

Executive Summary: State Water Budgeting

Currently the water resources of the country are under severe strain with continuously declining per capita water availability accompanied with the challenges of water scarcity, floods and contamination across the states in the face of its growing demand. India, already a water stressed country is rapidly moving towards becoming water scarce as a nation. Unless we act today to manage our water resources responsibly and efficiently, catastrophe is impending. Less water means, less food, nutritional, health and energy security undermining livelihoods and sustainability, slowdown of economy and finally poor quality of life. Given the constitutional scheme Water is a state subject. Thus any improvement in water management invites the attention of critical and pivotal role for State Governments.

One of the major reasons for steep decline in per capita availability of Water and for increase in the area under water scarcity, recurrence of floods and quality challenges is lack of effective control on annual water consumption (demand) exceeding the annual water availability (supply) and omissions to monitor and protect quality of water sources from contamination. The current scenario can at best be described as laissez faire where water consuming (demand) sectors are not concerned about water availability nor is there any state level single agency which oversees and coordinates to hold any sector or entity accountable for over exploitation and excessive use (demand). It is this governance deficit that is majorly responsible for over exploitation and contamination. National Water Mission has taken an initiative to bridge this critical water governance gap through an institutional mechanism of State Water Budgeting, on the lines similar to that of Financial budgeting.

Under State Water Budgeting, first all sources of Water viz., Rainfall, Glaciers, Springs, Rivers, Water storage structures, Wetlands, Tanks, Ground water, Coastal water and Waste water are measured/ estimated in terms of availability, utilisability, supply, demand and consumption on an annual basis taking 1st June (start of water year) as a reference. Simultaneously water (Utilisable) is allocated to various sectors- Forestry & wildlife, Farm Sector, Industry & Infrastructure, Establishments and Institutions and Drinking water and domestic use, based on past usage like that of financial budgets. The model provides flexibility to meet the emerging demands with a revision of allocations subject to a condition that annual water expenditure should not exceed estimated annual water availability.

State Water budgeting is a pioneering exercise because while water flows across natural hydrological units, states are political administrative units. The harmonization of science and political units was addressed by making water budgets first at basin/ sub-basin level and then compiling and consolidating for the State as a whole.

NWM not only introduced the concept of State water budgeting but also engaged with experts to validate the concept, developed technique, process documentation in the form of a model template and undertook capacity building of stakeholders and operationalized it in the states by suitable modification of existing scheme. 11 States are in different stages of State Water Budget

development which is in itself a dynamic and evolving exercise and need to be carried out every year. The details are available at NWM web link: (<http://nwm.gov.in/?q=state-specific-action-plan-water-ssap-water>)

1. Currently India is facing numerous challenges in water management:

- India with 17.5% of world population and 11.6% of world livestock population is endowed with only 4% global renewable water resources.
- Currently the water resources of the country are under severe strain with continuously declining per capita water availability (5177 m³ in 1951 to 1545m³ in 2011) accompanied with the challenges of widespread water scarcity, floods and contamination across the states in the face of accelerated demand for food security, Industry, per capita income etc. Inter-state water sharing conflicts are on rise. Despite all avowed conservation practices and investment under NREGS the number of over-exploited blocks are on continuous rise (839 in 2004 to 1034 in 2013 covering more than 4 lakh Sq.Km (17 % of India's area suitable for GW extraction i.e., 23 Lakh Sq.Km) because of indiscriminate extraction exceeding the annual recharge. Similarly, the rivers, glaciers, springs and water bodies are shrinking and drying. Regular recurrence of droughts and persistent farmers' suicides underscore the gravity of the situation. The problems got accentuated with climate change events resulting in erratic spatial and temporal variability in rainfall and other events.
- It is not surprising that India is the largest user of groundwater in the world with an estimated 251 cubic kilometers of groundwater per year - over a quarter of the global total.
- Future Scenario:
 - As per the Ministry's 1993 & 1999 estimates the total utilizable water resources of the country is 1123 BCM. However, T N Narasimhan, Univ.of California, Berkely (2008) noted that the utilizable water resources is just 712 BCM and has nearly reached the demand of the day.
 - **The National Commission for Integrated Water Resources Development (NCIWRD-1999 GOI)**, assessed that the annual water requirement by the year 2025 and 2050 will be about 843 BCM and 1180 BCM respectively while other sources of latest information provide different, rather alarming picture.
 - **IWMI (2000)**: The International Water Management Institute (IWMI) Water Scarcity Study reveals that, by 2025 one-third of the populations of India (280 million people) live in regions that will face absolute water scarcity.
 - **2030 Water Resource Group (2009)** estimated that by 2030, demand in India will grow to almost 1.5 trillion m³ against current water supply of approximately 740 billion m³ with likely severe deficit unless concerted action is taken.
 - **World Bank (2012)**: If current trends continue, in 20 years about 60% of India's aquifers will be in a critical condition.
 - **Mihir Shah Committee (2016)**: If the current pattern of demand continues, about half of the demand for water will be unmet by 2030 (p.5)
- Thus the message is clear: unless we act today to manage our water resources responsibly, economically and productively, catastrophe is impending. Less water means, less food and nutritional security undermining of livelihoods and sustainability, slowdown of economy and finally poor quality of life.
- Water is a state subject. Thus any improvement in access, availability, utilization and quality invites the attention of critical and pivotal role for State Governments.

1. Existing Scheme under National Water Mission.

As part of its mandate, NWM envisaged preparation of a State Specific Action Plan on Water sector (SSAP-Water) for each State/UT aligning with the State Action Plans on Climate Change already prepared by the States/UTs since 2011.

The SSAP –Water was originally proposed to be comprised of 3 components viz.,

- a) Preparation of Status Report on Water Resources Development and Management.
- b) Impact of Climate change and Intervention to address, mitigate and adapt.
- c) State Specific Action Plan on Water (SSAP-Water)

The states were asked to prepare the SSAP-Water plans on their own. Accordingly, NWM funded 11 State Irrigation Departments-Andhra Pradesh, Arunachal Pradesh, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Tamil Nadu, Telangana, Uttarakhand and West Bengal through their identified expert institutions in a phased manner since 2015.

2. National Workshop on State-specific Action Plan on Water Dated 5th June 2017

All the 11 states that were provided with funds for SSAP-Water were invited to make presentation of their water plans in the National workshop wherein 32 States and UTs were present. Expert institutions viz., Central Water Commission, Central Ground Water Board, Indian Meteorological Dept, Indian Agricultural Research Institute (New Delhi), NEERI, NIH, NRSC, and others; and representatives of various ministries viz., Agriculture, Environment, Forests and Climate Change and others were also present in the workshop. In the said event, it was observed that most of the State plans presented were more of **Irrigation Plans and not Water plans** illustrating lack of understanding about multiple dimensions and Hydrological cycle approach of water among States.

In the same meeting, MD, NWM made a presentation on

- (i) Dimensions of Water
 - (a) Quantity viz., supply and demand, reflecting hydrological cycle and
 - (b) Quality dimension; and
- (ii) Insight into Water Governance
- (iii) Problem Analysis

3.1. An illustration of quantitative dimension of Water recognizing the unity and integrity of the hydrologic cycle is as given below:

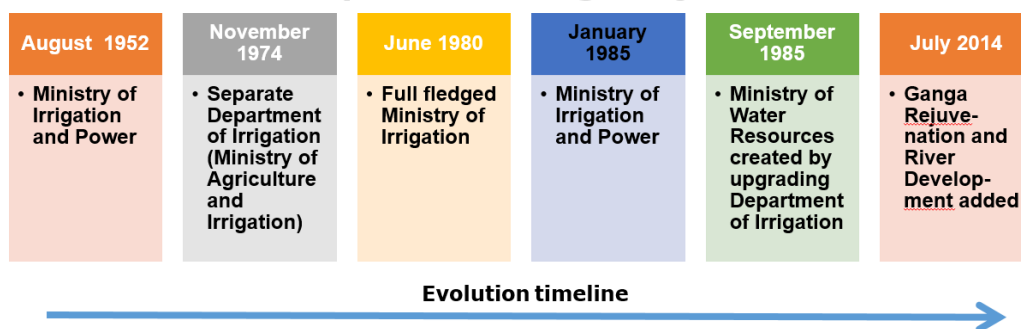
Supply / Source Side	Demand / Consumption side
1. Precipitation (Rainfall/ Snow)	1. Forestry and Wild Life
2. Glaciers	2. Farm sector
3. Springs	a. Agri- Horticulture- Rain fed & Irrigated
4. River Basins	b. Livestock, Birds and others
5. Projects- Irrigation / Multi-purpose	c. Fisheries & Others
6. Tanks	3. Industry & Infrastructure
7. Wetlands	a. Thermal Power Plants
8. Coastal Region	b. Iron and Steel
9. Ground Water Resources	c. Textiles and Jute
10. Waste Water	d. Paper and Pulp
	e. Other Industry
	f. Airports/Rail / Road Transport/etc
	4. Establishments / Institutions- Educational & Health Institutions
	5. Drinking water and Domestic use- Rural & Urban

3.2. Insights into Water Governance on a comparative study with Finance and Power- Single Agency coordination

1. In States, the subject of Water is mostly handled by the Irrigation Departments (though many have changed their names to Water Resource Departments while keeping the original organizational structure and mandate). These departments are mostly comprised of Engineers with a mandate limited to River Basins, Projects and command area, which fall under supply side. Thus it is not a surprise why Irrigation Departments have prepared Irrigation plans not Water Plans under SSAP-Water.

For that matter even the Central Ministry of Water Resources, River Development and Ganga Rejuvenation has nearly similar history.

Evolution of Ministry of Water Resources, River Development & Ganga Rejuvenation



- a. Secondly, in case of finance and power, the resource- money and energy is fully measured both at supply and demand end. Whereas in the case of water- with the exceptions of rainfall, reservoirs and ground water, the resource is mostly not measured both at supply and demand side.
- b. Thirdly, in the case of Finance, the superintendence and control over the sector both on supply and demand side viz., revenue generation and expenditure is with a single ministry. The control ensures that the expenditure is within the limits of revenue generation such that no sector can indulge expenditure beyond the allocation. In case any sector has more demand it has to engage negotiation with Finance Ministry for additional allocation but cannot have authority to extract on its own. Similarly, in case of Power Ministry, consumption of power by any sector shall be within the generation and allocation limits set by the Ministry.
- c. Paradoxically, with regard to superintendence and control of supply and demand of water resources, it is not with any single Ministry or Department rather in multitude of Ministries/ Departments both at Centre and State level. In other words, the governance is so widely distributed that there is no single agency responsible to monitor water resources. One result of such scenario is sub-optimal water use efficiency.

Water related Central Ministries/ Departments	
Supply / Source side	Demand / Consumption side
<ol style="list-style-type: none"> 1. Earth Sciences/ IMD- Precipitation 2. Defence-DRDO/SASE (Snow) 3. Science and Technology <ol style="list-style-type: none"> 1. DST (Glaciers & Springs/ Research) 2. Climate Change research 3. CSIR-Technology 4. Water Resources, River Development and Ganga Rejuvenation <ol style="list-style-type: none"> 1. Knowledge Management and Financing <ol style="list-style-type: none"> i. Rivers <ol style="list-style-type: none"> 1. Hydrology, Planning & Management 2. Irrigation Projects/ Reservoirs 3. Command Area Dev. 4. Dam Design & safety 5. Flood forecasting & Mgt 6. Cleaning: Ganga ii. Ground Water and Quality Assessment- Knowledge sharing iii. R&D, Capacity building, iv. NWM: Climate Change 2. Inter-state River Disputes 5. DoNER- WR development 6. Home Affairs / Disaster Mgt- Floods 7. Panchayat <ol style="list-style-type: none"> 1. Tanks & Wetlands & 2. Community participation 8. Rural Development <ol style="list-style-type: none"> 1. Water conservation & 2. Community participation 9. Housing and Urban Affairs <ol style="list-style-type: none"> 1. Tanks & Wetlands 2. Community participation 10. Environment, Forests and Climate Change <ol style="list-style-type: none"> 1. Waste Water & 2. Water Quality 3. Climate Change 	<p>Forestry and Wildlife</p> <ol style="list-style-type: none"> 11. Environment, Forests and Climate Change (Forestry/ Plantations & Wild life) <p>Farm Sector:</p> <ol style="list-style-type: none"> 12. Agriculture and Farmers Welfare-DACFW & DAHD <p>Industry</p> <ol style="list-style-type: none"> 13. Power- Thermal 14. Steel 15. Textiles 16. Paper & Pulp 17. MHIPE-Heavy Industries and Public Enterprises 18. Chemicals & Fertilizers, 19. MSME 20. Food Processing 21. Mines 22. Coal 23. Commerce & Industry 24. Electronics and IT <p>Infrastructure</p> <ol style="list-style-type: none"> 25. Road Transport and Highways 26. Railways 27. Shipping 28. Civil Aviation 29. Tourism 30. Housing and Urban Affairs <p>Establishments & Institutions</p> <ol style="list-style-type: none"> 31. Human Resources Development-DSEL & DHE 32. Health and Family Welfare 33. Housing and Urban Affairs <p>Drinking Water & Domestic usage</p> <ol style="list-style-type: none"> 34. Drinking Water and Sanitation- Rural 35. Housing and Urban Affairs-Urban

+ Ministry of Finance

- d. It is found that there are more than 30 Central Ministries related to Water in the Union and similar number of Departments in State Governments. To illustrate the implications, the Ministries/ Departments responsible for water consumption continue to draw and consume water without bothering water availability/ supply or recharge resulting in over withdrawal and excessive and wasteful use of water resources. In other words, currently there is neither planning nor control for judicious use of water with responsibility. The recent news report that 40% of India's Thermal Power Plants are in Water-Scarce Areas, threatening Shutdowns suggests the importance of water governance and water budgeting.
- e. Thus it is argued for single agency coordination for improved governance.

3.3. Problem Analysis:

The North-western, Western, central (Bundelkhand region) and southern region states are seriously suffering from declining water tables because of indiscriminate exploitation of ground water resources, while the states of eastern region, endowed with shallow water tables are affected with under utilisation. Rivers particularly peninsular rivers are shrinking because of decline in aquifers and the resulting low base flow contribution. In addition, much of waste water is unused. This manifestly demands better water management.

Of various reasons for steep decline in per capita availability of Water and for growing water scarcity, floods and quality challenges, one major reason is lack of effective control on annual water consumption (demand) exceeding the annual water availability (supply) and omissions to monitor and protect quality of water sources from contamination. The current scenario can at best be described as laissez faire where water consuming (demand) sectors are not concerned about water availability nor is there any state level single agency which oversees and coordinates to hold any sector or entity accountable for over exploitation and excessive use (demand).

It is this governance deficit that is majorly responsible for over exploitation, contamination (biological & chemical), inefficient and underutilization of precious water resources. National Water Mission has taken an initiative to bridge this critical water governance gap through an institutional mechanism of State Water Budgeting, on the lines similar to that of Financial budgeting.

Paradigm shift in discourse to address Water crisis: Hitherto ideas suggested to address Indian water crisis in academic discourse have been (a) bringing the subject of Water into the union list or in concurrent list through a constitutional amendment; or (b) empowering River basin authorities with the approval of co-basin states. Given the federal structure of our constitution, these suggestions are far from practicality. Thus in this context, the State Water Budgeting is a great enabler and empowering exercise for the states and UTs and for the country for water security, safety and sustainability.

3.4. Outcome of the Workshop

1. All the stakeholders unanimously agreed -
 - a. To the need to have single agency / department to be made responsible for coordinating all dimensions of Water and
 - b. To the proposal of State Water Budgeting on the lines of financial budget for responsible use of Water towards Water Security (Adequacy), Safety (Quality) and Sustainability under the supervision of one Agency/ Department at State or UT level, replacing the first component of Status Report component of SSAP-Water.
2. All the stakeholders also agreed that State Water Budgeting to be purposeful requires convergence and synergy of all the stakeholders of hydrological cycle and should be an annual exercise like that of financial budget for both responsible and efficient use of water through transparency and accountability.
3. State Water Budgeting requires preparation of plans for each of the components of Supply, demand and quality dimensions.
4. Thus the recommendation of the Workshop was that NWM should provide or facilitate a Model template for State Water Budgeting both for the uniformity and for cross comparison across the country.

3.5. Strategy adopted

1. The idea of a Water Budget was mooted in 5th June 2017 workshop and was brainstormed for its scientific basis, challenges, practicality and utility to accomplish the objectives of Water Security, Safety and Sustainability. The idea was further discussed incisively in a number of brainstorming sessions over 5 months involving 10 States, 30 Central Ministries related to Water, 60 National/Expert institutions, Industry associations, Civil society etc.
2. Finally, the state water budgeting methodology and template were finalized in consultation with all stakeholders in a National Workshop held on 23rd October 2017 and the same has been circulated to all States for implementation. It is expected that the first year will be a challenging year and the model will get evolved and matured in 5 years' time including its online digitization of process over a period.
3. In State Water Budget formulation, the State is taken as a spatial unit comprising of various Basins/Sub-basins while all other inputs/data necessary are to be brought/modified corresponding to spatial domain. The State Water Budget is aimed to look into the Supply side and Demand side of water. It requires assessment of Total Water Available, Utilizable Water out of the available water round the Hydrological/Water Year, Demands of Water from various Sectors for upcoming Water Year as well as Withdrawal and Consumptive Use for such sectors in last year (or for last five years) and finally the Outflows of Water from the System/State Boundary round the Water Year. The time scale unit from 1st June to 31st May is considered as Water Year for Water Budget. This will help to balance the Water Budget within the System Boundary in the form of the following Equation:

Input/Inflow of Water (round the Water Year) +/- Change in Storage of Water within the System (at the end of Water Year) = Consumptive Use of Water (round the Water Year) including losses + Output/Outflow of Water (round the Water Year)

In the exercise, the challenge has been documentation of State Water Budget duly incorporating various components of hydrological cycle. The process is both -intensive and extensive involving engagement of all the stakeholders.

4. The steps involved in the implementation of State Water Budgeting at State level are:
 - (i) Identification of Stakeholders
 - (ii) Orientation of stakeholders for Common understanding on Water- all of its dimensions, challenges and Water budgeting.
 - (iii) Diagnosis of the problem, performance management and budgeting using model template developed involving experts and stakeholders. Each of the supply/demand/quality sub-chapter template provided for
 - Status of measurement of water- Available, Utilisable, Demand, Supply and Consumption and Data Constraints/ Management
 - Problem Tree / Root cause Analysis: Cause, Effect and Interventions
 - Governance / Management
 - Water Financing and Economics
 - Bench marking and Performance Indicators: – for comparison across Districts/ Divisions/Basins/ Industrial Plants/ Units/ Products etc. covering aspects of

measurement, conservation, demand management, productivity, quality, economics etc.

- Reforms undertaken/ being undertaken/ proposed if any
- Road map of activities / tasks proposed with timelines.

(iv) Need for re-engineering of Water Governance for improved results.

3.6. Implementation: The preparation of State Water Budget is the responsibility of State Steering Committee headed by State / UT Chief Secretaries. The committee comprises of all stakeholders of water. A number of States have constituted the committees. Details are available in NWM website.

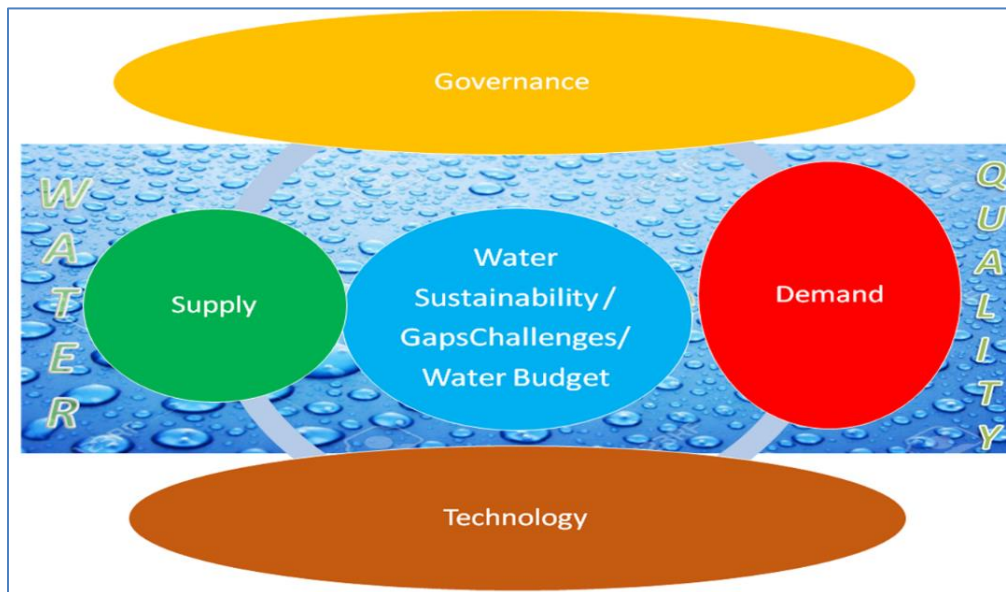
3.7. Transparency: The SSAP-Water: State Water Budgeting template is hosted in NWM website. The officials, experts and civil society involved in the exercise and proceedings of National Workshops and photographs too are available in the NWM website.

(<http://nwm.gov.in/?q=ssap-water-workshop-consultations>)

3.8. Sustainability: Human life is deeply connected with the water. More so in India as everybody is concerned with the water with the growing scarcity, quality concerns and its cost in daily life. Thus, the transparency in both water availability and consumption, will create required public opinion and by default propel the initiative to make it sustainable if it is successfully done for 5 years, for its inherent empowerment of the political representatives, public servants, general public and civil society in judicious use of interest.

Innovation: Transformative Formulation: State Water Budget for Water Security, Safety and Sustainability.

- a) Annual Financial Budgets are known as powerful institutional mechanisms of Governments and Corporate Bodies to effectively control expenditure within their income and thus check bankruptcy and deficits. Taking parallel, it is intended that water which is globally recognized as a very precious resource is to be used within the annual water availability and thus check over- exploitation, inefficiency and contamination through effective control.
- b) The goal of State Water Budget is to enable and empower the State or UT Governments to ensure that annual water withdrawals and consumption is within limits of annual (utilizable) water availability; using budgetary control similar to that of Finances viz.,
 - a. Measurement/estimation of resource (income and expenditure),
 - b. Allocation to different sectors /agencies/entities for development of ecosystem for sustainable supplies and consumption (demand); and
 - c. Allowing negotiation and revisions to meet emergency requirements.
- c) State Water Budgeting empowers the State Government in achieving Water Security, Safety and Sustainability through a wide array of interventions in 5 strategic areas viz.,
 - i. Water Governance- Improvement
 - ii. Supply Management
 - iii. Demand-side Management
 - iv. Water saving technology for improved Water Use Efficiency
 - v. Water Quality Management



It is a pioneering exercise in the country in a number of ways. Firstly, water flows across natural hydrological units while States are political administrative units, thus harmonization of these units has been the major challenge. It has been addressed by formulating water budgets first at basin level (considering aquifers therein) be it full or partial within the State boundary and then compiling & consolidating for the State as a whole. In other words, the total demand (including

futuristic demands as well) and total supply/availability are to be carried out first at the basin/ sub-basin level. Secondly the exercise promotes a measurement at all levels- supply, demand and quality which is a basic requirement for management. Thirdly the exercise enables single agency coordination under Water Resources Department for bringing in the required convergence and synergy. Above all it democratizes water governance with transparency and accountability.

In the words of Dr. A.D. Mohile one of the past chairman of CWC“the exercise should have been conceptualized 20 years back and would have saved the country from over exploitation and contamination”.

Merits / transformational outcomes of the initiative

With the institutionalisation of State Water Budgeting there will be a **paradigm shift in the current approach of managing water resources** in the years to come towards water security, safety and sustainability in the following ways viz.,

- a. **Holistic Hydrological cycle approach:** Hitherto water is seen compartmentally both by the Governments and citizens. With this exercise both- governments and non-government stakeholders are made to look at water as a multi-disciplinary & multi-dimensional activity- supply, demand, quality, technology etc. holistically and appreciate in hydrological cycle approach. The State Governments are constituting Steering Committees involving different stakeholders under the chairmanship of State Chief Secretary. So a very good beginning is being made.
- b. **Check deficits by balancing consumption with availability by an organised conflict approach:** Under this exercise, the states are expected to prepare State Water budgets by balancing annual water expenditure to annual water availability comprising estimates of availability and demand allocations to different departments/sectors for controlling water use like that of financial budget. Thus it puts a check on current *laisse faire* approach.
- c. **Culture of measurement and accountability:** The exercise not only encourage *AS IS* reporting of current status of measurement systems both at supply and demand side and on water quality; but also aimed to drive for wider arrangement and installation of measurement system by all providers and users both for proper management and accountability.
- d. **Paradigm shift in focus from Supply to Supply, Demand & Quality:** Hitherto much of India's water policies and interventions are supply oriented viz., irrigation projects/ reservoirs, command area development, Ground water, inter-linking of rivers etc. with no attention on demand side management with almost no attention on -water productivity in farm sector (more crop per drop), industry (more output per drop), establishments (more services per drop) and drinking water and domestic usage (water saving), water audits etc.. Thus this will be a paradigm shift in the existing approach.
- e. **Introduction of the concept of value for resource:** The exercise enables States to assess financing and economics of water for different uses, its rate of return and improved resource use efficiency to inject a sense of responsibility among political representatives, public servants and the general public.
- f. **Democratisation and transparency:** The exercise requires all the data to be made public, empowering citizens to make the water providers and users accountable. Thus it will deepen democracy in the use of nation's most precious Resource-Water as a common property with transparency in water productivity in comparison to the comparable efficient units / bench marking opening avenues for behavioural change through self-realisation/responsibility, incentivisation and penalisation.
- g. **Evidence based conflict resolution through transparency.**

In addition, the exercise, will contributes to sustainable food, nutritional, health and livelihood security, economic growth, reduces poverty and prepares both the states and the country in better addressing the impact of climate change.

Challenges of formulating a State Water Budget:

Given the complexity of formulating the state water budget methodology, a number of issues had to be taken into consideration:

Reconciliation of data from different sources, departments, hydrologic and political units

- Natural Surface Hydrological Unit, Administrative Unit (& Demand Centres) and Geo-Hydrological Unit (Aquifer) does not coincide
- Dynamic Hydrological Cycle (Variability, Fluctuations)
- Inadequate Monitoring of Hydrological Processes (Infiltration, Percolation, Interception, Depression Storage, Evapo-Transpiration, Overland Runoff)
- Lack of Precise Utilization Data (Supply, Consumptive Use, Return Flow)
- Large Scale Migration has impact on the Demand Pattern
- Technological advancements like solar based pumps, LIS, etc are changing the concept of water availability
- Changes like Land Use Pattern, Climate Change, geological modifications etc makes it dynamic and complex
- Demands directly met by Precipitation (RWH)
- Errors in Measurement, Precision of Equipment
- Unaccounted Utilization, Theft
- Multiple Departments dealing with Water (Irrigation, Water Resources, Rural Development, Agriculture etc); Lack of Convergence & Synergy in Water Governance;
- Non availability of Water Quality Data
- Constant interaction between Surface Water and Ground Water

Apportionment across Spatial Units & Temporal Units

- State Boundary is the System Boundary; The Basins/Sub-basins (full or partial) within the State will be the spatial units.
- The Districts, Blocks, Villages has to be apportioned as per the Basins/Sub-basins.
- Time Unit is a Water Year or Hydrological Year from 1st June present year to 31st May of next year.

Assessment of Utilizable Water must account for different factors including:

- Topography Constraints
- Hydro-Geological limitations of recharging Ground Water within a specified time
- Contamination and Water Quality issues
- Soil Moisture trapped in non agricultural areas
- Evaporation from Water Bodies
- Mandatory Downstream Releases (Inter State Tribunal/ International Water Treaty, Ecological Flows)

During the monsoon season, the precipitation (major source/supply of water) and the utilization (demand of various sectors) take place concomitantly and there is generally no dearth of water resources for satisfying the need. The final water budget will be ready once the monsoon season

is over i.e. approximately by the end of Kharif Season when the water in the reservoir, ground water, tanks, ponds, etc. will be available for use in different sectors from November till May (next year) which need to be allocated as per priority of use and other considerations.

Photographs





