



GOVERNMENT OF INDIA
MINISTRY OF WATER RESOURCES, RIVER DEVELOPMENT
& GANGA REJUVENATION

National Water Mission

TERMS OF REFERENCE (ToR)

FOR

**Preparation of State Specific
Action Plans for Water Sector**

TERMS OF REFERENCE

Part I Objective and Scope of Work

1. Background

Ministry of Water Resources, Government of India has launched National Water Mission as one of the eight National Missions, which form the core of the National Action plan for Climate Change (NAPCC), launched by the Hon'ble Prime Minister.

The main objective of the National Water Mission is “conservation of water, minimizing wastage and ensuring its more equitable distribution both across and within States through integrated water resources development and management”. The Comprehensive Mission Document of “National Water Mission” has identified following five goals;

I. Comprehensive water data base in public domain and assessment of the impact of climate change on water resource,

II. Promotion of citizen and state actions for water conservation, augmentation and preservation.

III. Focused attention to vulnerable areas including over-exploited areas,

IV. Increasing water use efficiency by 20%, and

V. Promotion of basin level integrated water resources management.

2. Purpose / objective of the assignment.

Various strategies for achieving the goals have been identified which lead to integrated planning for sustainable development and efficient management of water resources with active participation of the stakeholders after identifying and evaluating the development scenario and management practices towards better acceptability on the basis of assessment of the impacts of climate change on water resources based on reliable data and information.

Relatively very large temporal and spatial variation in rainfall and consequently in the river flow and ground water aquifers is an important feature of the water resources in India. Although the impact of climate change on water resources has not been accurately quantified, various studies indicate that the likely impact of climate change on water resources could contribute to further intensification of the extreme events. Further, the features of water resources – both the availability and the quality may also be considerably affected by the changes in the land use in the form of urbanization, industrialization and changes in the forest cover. Realizing that the various processes which influence the hydrologic cycle are of dynamic nature, precise quantification of the impact specifically due to climate change may not be a simple task and it would be necessary to make suitable assumptions at the initial stages.

It is apparent that in the context of likely impact of climate change on water resources, the most vulnerable areas in India would include (a) drought prone areas, (b) flood prone areas, (c) the coastal regions, (d) the region with deficient rainfall, (e) areas with over-exploited, critical and semi-critical stage of ground water development, (f) water quality affected areas, and (g) glacier/snow-fed river basins.

The water resources situation, its development, management and availability vary considerably from State to State. Many of the identified strategies/actions to achieve the goals of the NWM are required to be taken by the State Governments/Union Territories. In this context, it is highly desirable to develop State Specific Action Plans for Water Sector aligned with the State Action Plan on Climate Change formulated by the States under NAPCC which give the holistic roadmap to achieve the desired goals. The State specific Action Plans would essentially consist of:

- (a) Preparation of Status report on present situation of water resources development and management, water governance, Institutional arrangements, water related policies, cross-boundary issues and agreements etc of the State/Union Territory. The document should also define problems/issues related to all the aspects of water resources specific to the State.
- (b) Identifying a set of probable solutions to address the key issues/problem areas giving pros and cons of the solutions.
- (c) Preparation of detailed Action Plan for each of the Strategy/activity identified in the NWM to be implemented by the State/Union Territory.

3. Detailed scope of work / assignment.

The broad scope of work would be:

A. Preparation of Status Report on Water Resources Development and Management:

- i. Data in respect of water resources shall be collected/ compiled. The Status Report shall draw relevant latest information of the State Ministries/Departments/Agencies and Central Ministries/Departments/ Agencies. Primary data collection is not expected, however, if it becomes necessary to achieve the objective then may be collected. The source of information should be mentioned in the Status Report and where possible should be appended with the Report. All the maps being used in the reports may be converted in GIS format and put on Water Resources Information System (WRIS). The geo-spatial data may also be put in WRIS. The various data being collected for preparation of reports may be converted in to useful table/figures for easy understanding and inference.
- ii. Status report shall include assessment of gap in potential created and utilisation of water resources in domestic, irrigation and other sectors including recycle and reuse of water.
- iii. Organising State level workshops for dissemination of draft of the status report in order to obtain feedback about its correctness and completeness. Accordingly, relevant Government Officials, NGOs, other stakeholders should be invited in the workshop. National Water Mission and its goals should also be disseminated during the workshops. Status report shall be finalized incorporating the suggestions/ observation in the workshop.

The Status report shall broadly include following topics:

- (a) Introduction: Background, NAPCC, NWM;
- (b) About the State: Location, Physiography, Topography, Demography, Environment, Land use, Economy, Agriculture, Industries, Cities, Towns, Villages and other relevant details;
- (c) Water Resources of the State: General Climate (based on various meteorological parameters such as precipitation, temperature, humidity etc), river network, details of river basin/sub-basins, water bodies, glaciers etc, details hydro-meteorological and ground water, silt and water quality data observation/collection network of all agencies (Central/State/PSU/Private etc), type, frequency of measurement and duration of data availability, collection, digitization and compilation of all the available data, determination of trend of climate change in surface and ground water availability and demand (for the past period for which the data are available);
Quantitative estimate of domestic sewage/industrial effluent and extent of treatment.
- (d) Water Resources Planning and Development: Salient features of existing, ongoing and proposed WR projects, their planned water utilization and benefits (Domestic and Municipal water, Irrigation, Hydropower, Industrial, Navigation, environmental, recreation, Cultural etc), Monthly/ten-daily utilization details, details of sewage treatment plants (present, ongoing and proposed) alongwith their treatment capacities and point of discharge in river/canal/water bodies, recycling facilities in Industrial sector, Percentage water recycled, Reuse of treated domestic and Industrial sewage, treated waste water availability for appropriate reuse, Sedimentation trend in various reservoirs to ascertain the depletion in live storage over years, E-flow requirement (depth, discharge, extent/reach), Ecological assets and aquatic species to be protected by e-flows, number and importance, mapping of aquifers, water utilization in check dams and their effect on existing major/medium water resources projects and also on states allocated water share.

Surface and Ground water utilization (detailed estimates of demand and supply) with user wise percent division, Domestic water situation both urban as well as rural, Industrial water situation, Water quality.

System of Project investigation/preparation of DPR/techno-economic clearance/implementation/funding/operation & Maintenance, Details of Institutions involved in the Planning and Development.
- (e) Water Resources Management: Management in Irrigation water use, Command area development, Development & management in water stressed area, domestic water uses again both for urban (detailed with land use) as well as rural, details of reservoir operation, canal operation, flood zone mapping, ground water recharge, allocation for domestic water supply from all water bodies, water quality management, data collection of water utilization, traditional systems of water conservation/preservation/augmentation, waste water management etc. Details of Institutions involved in all the aspects of Management;
- (f) Irrigation and Agriculture: Existing cropping system/ crops/trees/farming system etc. and also recommended cropping system/ crops/trees/farming system suitable

to specific Agro Climatic conditions and ecological regions of the state based on water balance/budget of that region and crop/plant water and other requirements by various agriculture research institutes/Agencies.

Area under irrigation (surface and ground water), irrigation methods with area covered under each method.

- (g) Water Governance: State Water Policy, Water Regulatory Authority, Water related Acts and laws, Participatory Irrigation Management Act, Ground Water management act, Flood Plain Zoning Act, Dam Safety Act, inter-state issues, valid and subsisting Agreements, MOUs, effective award and decisions of tribunals, Non-Governmental agencies etc.
- (h) Water Resources Issues: Floods, Flash floods, Drainage congestion, water logging, landslides, Erosion of river banks/ coastal line, Present status of flood and erosion management, change in river flows, Lowering Ground water table, Saline water intrusion, Glacier melt, Glacial Lakes/GLOF, Water quality of river waters/ground water/ water bodies/domestic water supply, Drought, encroachment of water bodies/flood plains, watershed/catchment management, waste water and its treatment etc.;
- (i) Project related issues – Gap between irrigation potential created and utilized, Capacities enhancement of existing reservoirs, Institutional setup their specific mandates, Institutional, technical, managerial and implementation capacities, water use efficiency of irrigation projects/ domestic supply schemes/industrial uses, Salinity & Water logging in command areas, status of conjunctive use of water, details of water utilization by different sectors and issues due to competing demands, reservoir sedimentation, (un)reliability of water supply both in time as well in quantum, regular maintenance of water resources structures, Issues in implementation of on-going projects, water rates, paying capacity of water users etc.;
- (j) Documentation of Studies: Documentation of State/Region/Project/Issue specific studies carried out by the Academic Institutes, Research Agencies, International/National/State Agencies in respect of water resources.

B. Preparation of interim report

i. Assessment of impact of climate change

Assessment/study of impact of climate change on the Water resources sector in the state/basin shall be made for the next 30 years from year 2015. The Interim Report would include the latest available scenarios of impacts of Climate Change on State's water resources and how that may further affect the water resources services for various uses.

ii. Evolution of set of alternative interventions

- a. Evolution of a set of alternative interventions required to address each of issues/concerns identified in the Status Report in consultation with appropriate Central/State/UT Government Institutions, Local Government Bodies (Corporations/Municipalities/Panchayati Raj Institutions).
- b. All the strategies/activities identified under various goals of NWM assigned to the State Governments as given in Table-A shall be addressed in the Interim Report. Linkages with other remaining strategies/activities of NWM, Provisions in other related Missions under National Action Plan for Climate Change and State Action Plan for Climate Change (already prepared by the States/UTs), outcomes of various

studies undertaken by International agencies including ADB, World Bank etc. in the related areas should also be reviewed.

- c. Studies to meet various water demands (existing and projected) with water allocated to the state under present/contemplated infrastructure WR development in the state. Quantification of demands of various sectors (conflicting/competing/complementing).
- d. Interventions as Recycling /Reuse of *water* in suitable sectors such as horticulture/ agriculture, industry, energy production and even substitute to domestic water supply may be examined in different areas of the State.
- e. Priority of water resources development and management may be given to water stressed areas along with a plan to change the cropping pattern more suitable to the agro climatic conditions and water availability in the state.
- f. State Action Plan may also consider bringing more and more area under drip and sprinkler irrigation, especially with use of solar power. In the states having hilly areas, strengthening and developing water storage structures in natural formations of hilly areas may also be considered.
- g. The State Action Plan shall also include steps for enhancing the capacities of existing reservoirs and bridging the gap between the Irrigation potential created and utilized.
- h. Need assessment for sensitization, training and capacity building of Panchayati Raj Institutions, Urban Local Bodies, Water Users Associations and other stake holders throughout India in equitable and sustainable management of water resources with focus on water conservation, augmentation, preservation and efficient use. It may be emphasized that there is need for greater awareness on issues related to water at the level of the community. As part of NRLM, it is expected that in about seven-eight years 80-90 lakh SHGs of women would be formed and federated into village and block levels, concerning different aspects of water. This aspect may be dealt in much detail. The Report shall also give a thought to way forward for each and every issue.
- i. Development of region and target group wise modules/training materials/audio-visuals as per the findings of above needs assessment. Capacity building/skill development activities should also include various on farm water management practices like land leveling, mulching, bunding, ridge & furrow, raised basin etc. along with other application and soil management practices. Also, Develop modules for interactive sessions for Policy makers for sensitization.
- j. Proposal for specific roles of Panchayati Raj Institutions especially in respect of traditional water bodies and minor irrigation may be formulated. It may be noted that more than 75% of MGNREGS is planned for and implemented by PRIs and bulk of the projects relate to Natural Resources Management. Therefore, strengthening of PRIs for local NRM (beyond ground water regulation) may be elaborated.
- k. Extensive plan for convergence of Integrated Watershed Management Project and MGNREGS to achieve goal of PMKSY.

- l. Develop viable mechanisms for coordination among various State agencies/departments/ULBs and other stakeholders related to water sector for effective convergence and integration of their programmes related to water resources development and management in holistic manner with the aim of efficiently utilising every drop of water.
 - m. Mechanisms for coordination among Co-Basin States shall also be developed in consultation with other co-basin states and fitting the state action plan in overall River Basin Master Plan as per the sustainable development capacity of river basin.
 - n. Short listing of feasible alternatives and detailed analysis to evaluate them in terms of cost involved, benefits, adverse impacts and sustainability over time (cost-benefit analysis, multi-criteria analysis etc)
- iii. Organising Second State level workshop**
Organising second State level workshop for dissemination of Interim Report in order to seek views for suggested alternative interventions, any other ideas and for appropriateness of suggested way forward. Accordingly, relevant Government Officials, NGOs, other stakeholders should be invited in the workshop.
- iv. Organize sessions in the state for Policy makers for sensitization.**

C. Preparation of State Specific Action Plans

- i. Preparation of State Specific Action Plans which shall be built on the interim report and suggestions/comments received during the Interim level workshops with appropriate roles of Central/State agencies, fund requirement and possible sources of funding.
- ii. The final draft of the State Specific Action Plans should be thoroughly discussed in third State level workshop. The invitees should include High level Officers involved in final decision making, planning and policy making.
- iii. The State Specific Action Plans should be finalized after suitably incorporating suggestions/comments received during the workshops.

Table-A

Goal-wise strategies/activities required to be implemented by the States/UTs are tabulated below with expectation against each of the strategy/activity.

Strategies		Expectation from the State / UT
0.2	Setting up of Climate Change Cells in States/UTs	Status of creation of climate change cells, particularly for water resources in the States, review of functioning of the cell(s), and suggest improvements. The climate change cells are expected to keep themselves abreast with the current knowledge/developments in the field, coordinate implementation of all the strategies/activities of NWM at State level and act as catalyst to achieve the goals of the NWM.
1.1.c	Collection of necessary additional hydro meteorological and hydrological data for proper assessment of impact of climate change particularly in Himalayan region, coastal region etc including other improvements required in hydrometric networks to appropriately address the issues related to the climate change. The data should inter-alia include (i) Coastal and estuarine water, salinity and tidal water levels and the changing discharges in both directions in estuarine areas,(ii) Hydrological and hydro-meteorological data in low rainfall areas, (iii) Hydrological and hydro-meteorological data above permanent snowline, glaciated areas, seasonal snow areas in Himalayan region, (iv) Better network for collection of evaporation and rain gauge data using automated sensors, (v) Establishment/strengthening of ground water monitoring network through construction of purpose built observation wells, sanctuary wells for coastal aquifer management and water quality monitoring, (vi) Repeated collection of data about river geometry and morphology for monitoring erosion and carrying capacity, (vii) Massive tidal hydraulics data collection, and (viii)	Complete inventory of data collection network/sites of all the hydrological and meteorological parameters including the frequency and period of data availability and organization which is keeping the data. Suggest data collection locations along with methodology.

Strategies		Expectation from the State / UT
	Surface and ground water quality data collection.	
1.2	Development of Water Resources Information System and development of Web enabled Ground Water Information System and placing them in public domain	Review the present system of data keeping related to all the aspects of water resources and recommendations for putting water related information on the WRIS and Ground Water Information System by the state agencies.
1.6.b	Comprehensive Reassessment of The groundwater resources up to Block / Mandal / Taluka level for the entire country	Status of reassessment exercise pertaining to the State/UT.
2.1.a	Interactive session with policy makers for sensitization	Develop modules for interactive sessions and also organize a few sessions in identified states (5 Nos)
2.1.b	Capacity building for professionals from various departments / organizations associated with water resources development and management	Identify the capacity needs /requirements, Gaps and ways to bridge the Gap. Sample surveys may also be carried out in related institutions/ organisations.
2.2.b	States to enact appropriate Participatory Irrigation Management (PIM) Act.	Status of the enactment, its effectiveness in implementation. Key issues, if not enacted and recommendations for way forward.
3.1. a	Expeditious implementation of major and medium irrigation projects by States in areas / situations sensitive to climate change. [Creation of storage of 64 BCM is targeted through completion of on-going 205 major & medium irrigation projects during XI Plan. Creation of 9 Mha of irrigation potential is targeted through major & medium irrigation projects (including ERM projects)]	Present situations of water resources development. Institutional readiness, Bottlenecks in implementation, review of provisions in plan & non-plan and way forward.
3.1.b	Expeditious implementation of ERM of irrigation projects by States in areas / situations sensitive to climate change	
3.1.c	Expeditious implementation of minor irrigation schemes including schemes for ground water development by States in areas	

Strategies		Expectation from the State / UT
	/ situations sensitive to climate change.	
3.2	Promotion of traditional system of water conservation - expeditious implementation of programme for repair, renovation and restoration of water bodies in areas /situations sensitive to climate change by (i) Increasing capacity of minor tanks, and (ii) Rehabilitating water bodies, with changed focus.	
3.3.b	Expeditious implementation of programme for conservation of water through recharge of ground water including rainwater harvesting in areas / situations sensitive to climate change	
3.3.d	Promotion of a Panchayat /district level model for ground water regulation.	Study the present regulation mechanism and suggestion for new /modified system.
3.3.e	Exploration of ground water including ground water exploration to decipher deeper fresh water aquifers up to 1000/1500m	Recommendation based on the ground water situation in the State/UT or part of it.
3.4.a	Rainwater harvesting and artificial recharge to ground water	A present day status and suggestions for upscaling, if feasible and also suggest policy initiatives. The water quality aspects need to be studied and discussed in detail.
3.4.b	Expansion of program for recharge of ground water through dug wells State Governments and CGWB	
3.5	Conservation and preservation of wetlands	
3.8.a	Mapping of areas likely to experience floods, establishing hydraulic and hydrological models and developing comprehensive schemes for flood management & reservoir sedimentation	Present status of flood management, mathematical modeling, mapping and capacity of State or national agencies. Review of flood management issues both structural and non- structural and ameliorative measures for flood management & reservoir sedimentation.
3.8.b	Encourage and enforce flood plain zoning in flood prone rivers.	Present status, issues related to enforcement, suggest alternatives, if any.
4.1	Research in area of increasing water use efficiency and maintaining its quality in agriculture, industry and domestic sector.	Institutional capacity of the States; Suggestions for mainstreaming the concept of WUE and bench marking in all the sectors. Likely bottlenecks and solutions
4.2.d	Strict enforcement of provisions in respect of waste water treatment	Present status, issues related to enforcement, suggest alternatives, if any.

Strategies		Expectation from the State / UT
4.7.a	Pilot project for improving water use efficiency.	Present status and readiness of the States. Action plan for increasing output per unit of water i.e. looking at engineering and agronomic aspects in conjunction. Expeditious improvement of canal conveyance/ distribution network and coverage of micro irrigation in the State. Likely bottlenecks and solutions.
4.7.b	Pilot project for improving efficiency of water system	
4.8	Promote Water Regulatory Authorities for ensuring equitable water distribution and rational charges for water facilities.	Present status in the State/UT, suggest framework for the Regulatory Authority.
4.12	Incentivize use of efficient irrigation practices and fully utilize the created facilities.	Present status and suggestions on policy level and for implementation.
4.12.b	Initiation of actions by the States and other agencies.	Recommendation for Efficient energy management and energy efficient lifting devices to encourage small and marginal farmers to use ground water where it is available in abundance and not explored due to economic constraints i.e. excessive energy cost.
5.2	Review of State Water Policy.	Present status.
5.4.c	Adoptions and application of guidelines by project authorities and appraising agencies.	Present status and way forward.