions at the public hearings, the public comments shall be accepted through either speed post, registered post, in person, in e-mail, courier, or fax, or any other form to arrange for the written comments to reach the SIWEA within the specified period.
6. The SIWEA shall, within three weeks immediately after the end of the period provided for public to comment and suggest on the Revised Draft of the Regulations, prepare a detailed report on all public comments and suggestions received, and the reasons for acceptance or rejection of the comments and suggestions.
7. The SIWEA shall, within four weeks of end of the period provided to invite public comments, prepare a Further Revised Draft of Regulations after incorporating public comments, and shall arrange for the SC to receive the Further Revised Draft of the Regulations within seven days of its drafting.
8. The SC shall discuss and effect changes to, through its Drafting Committee, in its meeting specially held for this purpose within three weeks of its receipt, the Further Revised Draft of the Regulations.
9. The final regulations are tabled before the State Legislature within seven days of their finalization by the SC.

## **Schedule 5**

### **PROCESS FOR PREPARATION OF CONDUCT OF BUSINESS REGULATIONS (CBRS)**

1. The SIWEA shall, within a period of fifty weeks from notification of this Act and within the framework of this Act and of the Rules and Regulations prescribed therein, shall prepare the First Draft of the Conduct of Business Regulations (CBRs). The SIWEA shall arrange for the SC to receive the First Draft of the CBRs within seven days of the preparation of the First Draft of the Regulations.
2. The SC and WRD shall within a period of three weeks of its receipt provide comments and suggestions to the SIWEA regarding the First Draft of the CBRs.

3. The SIWEA shall, within two weeks of its preparation, arrange to have the First Draft of the CBRs published on the website of the WRD and of the State Government and of the SIWEA, and in the form of printed copies at all the Taluka offices of the WRD. The SIWEA shall publish a notice in at least six leading dailies of the state, among them at least three in the local vernacular language, and for each language covering the entire geographical extent of the state, announcing the publication of the First Draft of the CBRs.
4. The SIWEA shall provide a period of eight weeks after the preparation of the First Draft of the CBRs, for the public to comment on the First Draft of the CBRs. The public comments shall be invited through public hearings and also in written form. The public hearings shall be carried out at all Regional Headquarters of the state, or at an adequate number of places to provide an opportunity to public from all areas of the state to attend the hearings, whichever is more. In addition to oral submissions at the public hearings, the public comments shall be accepted through either speed post, registered post, in person, in e-mail, courier, or fax, or any other form to arrange for the written comments to reach the SIWEA within the specified period.
5. The SIWEA shall, within three weeks immediately after the end of the period provided for public to comment and suggest on the First Draft of the CBRs, prepare the CBRs.
6. The SIWEA shall, within three weeks immediately after the end of the period provided for public to comment and suggest on the First Draft of the CBRs, prepare a detailed report on all comments and suggestions received from the public and from the WRD and the SC, including the reasons for acceptance or rejection of the comments and suggestions. The report shall be published on the SIWEA's website, and on the websites of the WRD and of the state government, and shall be circulated in the form of printed copies at the offices of WRD at all taluka places. The SIWEA shall publish a notice in at least six leading dailies of the state, among them at least three in the local vernacular language, and for each language covering the entire geographical extent of the state, announcing the publication of the report.
7. The final CBRs shall be tabled before the SL.

## **Schedule 6**

### **PROCESSES FOR PREPARATION OF CRITERIA**

1. The SIWEA shall, within a period of fifty weeks from the notification of this Act and within the framework of this Act and of the Rules and Regulations prescribed therein, shall prepare the First Draft of the Criteria. The SIWEA shall arrange for the SC to receive the First Draft of the Criteria within seven days of the preparation of the First Draft of the Criteria.

2. The SC and WRD shall within a period of three weeks of its receipt provide comments and suggestions to the SIWEA regarding the First Draft of the Criteria.
3. The SIWEA shall, within two weeks of its preparation, arrange to have the First Draft of the Criteria published on the website of the WRD and of the State Government and of the SIWEA, and in the form of printed copies at all the Taluka offices of the WRD. The SIWEA shall publish a notice in at least six leading dailies of the state, among them at least three in the local vernacular language, and for each language covering the entire geographical extent of the state, announcing the publication of the First Draft of the Criteria.
4. The SIWEA shall provide a period of eight weeks after the preparation of the First Draft of the Criteria, for the public to comment on the First Draft of the Criteria. The public comments shall be invited through public hearings and also in written form. The public hearings shall be carried out at all Regional Headquarters of the state, or at an adequate number of places to provide an opportunity to public from all areas of the state to attend the hearings, whichever is more. In addition to oral submissions at the public hearings, the public comments shall be accepted through either speed post, registered post, in person, in e-mail, courier, or fax, or any other form to arrange for the written comments to reach the SIWEA within the specified period.
5. The SIWEA shall, within three weeks immediately after the end of the period provided for public to comment and suggest on the First Draft of the Criteria prepare the Criteria.
6. The SIWEA shall, within three weeks immediately after the end of the period provided for public to comment and suggest on the First Draft of the Criteria, prepare a detailed report on all comments and suggestions received from the public and from the WRD and the SC, including the reasons for acceptance or rejection of the comments and suggestions. The report shall be published on the SIWEA's website, and on the websites of the WRD and of the state government, and shall be circulated in the form of printed copies at the offices of WRD at all taluka places. The SIWEA shall publish a notice in at least six leading dailies of the state, among them at least three in the local vernacular language, and for each language covering the entire geographical extent of the state, announcing the publication of the report.

## **Schedule 7**

### **PROCEDURE OF PUBLIC DELIBERATIONS (PPD)**

The Procedure of Public Deliberations (PPD) shall involve the following steps and components:

1. The Draft of the document prepared by any agency published before the PPD shall be adequately comprehensive, in-depth, incorporating comments and suggestions of the other involved governing agencies.

2. The Draft shall be published on the websites of the SIWEA, the SC, WRD, the Valley Development Corporation, and of the State Government.
3. Notice announcing the publication of the Draft shall be placed, at prominent places, in leading state, national, and regional newspapers in local language and in one newspaper in English language, simultaneously with the publication of the Draft on the websites, informing public about the publication of the Draft.
4. Depending on the length of the document, a period of at least two weeks shall be provided by the agency preparing the document, to invite comments and suggestions of the stakeholders, third party agencies, and the public in general, through various modes of communication, including but not limited to post, speed post, registered post, courier, fax, submission in person, and e-mail, receipt of each of which, shall be acknowledged.
5. A report on all comments and suggestions received from all public, along with the responses from the relevant agencies covered under this Act, shall be published on the website of the SIWEA before the further process of finalization of the document begins.
6. The final draft, approved by the corresponding agency, shall be made available on the websites of the SIWEA, the WRD, and the State Government, within one week of its approval.

## **Schedule 8**

### **PROCEDURE OF COMPREHENSIVE PUBLIC DELIBERATIONS (PCPD)**

The Procedure of Comprehensive Public Deliberations (PPD) shall involve the following steps and components:

1. The Draft of the document prepared by any agency published before the PPD shall be adequately comprehensive, in-depth, incorporating comments and suggestions of the other involved governing agencies.
2. The Draft shall be published on the websites of the SIWEA, the SC, WRD, the Valley Development Corporation, and of the State Government.
3. Notice announcing the publication of the Draft shall be placed, at prominent places, in leading state, national, and regional newspapers in local language and in one newspaper in English language, simultaneously with the publication of the Draft on the websites, informing public about the publication of the Draft.
4. The Draft of the document shall be made available in printed copies, with adequate number of copies, at the sub-basin level offices of the WRD, within one week of the publication of the Draft on the websites.
5. Depending on the length of the document, a period of at least four weeks shall be provided by the agency preparing the document, to invite comments and suggestions of

the stakeholders, third party agencies, and the public in general, through various modes of communication, including but not limited to post, speed post, registered post, courier, fax, submission in person, and e-mail, the receipt of each which, shall be acknowledged.

6. A report on all comments and suggestions received from all public, along with the responses from the relevant agencies covered under this Act, shall be published on the website of the SIWEA before the further process of finalization of the document begins.
7. The final draft, approved by the corresponding agency, shall be made available on the websites of the SIWEA, the WRD, and the State Government, within one week of its approval.

## **Schedule 9**

### **POWERS AND FUNCTIONS OF SIWEA RELATED TO REGULATION AREAS**

*(This section provides a range of regulatory functions that states can choose to incorporate in their respective state legislations, depending on priorities and ground realities in the state. This modular approach to the Model Bill allows for flexibility to accommodate the differences in stages of development of the water sector in the states. The regulatory functions listed below are merely indicative and states are invited to create their own regulation areas for intervention by the WRS.)*

#### **Powers and functions related to Water Access, Extraction, and Use**

1. The SIWEA shall have the following powers and functions with respect to Water Access, Extraction, and Use:
  - a) Review and assess the process of allotment of entitlements with respect to the rules, regulations, and criteria.
  - b) Review and assess the water access, extraction, and use done by and for different categories of water uses in the state
  - c) Redress grievances related to water access, extraction, and use.
  - d) Reporting after review as per the criteria evolved for this purpose, the status of water access, extraction, and use done by different categories of water users.

#### **Powers and functions related to Execution of projects and programs**

2. The SIWEA, shall have the following powers and functions with respect to execution of projects and programs:
  - a) Review and assessment of proposals, prior to their final approval by the government, for new projects or for any changes in technical, economic, or financial components of the projects approved earlier.

- b) Review and assessment of the processes, procedures, and outcomes of these processes and procedures for identification and rehabilitation of the PAPs. The rehabilitation of the PAPs shall be carried out within the framework prescribed by the provisions of the LARR Act.
- c) Review and assessment of the processes, procedures, and outcomes of these processes and procedures for redress of grievances related to rehabilitation of the PAPs.
- d) Reporting after review as per the criteria evolved for this purpose, the project work in progress, at various stages.
- e) Preparation, with logistical support from WRD circle offices, reports based on periodic review of efficiency and ecological impacts of completed projects, as per the criteria evolved for this purpose.
- f) Prepare and publish monitoring reports, with inputs from general public through PPD, to assess compliance with the guidelines and principles, rules, regulations, and criteria related to project planning, execution, and operations and maintenance.
- g) Issuing advisories and or orders to implementing and/ or executive agencies to enforce compliance to and to take corrective measures for the deviations or departures with respect to the rules, regulations, and criteria applicable for project planning, execution, and operations and maintenance
- h) Undertaking random reviews of the contracts and reports based on this review.
- i) Continuous assessment of investments, purchases, expenditures and sourcing of finance, for good financial health of the sector, as per the criteria in this regard.

**Powers and functions related to Water Service Provisioning**

3. The SIWEA, shall have the following powers and functions with respect to water service provisioning -
  - a) Review and assess the water provisioning system with respect to the rules, regulations, and criteria to ensure secured water access and good quality service provisioning to all.
  - b) Issue orders to corresponding agencies, inter alia including private service providers, to enforce compliance to the rules, regulations, and criteria with respect to service provisioning
  - c) The procedure for Comprehensive Public Deliberations conducted by the SIWEA to give effect to the provisions related to water service provisioning shall be in accordance with 0.

### **Powers and Functions related to Allocation of Financial and Other Resources to Projects**

4. The SIWEA, shall have the following powers and functions with respect to allocation of financial and other resources to projects -
  - a) The SIWEA shall review and appraise the financial requirements for projects and programs.
  - b) The SIWEA shall provide advise, comments, and suggestions for amendments and correction in the plans prepared by the WRD, within the framework specified by the extant rules, regulations, CBRs, and criteria.
  - c) The processes and procedures conducted by the SIWEA in pursuance of these provisions shall be in accordance with 0.

### **Powers and functions related to Environmental sustainability**

5. The SIWEA, shall have the following powers and functions with respect to ensuring environmental sustainability:
  - a) The SIWEA, through appropriate agencies, shall carry out review and appraisal of implementation of the various environmental regulations and laws mainly in relation to protection and conservation of water related ecosystems.
  - b) The SIWEA shall issue orders to enforce adherence to the guidelines, principles, rules, regulations, CBRs, and criteria for ensuring environmental sustainability.
  - c) The processes and procedures conducted by the SIWEA in pursuance of these provisions shall be in accordance with 0.

### **Powers and functions related to Processes and Procedures**

6. The SIWEA, shall have the following powers and functions with respect to processes and procedures carried out to give effect to the provisions of this Act -
  - a) Preparation and publication of compliance reports, inter alia including the orders issued by the SIWEA for ensuring compliance, and the action taken by the corresponding agencies in compliance with the orders.
  - b) The processes and procedures conducted by the SIWEA for carrying out process of comprehensive public deliberations in pursuance of these provisions shall be in accordance with 0 of this Act.

### **Powers and functions related to Disaster management**

7. The SIWEA, shall have the following powers and functions with respect to Disaster Management:

- a) Enforcement of norms and criteria for managing water scarcity situation through issuing orders to the relevant agencies including strict penalization that may include fine, compensation, or imprisonment
- b) The processes and procedures conducted by the SIWEA to ensure process of comprehensive public deliberations in pursuance of these provisions shall be in accordance with 0 of this Act.

**Powers and functions related to Ensuring Compliance to the Provisions of this Act**

- 8. The SIWEA, shall have the following powers and functions with respect to ensuring compliance to the rules and regulations made under the act:
  - a) The SIWEA shall annually prepare and simultaneously publish on its website reports based on assessment related to compliance by all agencies and actors to the rules and regulations and to the framework specified in the Act
  - b) The SIWEA, based on the review and assessment of compliance, may issue orders to corresponding agencies seeking explanations and/ or reports on actions proposed or taken on the assessment report, with written reason and rationale
  - c) The processes and procedures conducted by the SIWEA to ensure process of comprehensive public deliberations in pursuance of these provisions shall be in accordance with 0 of this Act

**Powers and functions related to Private Sector Participation**

- 9. The SIWEA, shall have following powers and functions with respect to Private Sector Participation:
  - a) Assess the technical, economic, and financial aspects of projects, programs, and schemes with full or partial private sector participation, with due Process of Public Deliberations, to ensure and assess the following:
    - i. Implications and encumbrances on public finance, public owned properties and assets, and public resources.
    - ii. the revenue model and extent of all types of benefits to the private parties involved.
  - b) Prepare and publish monitoring reports on the functioning of the projects and programs with partial or full private sector participation, with inputs from general public through process of comprehensive public deliberations as prescribed in 0 of this Act.
  - c) Assess compliance with the guidelines and principles, rules, regulations, CBRs, and criteria related to private sector participation.

- d) Issue orders to corresponding agencies to enforce compliance to and to correct the aberrations with respect to the rules, regulations, and criteria prescribed for private sector participation.
- e) Undertake random review of the contracts in the monitoring reports.
- f) Approval or disapproval of tariff and other service-related proposals prepared by the private or public utilities, based on the applicable regulations, CBRs, and criteria.
- g) Approving and issue orders to grant, revoke, modify, or make other changes to, the licenses to private sector applicants, within the framework specified by the guidelines and principles of this Act, the rules, regulations, and the criteria applicable to private sector participation.
- h) Carry out community-level public hearings (to facilitate and carry out a multi-stakeholder dialogue involving the public and the competent and responsible officials of the private entities)

**Powers and functions related to Integrated State Water Plan (ISWP)**

10. The SIWEA, shall have following powers and functions with respect to the preparation and enforcement of the ISWP:

- a) The SIWEA shall review and assess the ISWP and its component plans, before their final approval by the SC, prepared by the appropriate departments and agencies of the state government, through the process for public deliberations, and table them, with comments and suggestions, for approval of the SC.
- b) The SIWEA shall evaluate and report issues related to the adherence of the ISWP with:
  - i. the norms for content and the process of preparation of the ISWP
  - ii. status of the interim report technically validating the data being used for preparation of the ISWP.
  - iii. Aspects to ensure validity and compliance of the draft plans and plan being submitted for finalization, with respect to the guidelines and principles prescribed in this Act.
- c) The SIWEA shall issue orders to the agency preparing the component plans to be included in preparation of the ISWP to enforce compliance with the norms for the content and process in the development of the ISWP
- d) The processes and procedures conducted by the SIWEA to ensure process of comprehensive public deliberations in pursuance of these provisions shall be in accordance with 0 of this Act

## **Powers and functions related to Climate Change**

11. The SIWEA shall have the following powers and functions with respect to Climate Change:

- a) Review and assess the process of and for assessment of potential and observed impacts of climate change on the water resource situation with respect to the rules, regulations, and criteria,
- b) Review and assess the preparedness of institutions including organizations and policy instruments, and preparedness of stakeholders to face, mitigate, and prevent the impacts of climate change on water resource situation,
- c) Revision, reporting, and strengthening of institutional processes in key regulation areas to address the challenges of climate change.

*Note: Some regulation areas (e.g., inland water ways and fishing) which could have critical importance for some states shall have to be covered additionally.*

## **Schedule 10**

### **ASPECTS AND ELEMENTS OF VARIOUS REGULATION AREAS TO BE COVERED BY REGULATIONS**

The Regulations shall cover the following aspects and elements of respective Regulation areas:

#### **Water Access, Extraction, and Use**

1. The Regulations shall specify and elaborate on different aspects of access, extraction, and use of water, within the framework of guidelines and principles of the Act, including:
  - a) Principles for allotment of entitlements
  - b) rights to water for lifeline and livelihoods including water for use for livestock and flora and fauna,
  - c) flow of water for environmental purposes, and
  - d) use of water for achieving optimum economic growth
  - e) list of priorities of use categories for allocation of water in normal and scarcity periods

#### **Execution of Projects and Programs**

2. The Regulations shall specify and elaborate on various aspects of Execution of Projects And Programs, within the framework of guidelines and principles of the Act, inter-alia including:

- a) Review and assessment of project and program design, construction, and operations and maintenance, inter alia including adherence to the integrated state water plan
- b) Review, assessment, and making appropriate recommendations about Project proposals
- c) Identification of the project-affected people (PAPs)
- d) Rehabilitation of the PAPs, including the time line, substantive policy guidelines, and procedures and processes for grievance redressal related to rehabilitation
- e) Review and assessment of rehabilitation of the PAPs in a continuous, transparent, participatory, and accountable manner
- f) Operations, management and maintenance of completed projects and programs
- g) Continuous assessment of investments, purchases, expenditures and sourcing of finance, for good financial health of the sector, including conditionalities to ensure the same

### **Water Service Provisioning**

3. The Regulations shall specify and elaborate on different aspects of Water Service Provisioning within the framework of guidelines and principles of the Act, different aspects of inter-alia including:
  - a) Season-wise Quality and quantity of water provided to various categories of water users at bulk and retail levels
  - b) Ensuring secured access of water for life and livelihoods for all public at all times, with special focus on the disadvantaged, vulnerable, under-represented, and specifically vulnerable sections of the public inter alia including setting appropriate tariff
  - c) Ensuring good financial health of the water provisioning system to ensure sustained water provisioning to all public inter alia through setting appropriate tariff
  - d) Terms of water service during deficit period
  - e) Evaluation of service provisioning performance of the utilities and linking quality of service provisioning with tariff

### **Allocation of Financial and Other Resources**

4. The Regulations for Allocation of Financial and Other Resources shall specify and elaborate on different aspects of Allocation of Financial And Other Resources within the framework of guidelines and principles of the Act, aspects of inter-alia including:

- a) Improving tariff recovery through reducing losses & theft, and increasing tariff of non-poor
- b) external (e.g. government and private sources) sources of finance and other resources
- c) Periodic plan for allocation of available financial and other resources, drawing from the budgets, to various projects, facilities, and areas
- d) Equitable distribution of financial and other related resources based on factors affecting equity – regional and other factors including priority for completion of projects in drought-prone and backward regions
- e) Setting priority related to competing demands on available financial resources
- f) Completion of pending projects, initiating new projects, maintenance or repairs of existing projects

### **Environmental Sustainability**

5. The Regulations for Environmental Sustainability shall specify and elaborate on various aspects of Environmental Sustainability within the framework of guidelines and principles of the Act, aspects of inter-alia including:
  - a) Composite Environmental and Social Impact Assessment (ESIA) for construction, operation, maintenance, and repairs, and any other changes that may be planned, proposed, or in process for all projects of the state, including assessment of the composite and compounded impacts that the planned, in-process or other projects may have with those of the historically established or operational projects
  - b) Environmental threshold (tipping point) for water related projects and other human activity including pollution (standards for individual as well as cumulative impacts)
  - c) Principles related to utilization of water entitlements as tool to control water pollution
  - d) Projects and other human activities including pollution, sand mining and others so that their cumulative impacts is below the environmental threshold
  - e) Human activities such as pollution, sand mining and others affecting water-related ecosystem services
  - f) ‘Ecological restoration’ for past and new projects so as to reduce the environment impacts and bringing those below the environmental threshold

### **Processes and Procedures In Functioning Of The Water Sector**

6. The Regulations shall specify and elaborate on different aspects of Processes And Procedures In Functioning Of The Water Sector within the framework of guidelines and principles of the Act, aspects of inter-alia including Consideration of comments, suggestions, and opinions from public for all actions taken under this Act

#### **Disaster Management**

7. The Regulations for Disaster Management shall specify and elaborate on different aspects of Disaster Management within the framework of guidelines and principles of this Act, aspects of inter-alia including:
  - a) Guidelines and principles to prevent and manage water-related disasters, arising out of either external situations normally out of human control, or out of acts of any other factors including man-made factors, or out of interaction of other sectors with the water sector.
  - b) Principles within the framework specified by the Disaster Management (DM) Act (if extant), in relation to water-related disasters

#### **Private Sector Participation**

8. The Regulations shall specify and elaborate on different aspects of Private Sector Participation within the framework of guidelines and principles of this Act, aspects of inter-alia including:
  - a) Evaluation of the need for private sector participation in particular cases (including application of public sector comparator) and assessment of alternatives on the basis of socio-cultural, techno-economic, environmental, financial, and gender-based criteria, and in line with the guidelines and principles stipulated in the Act
  - b) Licensing of private service providers, and determining conditions for such licenses
  - c) Conditions for revoking of license granted
  - d) Enforcement of compliance by the defaulters, and grounds for Penalizing and penalties in form of fines and compensation
  - e) Measures for facilitation of private sector participation

#### **Selection of Members of SIWEA and other Staff of SIWEA**

9. The Regulations shall specify and elaborate on different aspects of Selection Of Members Of The SIWEA And The Other Staff Of The SIWEA within the framework of guidelines and principles of this Act, aspects of inter-alia including:
  - a) Approval or disapproval of, or modifications in selection process plan for particular positions

- b) Directions to abandon, postpone or make changes in the selection process if the same is found faulty or biased
- c) Approval or disapproval of the final selection based on the process compliance
- d) Platform and mechanisms for promoting public opinion and complaints and resolution of the same with appropriate directions
- e) Removal of person in office based on faulty selection process

**Preparation of Integrated State Water Plan (ISWP)**

10. The Regulations shall specify and elaborate on different aspects of Preparation of Integrated State Water Plan within the framework of guidelines and principles of this Act, inter-alia including the preparation in a time-bound manner, and applicability of the ISWP across the state.

**Addressing issues related to Climate Change**

11. The Regulations shall specify and elaborate on different aspects of potential impacts of climate change on the state's water resource situation, within the framework of guidelines and principles of this Act, inter-alia including the preparedness of institutions and preparedness of stakeholders to effectively and efficiently prevent and/ or mitigate potential or observed impacts of climate change on water resource situation in the state.

**Schedule 11**

**ELEMENTS OF PROCESSES FOR VARIOUS REGULATION AREAS TO BE COVERED BY CBRs**

The following elements of the respective Regulation Areas shall be covered by the CBRs for each Area of Intervention:

**Water Access, Extraction, and Use**

1. The CBRs for Water Access, Extraction, and Use shall inter alia include CBRs for:
  - a) Processes of and for determination of criteria for and of allotment of entitlements
  - b) processes to be followed for carrying out the SIWEA's duties within the framework of the Rules, and Regulations made under this Act
  - c) process of and for determination of the Criteria for Water Allocation, Extraction, and Use

**Execution Of Projects And Programs**

2. The CBRs for Execution of Projects and Programs shall inter alia include CBRs for:

- a) Processes of and for Continuous assessment of investments, purchases, expenditures and sourcing of finance to ensure good financial health of the sector
- b) Processes of and for determination of criteria including techno-economic, socio-cultural including gender sensitive aspects, and environmental and ecological aspects of project and program design, including adherence to the integrated state water plan
- c) Processes of and for review and assessment of project proposals
- d) Processes of and for review and assessment of identification and rehabilitation of the PAPs and grievance redressal related to rehabilitation of the PAPs
- e) Processes of and for determination of criteria for operations, management and maintenance of completed projects and programs
- f) Processes of and for Determination of criteria for management of various sources of finance for good financial health of the sector
- g) Processes of and for Periodic and recurring assessment and review of the construction work-in-progress of Projects and Programs
- h) Processes of and for Periodic assessment and review of the operations and maintenance of all Projects and Programs
- i) Process of and for periodic review and up-gradation of the Criteria prescribed herein

### **Water Service Provisioning**

3. The CBRs for Water Services Provisioning shall inter alia include CBRs for:
  - a) Processes of and for determination of criteria determining water tariff based on quality and quantity of water provided, losses and thefts of water, and other aspects to ensure social, environmental, and financial sustainability of water provisioning systems
  - b) Process of and for Determination of criteria for quality and quantity of water provided to various categories of water users
  - c) Process of and for Determination of criteria to ensure secured water access to all public, with special focus on the disadvantaged, vulnerable, under-represented, and specifically vulnerable sections of the public
  - d) Process of and for Determination of standards and criteria for Ensuring good financial health of the water provisioning system to ensure sustained water provisioning to all public

- e) Process of and for Periodic review of level of service provisioning to all public, with special focus on the disadvantaged, vulnerable, under-represented, and specifically vulnerable sections of the public
- f) Process of evaluation of service provisioning performance of the utilities, apart from evaluation as per the aforementioned aspects

#### **Allocation Of Financial And Other Resources**

- 4. The CBRs for Allocation of Financial and Other Resources shall inter alia include CBRs for:
  - a) Process of and for appraisal and review of financial requirements for projects and programs
  - b) Process of and for review, approval, and appraisal of plans for mobilization of funds and other resources for projects and programs

#### **Environmental Sustainability**

- 5. The CBRs for Environmental Sustainability shall inter alia include CBRs for:
  - a) Process of and for Carrying out the ESIA
  - b) Process of and for Determination of the norms and standards required to give effect to the Rules
  - c) Process of and for Review and assessment of the performance of all stakeholders with respect to giving effect to the Rules, and assessment of their performance with respect to environmental sustainability
  - d) Process of and for Issue of orders to various corresponding agencies to ensure compliance to the guidelines, principles, and rules for ensuring environmental sustainability

#### **Processes and Procedures In Functioning of Water Sector**

- 6. The CBRs for Processes And Procedures In Functioning of Water Sector shall inter alia include CBRs for:
  - a) Process of and for determination of Norms for ‘deliberative’ process for all areas (affecting public interest) of decision making and regulation inter alia including regulation of WAEU, water services, water plans.
  - b) Process of and for determination of Norms for ‘consultative’ process for areas of decision-making under this Act
  - c) Process of and for determination of Norms for universal application of TAP

- d) Process of and for determination of Criteria for ‘official representation’ of the marginalized groups and norms of their functioning, while not limiting the representation of the marginalized groups to the official representatives
- e) Process of and for determination of Norms for preparedness (including capacity building) of users, associations and TPAs before initiating a deliberative or consultative decision making process
- f) Process of and for Review and approval of process plans on crucial decision making
- g) Process of and for Review and appraisal of other processes
- h) Process of and for determination of Steps for capacity building of marginalized and disadvantaged sections of the society

### **Disaster Management**

- 7. The CBRs for Disaster Management shall inter alia include CBRs for:
  - a) Process of and for Determination of norms and criteria for declaration of different levels of water scarcity and actions to be taken for water saving and other measures
  - b) Process of and for Carrying out community-level public hearings to bring to the community's notice the entities responsible for water-related disasters defined in the regulations
  - c) Process of and for Determination of criteria for declaration of occurrence of water-related disasters
  - d) Process of and for Determination of criteria for managing those disasters

### **Ensuring Compliance to the Provisions of This Act**

- 8. The CBRs for Ensuring Compliance to the Provisions of This Act shall inter alia include CBRs for:
  - a) Process of and for Annual review and appraisal of compliance to various rules, regulations, norms, criteria and other legislations (primary and secondary)
  - b) Process of and for publishing to the Public a report on the status of compliance
  - c) Process of and for Preparation of Annual assessment reports related to compliance by all agencies and actors to the rules and regulations and to the framework specified in the Act

### **Private Sector Participation**

9. The CBRs for Private Sector Participation shall inter alia include CBRs for:
- a) Process of and for Preparation of monitoring report with inputs from general public to assess compliance with the guidelines/ rules
  - b) Process of and for Selection of private entities including those for assessment of financial, technical, legal, and socio-cultural capacity and capability of the private entity
  - c) Process of and for Approval or disapproval of tariff and other service proposals
  - d) Process for and norms for entry level regulation of private sector participation
  - e) Process for vetting and technical validation of the revenue model for privatization of any particular service
  - f) Process of and for Approval or disapproval of license at the entry stage
  - g) Process of and for Licensing of private service providers including periodic service contracts and its review based on quality standards and costs (including tariff)
  - h) Process of and for Annual review, monitoring and appraisal of the private service provider in relation to the contract terms, other policies / laws, and public concerns
  - i) Process of and for Revoking the license granted
  - j) Process of and for Community-level public hearings bringing in front of the community the competent and responsible officials of the private entities

**Selection Of Members Of The SIWEA And The Other Staff Of The SIWEA**

10. The CBRs for selection of members of the SIWEA shall inter alia include CBRs for:
- a) Plan of selection process for crucial positions including plan for publication of advertisements, specific selection criteria, names of evaluators, evaluation method, minimum number and quality of applications to be received for proceeding with selection process and so on
  - b) Criteria and norms for removal of the person from office (one who gets selected and not who selects) based on faulty selection process

**Preparation of Integrated State Water Plan (ISWP)**

11. The CBRs for preparation of the ISWP shall inter alia include CBRs for:
- a) Process of and for preparation of the ISWP

- b) Process of and for development of the plans encompassing expert inputs, time lines, and the deliberative process
- c) Process of and for periodic review of the plans and the amendments to be made therein. The regulations shall include time line and responsibilities for drafting and finalization of the ISWP

**Addressing issues related to impacts of Climate Change on water resource situation**

12. The CBRs for addressing issues related to Climate Change shall inter alia include CBRs for:

- a) Processes of and for review and assessment of potential and observed impacts of climate change on the water resource situation with respect to the rules, regulations, and criteria,
- b) Processes of and for review and assessment of the preparedness of institutions including organizations and policy instruments, and preparedness of stakeholders to face, mitigate, and prevent the impacts of climate change on water resource situation of the state,
- c) Processes of and for revision, reporting, and strengthening of institutional processes in key regulation areas to address the observed and potential impacts of climate change on the water resource situation in the state.

**Schedule 12**

**ELEMENTS OF VARIOUS REGULATION AREAS TO BE COVERED BY CRITERIA**

The following elements of various Regulation areas shall be covered by the Criteria for those respective Regulation areas:

**Water Access, Extraction, and Use**

- 1. The criteria for allocation, extraction, and use of water shall inter-alia include:
  - a. Criteria for allotment of entitlements
  - b. priority of water use
  - c. norms for maximum water use for various activities
  - d. norms for effluent treatment
  - e. criteria for limits of extraction from unregulated, local water sources

**Execution of Projects And Programs**

2. The criteria for execution of projects and programs shall inter-alia include:
  - a. Techno-economic, socio-cultural including gender sensitive aspects, and environmental and ecological aspects of project and program design, including adherence to the integrated state water plan
  - b. Techno-economic aspects as the basis for Review and assessment of construction work in progress project
  - c. Techno-economic, socio-cultural including gender sensitive aspects, and environmental and ecological aspects of project and program O&M
  - d. norms for project-level investments and purchases related to equipment, establishment, and other aspects of project management

### **Water Service Provisioning**

3. The criteria for water service provisioning shall inter-alia include:
  - a. Criteria based on quality of water, quality of service, quantity of water, to determine tariff
  - b. Quality and quantity of water provided to various categories of water users with special focus on the disadvantaged, vulnerable, under-represented, and specifically vulnerable sections of the public
  - c. Ensuring good financial health of the water provisioning system to ensure sustained water provisioning to all public
  - d. Quality of service provisioning
  - e. Assessment of water service provisioning system with respect to its adherence to the guidelines and principles, the rules, regulations, and the criteria related to water service provisioning

### **Allocation of Financial and Other Resources**

4. The criteria for allocation of financial and other resources shall inter-alia include:
  - a. Norms and standards for reducing losses & theft, and increasing tariff of non-poor,
  - b. Norms for external (e.g. government and private sources) sources,
  - c. Norms and standards for allocation of available financial and other resources,
  - d. Criteria for equitable distribution of financial and other related resources based on factors affecting equity – regional and other factors including priority for completion of projects in drought-prone and backward regions,

- e. Criteria for setting priority related to competing demands on available financial resources,
- f. completion of pending projects, initiating new projects, maintenance or repairs of existing projects

### **Environmental Sustainability**

- 5. The criteria for environmental sustainability shall inter-alia include:
  - a. Criteria based on environmental sustainability determining tariff
  - b. Standards for parameters to be assessed in the ESIA activities, according to their priority and importance for various geographies of the state
  - c. Standards for environmental threshold (tipping point) for water related projects and other human activity including pollution (standards for individual as well as cumulative impacts)
  - d. priority for projects and other human activities including pollution, sand mining and others so that their cumulative impacts is below the environmental threshold
  - e. Norms for tolerable and non-tolerable human activities such as pollution, sand mining and others affecting water-related ecosystem services
  - f. Norms and conditions for 'ecological restoration' for past and new projects so as to reduce the environment impacts and bring it below the environmental threshold

### **Disaster Management**

- 6. The criteria for disaster management shall inter-alia include:
  - a. Norms and standards for declaration of various levels of water scarcity and actions to be taken for water saving and other measures
  - b. Criteria for declaration of occurrence of other water-related disasters
  - c. Steps to be taken by all relevant agencies and actors for managing disasters

### **Private Sector Participation**

- 7. The criteria for private sector participation shall inter-alia include:
  - a. Criteria determining the details of tariff recovery in case of private water provisioning
  - b. criteria including norms for project-level purchases related to equipment, establishment, and other aspects of project management

- c. Standards and norms for private sector participation including specifications of the sectoral responsibilities that are envisioned possibly to be handed over to the private parties
- d. Norms for Approval or disapproval of license at the entry stage
- e. Norms for selection of private entities including those for assessment of financial, technical, legal, and socio-cultural capacity and capability of the private entity
- f. Norms for entry level regulation of private sector participation
- g. Norms for adherence to service standards and other regulations by private service provider
- h. Norms for termination of contracts or discontinuation of services by private service provider
- i. Norms for licensing of private service providers including periodic service contracts and its review based on quality standards and costs (including tariff)
- j. Norms for revoking of license granted

**Preparation of Integrated State Water Plan (ISWP)**

- 8. The criteria for preparation of the ISWP shall inter-alia include:
  - a. Aspects of validity of the ISWP with respect to the guidelines and principles prescribed in this Act
  - b. Aspects of validity of the component plans thereof, with respect to the guidelines and principles prescribed in this Act

**Addressing issues related to impacts of Climate Change on water resource situation**

- 9. The criteria for addressing issues related to Climate Change shall inter alia include:
  - a. Norms and standards for potential and observed impacts of climate change on the water resource situation in the state,
  - b. Norms and standards for the preparedness of institutions including organizations and policy instruments, and preparedness of stakeholders to face, mitigate, and prevent the impacts of climate change on water resource situation of the state,
  - c. Norms and standards to assess impacts on key regulation areas in order to address the observed and potential impacts of climate change on the water resource situation in the state.