Draft

Uttar Pradesh State Water Policy, 2020

1. PREAMBLE

A scarce natural resource, water is fundamental to life, livelihood, food security and sustainable development. The State of Uttar Pradesh is endowed with bountiful water resources which were considered abundant but because of increasing demand for various purposes namely irrigation, drinking and domestic, power (thermal and hydro), industrial and other uses, its scarcity is becoming apparent which shall get more pronounced with increasing population. Uttar Pradesh accounts for 16.17 % of the country's population and has 20.80 % of country's renewable water resources with 7.33 % of country's land area. There are further limits on utilizable quantities of water owing to uneven distribution over time and space. In addition, there are challenges of frequent floods and droughts in one or the other part of the state.

With a growing population and rising needs of a fast developing state as well as the given indications of the impact of climate change, availability of utilizable water will be under further strains in future with the possibility of deepening water conflicts among different user groups. Low consciousness about the scarcity of water and its life sustaining and economic value results in its mismanagement, wastage and inefficient use, as also pollution and reduction of flows below minimum ecological needs. In addition, there are inequities in distribution and lack of a unified perspective in planning, management and use of water resources. The objective of the State Water Policy is to take cognizance of the existing situation and to propose a framework for creation of a system of laws and institutions and for a plan of action with a unified state perspective.

2. CONCERNS ABOUT WATER RESOURCES IN THE STATE

The present scenario of water resources and their management in Uttar Pradesh has given rise to several concerns, important amongst them are;

(i) Large parts of Uttar Pradesh have already become water stressed. Rapid growth in demand for water due to population growth, urbanization and changing lifestyle pose serious challenges to water security.

(ii) Issues related to water governance have not been addressed adequately. Mismanagement of water resources has led to a critical situation in many parts of the state.

(iii) There is wide temporal and spatial variation in availability of water, which may increase substantially due to climate changes, causing more water crisis and incidences of water related disasters, i.e., floods, increased erosion and increased frequency of droughts, etc.

(iv) Climate change may also have an impact on habitations, agriculture and industry in the state.

(v) Access to safe water for drinking and other domestic needs still continues to be a problem in many areas. Skewed availability of water between different regions and different people in the same region and also the intermittent and unreliable water supply system has the potential of causing social unrest.

(vi) Groundwater, though part of hydrological cycle and a community resource, is still perceived as an individual property and is exploited inequitably and without any consideration to its sustainability leading to its over-exploitation in several areas.

(vii) Water resources projects, though multi-disciplinary with multiple stakeholders, are being planned and implemented in a fragmented manner without giving due consideration to optimum utilization, environment sustainability and holistic benefit to the people.

(viii) Inter-regional, inter-State, intra-State, as also inter-sectoral disputes in sharing of water, strain relationships and hamper the optimal utilization of water through scientific planning on basin/sub-basin basis.

(ix) Grossly inadequate maintenance of existing irrigation infrastructure has resulted in wastage and under-utilization of available resources. There is a widening gap between irrigation potential created and utilized.

(x) Natural water bodies and drainage channels are being encroached upon, and diverted for other purposes. Ground water recharge zones are often blocked.

(xi) Growing pollution of water sources, especially through industrial effluents, is affecting the availability of safe water besides causing environmental and health hazards. In many parts of the State, large stretches of rivers are both heavily polluted and devoid of flows to support aquatic ecology, cultural needs and aesthetics.

(xii) Access to water for sanitation and hygiene is an even serious problem. In adequate sanitation and lack of sewage treatment are polluting the water sources.

(xiii) Low consciousness about the overall scarcity and its economic value of water results in its wastage and inefficient use.

(xiv) The lack of adequate trained personnel for scientific planning, utilizing modern techniques and analytical capabilities incorporating information technology constrains good water management.

(xv) A holistic and inter-disciplinary approach at water related problems is missing.

(xvi) The public agencies in charge of taking water related decisions tend to take these on their own without consultation with stakeholders.

3. BASIC PRINCIPALS OF POLICY

Public policies on water resources need to be governed by certain basic principles, so that there is some commonality in approaches in dealing with planning, development and management of water resources. These basic principles are:

(i) Planning, development and management of water resources need to be governed by **State/National** perspectives on an integrated and environmentally sound basis, keeping in view the human, social and economic needs.

(ii) Principle of equity and social justice **must be used for** allocation of water.

(iii) Good governance through informed decision making is crucial to the objectives of equity, social justice and sustainability.

(iv) Water needs to be managed as a community resource held, by the state, under public trust doctrine to achieve food security, livelihood, and equitable and sustainable development for all.

(v) Access to safe and clean drinking water and sanitation should be regarded as a right to life essential to the full enjoyment of life and all other human rights. As such, water for such human needs should have a pre-emptive priority over all other uses.

(vi) Water, over and above the pre-emptive need for safe drinking water and sanitation, should be treated as an economic good so as to promote its conservation and efficient use.

(vii) Water is essential for sustenance of eco-system, and therefore, ecological needs should be given due consideration.

(viii) All the elements of the water cycle, i.e., evapo-transpiration, precipitation, runoff, river, lakes, soil moisture, and ground water, etc., are interdependent. The basic hydrological unit is the river basin, which should be considered as the basic unit for planning.

(ix) Water quality and quantity are interlinked and need to be managed in an integrated manner, consistent with broader environmental management approaches inter-alia including the use of economic incentives and penalties to reduce pollution and wastage.

(x) The impact of climate change on water resources availability must be factored into water management related decisions.

4. WATER AVAILIBILITY

4.1 In Irrigation sector, which has so far been the principal consumptive user, about 43.8 BCM of surface water and about 48.5 BCM (net) of ground water has been utilized out of the total of about 161.64 BCM of surface water and about 65.31 BCM exploitable (total replenishable 79.92 BCM) ground water resources of the state. Another about 27.8 BCM of surface water shall get utilized after completion of on-going projects. 43.2 BCM is the quantity which cannot be utilized at present. Thus there remains only about 22.2 BCM, which can be utilized for future irrigation projects after reserving about 24.67 BCM for drinking, industrial and pollution control.

4.2 It is estimated that for domestic, industrial and irrigations needs of growing population, the level of ground water exploitation will increase from 45.58 BCM to 72.06 BCM by 2025 which will increase the requirement of ground water from the present level. Tubewells are the major source of irrigation followed by canals, tanks and lakes which makes the dependency upon ground water larger than the dependency on surface water.

4.3 State has a total of 19.13 mha of culturable land out of which about 16.5 mha. is presently under agriculture. The food grains requirement for the projected population by the year 2030, irrigation facilities shall have to be adequately provided by harnessing the untapped potential and also by bringing about improvement in the management of water resources.

4.4 Water for drinking and domestic use has the highest priority while allocating the water resources of the state. The state has to provide adequate drinking water facilities (both for people and livestock) to the entire population in both urban and rural areas. Sanitation facilities for entire population in urban areas and most of the rural areas should also be provided.

4.5 The state has been perennially short of power. Apart from shortfall in total energy requirements, the shortage of peak power is more acute. Hydel power is most suitable to take up the peak loads in addition to being environment friendly and using renewable resource.

4.6 The present industrial status of the state calls for a quantum jump in the industrial development, which shall have substantial requirement of water to be used consumptively. Adequate provision in water resource planning shall be made for industrial use also.

4.7 Adequate provision for ecological, navigational, recreational and other purposes has also to be made. The quantity of water, its protection against pollution and safeguards against water related health hazards are also key concerns.

5. ALLOCATION PRIORITIES

5.1 In the planning and operation of systems, the state water allocation priorities should be broadly as below:

- Drinking and Domestic use
- Environmental flow
- Irrigation
- Hydro and thermal power
- Agro industries and non agricultural industries
- Navigation and other uses

These priorities might be modified, if necessary, in particular region with reference to area specific considerations.

6. WATER FRAMEWORK LAW

There is a need for comprehensive legislation for optimum development of inter-State rivers and river valleys to facilitate inter-State coordination ensuring scientific planning of land and water resources taking basin/sub-basin as unit with unified perspectives of water in all its forms (including precipitation, soil moisture, ground and surface water) and ensuring holistic and balanced development of both the catchments and the command areas. Such legislation needs, inter-alia, to deal with and enable establishment of basin authorities with appropriate powers to plan, manage and regulate utilization of water resource in the basins.

7. USES OF WATER

7.1 Water is required for domestic, **environmental flow**, irrigation, industries, agriculture, hydro-power, thermal power, navigation, recreation etc. Utilization in all these diverse uses of water should be optimized and an awareness of water as a scarce resource should be fostered.

7.2 The State and the local bodies (governance institutions) must ensure access to a minimum quantity of potable water for essential health and hygiene to all its citizens, available within easy reach of the household.

7.3 Ecological needs of the river should be determined, through scientific study, recognizing that the natural river flows are characterized by low or no flows, small floods (freshets), large floods, etc., and should accommodate developmental needs. A portion of river flows should be kept aside to meet ecological needs ensuring that the low and high flow releases are proportional to the natural flow regime, including base flow contribution in the low flow season through regulated ground water use.

7.4 Rivers and other water bodies should be considered for development for navigation as far as possible and all multipurpose projects over water bodies should keep navigation in mind right from the planning stage.

7.5 Community should be sensitized and encouraged to adapt first **utilize** of water as per local availability of waters, before providing water through long distance transfer. Community based water management should be institutionalized and strengthened.

8. ADAPTATION TO CLIMATE CHANGE

8.1 Climate change is likely to increase the variability of water resources affecting human health and livelihoods. Therefore, special impetus should be given towards mitigation at micro level by enhancing the capabilities of community to adopt climate resilient technological options.

8.2 The anticipated increase in variability in availability of water because of climate change should be dealt with by increasing water storage in its various forms, namely, soil moisture, ponds ground water, small and large reservoirs and their combination. Districts and blocks should be incentivized to increase water storage capacity, which inter-alia should include revival of traditional water harvesting structures and water bodies.

8.3 The adaptation strategies could also include better demand management, particularly, through adoption of compatible agricultural strategies and cropping patterns and improved water application methods, such as land leveling and /or drip/sprinkler irrigation as they enhance the water use efficiency, as also, the capability for dealing with increased variability because of climate change. Similarly, industrial processes should be made more water efficient.

8.4 Stakeholder participation in land-soil-water management with scientific inputs from local research and academic institutions for evolving different agricultural strategies, reducing soil erosion and improving soil fertility should be promoted. The specific problems of hilly areas like sudden run off, weak water holding capacity of soil, erosion and sediment transport and recharging of hill slope aquifers should be adequately addressed.

8.5 Planning and management of water resources structures, such as Dams, Barrages, Flood embankments, etc., should incorporate coping strategies for possible climate changes. The acceptability criteria in regard to new water resources projects need to be re-worked in view of the likely climate changes.

9. ENHANCING WATER AVAILABLE FOR USE

9.1 In view of the water resources (surface and ground water) availability of the state and the status of present use and to cater for future needs, judicious and optimal exploitation, utilization, conservation and management of this limited resource is imperative. The availability of water resources and its use by various sectors in various basins in the State need to be assessed scientifically and reviewed at periodic intervals, say, every five years. The trends in water availability due to various factors including climate change must be assessed and accounted for during water resources planning. Such a planning should also address to reconcile the conflicts, if they arise, between different uses.

9.2 As per present estimate, Uttar Pradesh receive on average annual precipitation of about 228.28 Billion Cubic Meter (BCM), which is its basic water resource. Out of this, after considering the natural evaporation- transpiration, only about 161.64 Billion Cubic Meter (BCM) is average annual natural flow through rivers. Of this, only about 118.47 BCM is utilizable through the present strategies, if large inter-basin transfers are not considered. Thus, the availability of water is limited but the demand of water is increasing rapidly due to growing population, rapid urbanization, rapid industrialization and economic development. Therefore, availability of water for utilization needs to be augmented to meet increasing demands of water. Direct use of rainfall, desalination and avoidance of inadvertent evapo-transpiration are the new additional strategies for augmenting utilizable water resources.

9.3 There is a need to map the aquifers to know the quantum and quality of ground water resources (replenishable as well as non-replenishable) in the state. This process should be fully participatory involving local communities. This may be periodically updated.

9.4 Declining ground water levels in over-exploited areas need to be arrested by introducing improved technologies of water use, incentivizing efficient water use and encouraging community based management of aquifers. In addition, artificial recharging projects, where necessary, should be undertaken so that extraction is less than the recharge. This would allow the aquifers to provide base flows to the surface system and maintain ecology.

9.5 Inter-basin transfers are not merely for increasing production but also for meeting basic human need and achieving equity and social justice. Inter-basin transfers of water should be considered on the basis of merits of each case after evaluating the environmental, economic and social impacts of such transfers. The inter- basin transfer of water to recharge depleting ground waters in water stressed areas and also to cater for the flood water should be encouraged. If the transfer is from an open basin to a closed basin, increased water use is achieved. Such transfers need to be encouraged.

9.6 Integrated Watershed development activities with groundwater perspectives need to be taken in a comprehensive manner to increase soil moisture, reduce sediment yield and increase overall land and water productivity. To the extent possible, existing programs like MGNREGA **should be continued** by farmers to harvest rain water using farm ponds, dug-wells and other soil and water conservation measures.

10. DEMAND MANAGEMENT AND WATER USE EFFICIENCY

10.1 The management of water resources for diverse and optimum uses should be done by adopting participatory approach by involving not only the various governmental agencies but also the users and other stakeholders in an effective and decisive way in various aspects of planning, design, development and management of the water resources scheme. The provisions of the Uttar Pradesh Participatory Irrigation Management Act, 2009 and the rules and regulations made there under should be followed.

10.2 A system to evolve benchmarks for water uses for different purposes, i.e., water footprints and water auditing should be developed to promote and incentivize efficient use of water. The “project” and the “basin” water use efficiencies need to be improved through continuous water balance and water accounting studies. An institutional arrangement for promotion, regulation and evolving mechanisms for efficient use of water at basin/sub-basin level will be established for this purpose at the State level.

10.3 Given the limits on enhancing the availability of utilizable water resources and increased variability in supplies due to climate change, meeting the future needs will depend more on demand management, and hence, this needs to be given priority, especially through:

(a) evolving an agricultural system which economizes on water use and maximizes value from water, and

(b) bringing in maximum efficiency in use of water and avoiding wastages.

(c) **State should encourage farmers to adopt crops suitable in accordance with availability of water in basin/sub basin and establish facilities for value addition to produced crop suitable for each basin/sub basin.**

10.4 The project appraisal and environment impact assessment for water uses, particularly for industrial projects, should, inter-alia, include the analysis of the water footprints for the use.

10.5 Recycle and reuse of water, including return flows, should be the general norm.

10.6 Project financing should be structured to incentivize efficient and economic use of water and facilitate early completion of ongoing projects.

10.7 Water saving in irrigation use is of paramount importance. Methods like aligning cropping pattern with natural resource endowments, micro irrigation (drip, sprinkler, etc.), automated irrigation operation, evaporation-transpiration reduction, etc., should be encouraged and incentivized. Recycling of canal seepage water through conjunctive ground water use may also be considered.

10.8 Use of very small local level irrigation through small bunds, field ponds, agricultural and engineering methods and practices for watershed development, etc, need to be encouraged. However, their externalities, both positive and negative, like reduction of sediments and reduction of water availability, downstream, may be kept in view.

10.9 There should be concurrent mechanism involving users for monitoring if the water use pattern is causing problems like unacceptable depletion or building up of ground waters, salinity, alkalinity or similar quality problems, etc., with a view to planning appropriate interventions.

11. WATER PRICING

11.1 Pricing of water should ensure its efficient use and reward conservation. Equitable access to water for all and its fair pricing, for drinking and other uses such as sanitation, agricultural and industrial, should be arrived at through independent **Water Management and Regulatory Commission** after wide ranging consultation with all stakeholders.

11.2 In order to meet equity, efficiency and economic principles, the water charges should preferably, as a rule, be determined on volumetric basis, after ascertaining the views of the beneficiary public, based on the principle that the water charges shall reflect the full recovery of the cost of administration, operation and maintenance of water resources projects taking into account the cross subsidy, if any. **In case of water pricing for irrigation purposes, firstly water rates should be determined on the basis of per watering in area before arrival on volumetric determination.**

11.3 Recycle and reuse of water, after treatment to specified standards, should also be incentivized through a properly planned tariff system, in which there is a cost for the quantity withdrawn, a refund for properly treated water returned for reuse, and heavy fines for returning polluted waters.

11.4 The principle of differential pricing may be retained for the pre-emptive uses of water for drinking and sanitation; and high priority allocation for ensuring food security and supporting livelihood for the poor. Available water, after meeting the above needs, should increasingly be subjected to allocation and pricing on economic principles so that water is not wasted in unnecessary uses and could be utilized more gainfully.

11.5 Water Users Associations (WUAs) should be given statutory powers to collect and retain a portion of water charges, manage the volumetric quantum of water allotted to them and maintain the distribution system in their jurisdiction.

11.6 Heavy under-pricing of electricity leads to wasteful use of both electricity and water. The over-drawal of groundwater should be minimized by regulating the use of electricity for its extraction. Separate electric feeders for pumping groundwater for agricultural use should be considered.

12. CONSERVATION OF RIVER CORRIDORS, WATER BODIES AND INFRASTRUCTURE

12.1 Conservation of river corridors, water bodies and infrastructure should be undertaken in a scientifically planned manner through community participation. Waterway transportation should be promoted wherever possible. The storage capacities of water bodies and water courses and/or associated wetlands, the flood plains, ecological buffer and areas required for specific aesthetic recreational and/or social needs may be managed to the extent possible in an integrated manner to balance the flooding, environment and social issues as per prevalent laws through planned development of urban areas, in particular.

12.2 Encroachments and diversion of water bodies (like rivers, lakes, tanks, ponds, etc.) and drainage channels (irrigated area as well as urban area drainage) must not be allowed, and wherever it has taken place, it should be restored to the extent feasible and maintained properly.

12.3 Urban settlements, encroachments and any developmental activities in the protected upstream areas of reservoir/water bodies, key aquifer recharge areas that pose a potential threat of contamination, pollution, reduced recharge and those endanger wild and human life should be strictly regulated.

12.4 Recycle and reuse of water, including return flows, should be practiced wherever possible.

12.5 Environmental needs of hilly regions, aquatic eco-system, wet lands and embanked flood plains need to be recognized and taken into consideration while planning.

12.6 Efforts should be made to ensure that the sources of water and water bodies do not get polluted. System of third party periodic inspection should be evolved and stringent punitive actions should be taken against the persons responsible for pollution.

12.7 Quality conservation and improvements are even more important for ground waters, since cleaning up is very difficult. It needs to be ensured that industrial effluents, local cess pools, residues of fertilizers and chemicals, etc., do not reach the ground water.

12.8 The water resources infrastructure shall be maintained properly to continue to get the intended benefits. A suitable percentage of the costs of infrastructure development may be set aside along with collected water charges, for repair and maintenance. Contract for construction of projects should have inbuilt provision for longer periods of proper maintenance and handing over back the infrastructure in good condition.

12.9 Legally empowered dam and barrage safety services need to be ensured in the State. Appropriate safety measures, including downstream flood management, for each dam and barrage should be undertaken on top priority.

13. PROJECT PLANNING AND IMPLEMENTATION

13.1 Considering the existing water stress conditions in the State and the likelihood of worsening situation due to climate change and other factors, water resources projects should be planned as per the efficiency benchmarks to be prescribed for various situations.

13.2 Being inter-disciplinary in nature, water resources projects should be planned considering social and environmental aspects also in addition to techno-economic considerations in consultation with project affected and beneficiary families. The integrated water resources management with emphasis on finding reasonable and generally acceptable solutions for most of the stakeholders should be followed for planning and management of water resources projects.

13.3 A river basin or a sub-basin in case of surface water along with the corresponding aquifer for ground water should be considered as a unit of development while planning water resources of the state rather than consideration of an individual project. The planning of such a unit should take into account the present status of development and consider surface and under ground water as a unitary resource ensuring their optimal conjunctive use wherein drainage should also be considered as its integral part.

13.4 The priorities of development should also be aimed at reducing the existing regional imbalances. In this context, transfer of water from surplus to scarcity areas should also be considered.

13.5 The occurrence of surface water in the state is unevenly distributed both in time and space and the under ground water is unevenly distributed in space. This aspect should be duly addressed while formulating projects.

13.6 Water harvesting should be given consideration in planning water resources. Viable projects, especially in scarce ground water areas, should be investigated and implemented to increase the surface water availability would also help in recharging the ground water.

13.7 Flood protection should be considered as an essential component while planning water resources of a basin or sub-basin.

13.8 Considering the heavy economic loss due to delay in implementation of projects, all clearances, including environmental and investment clearances, be made time bound.

13.9 Concurrent monitoring at project, district and State level should be undertaken for timely interventions to avoid time and cost over-runs.

13.10 All components of water resources projects should be planned and executed in a *pari-passu* manner so that intended benefits start accruing immediately and there is no gap between potential created and potential utilized.

13.11 Local governing bodies like Panchayats, Municipalities, Corporations, etc., and Water Users Associations, wherever applicable, should be involved in planning of the projects. The unique needs and aspirations of the Scheduled Caste and Scheduled

Tribes, women and other weaker sections of the society should be given due consideration.

13.12 All water resources projects, including hydro power projects, should be planned to the extent feasible as multi-purpose projects with provision of storage to derive maximum benefit from available topology and water resources.

14. RESETTLEMENT AND REHABILITATION

14.1 The study of the impact of a project, during construction and afterwards, on human lives, settlements, occupations, economic and other aspects should be an essential component of water resource planning. Since this is an aspect which affects all kinds of development activities and has wide ramifications, a multidisciplinary task force should be constituted to lay down the general principles and also assist in formulating individual projects.

14.2 The identification, resettlement & rehabilitation of project affected families shall be given due consideration right at the beginning of the project formulation. In addition to compensation for loss of land, house and sustenance livelihood, the project affected families **may be considered as** partners in progress and given a share in the benefits comparable to project benefited families.

14.3 The cost of rehabilitation and compensation to the project affected families should be borne by the project.

14.4 The resettlement & rehabilitation policy for water resources project should conform to the national act / guidelines in this regard.

15. MANAGEMENT OF FLOOD & DROUGHT

15.1 While every effort should be made to avert water related disasters like floods and droughts, through structural and non-structural measures, emphasis should be on preparedness for flood / drought with coping mechanisms as an option. Greater emphasis should be placed on rehabilitation of natural drainage system.

15.2 The community participation should be encouraged in the management of flood and droughts.

15.3 Land, soil, energy and water management with scientific inputs from local, research and scientific institutions should be used to evolve different agricultural strategies and improve soil and water productivity to manage droughts. Integrated farming systems and non-agricultural developments may also be considered for livelihood support and poverty alleviation.

15.4 In order to prevent loss of land eroded by the river, which causes permanent loss, revetments, spurs, embankments, etc., should be planned, executed, monitored and maintained on the basis of morphological studies. This will become increasingly more important, since climate change is likely to increase the rainfall intensity, and hence, soil erosion.

15.5 Flood forecasting is very important for flood preparedness and should be expanded extensively across the state and modernized using real time data acquisition system and linked to forecasting models. Efforts should be towards developing physical

models for various basin sections, which should be linked to each other and to medium range weather forecasts to enhance lead time.

15.6 Operating procedures for reservoirs should be evolved and implemented in such a manner to have flood cushion and to reduce trapping of sediment during flood season. These procedures should be based on sound decision support system.

15.7 Protecting all areas prone to floods and droughts may not be practicable; hence, methods for coping with floods and droughts have to be encouraged. Frequency based flood inundation maps should be prepared to evolve coping strategies, including preparedness to supply safe water during and immediately after flood events. Communities need to be involved in preparing an action plan for dealing with the flood/drought situations.

15.8 To increase preparedness for sudden and unexpected flood related disasters, dam/ embankment break studies, as also preparation and periodic updating of emergency action plans/disaster management plans should be evolved after involving affected communities.

16. WATER SUPPLY AND SANITATION

16.1 There is a need to remove the large disparity between stipulations for water supply in urban areas and in rural areas. Efforts should be made to provide improved water supply in rural areas with proper sewerage facilities. Least water intensive sanitation and sewerage systems with decentralized sewage treatment plants should be incentivized.

16.2 Urban and rural domestic water supplies should preferably be from surface water in conjunction with groundwater and rain water. Where alternate supplies are available, a source with better reliability and quality needs to be assigned to domestic water supply. Exchange of sources between uses, giving preference to domestic water supply should be possible. Also, reuse of urban water effluents from kitchens and bathrooms, after primary treatment, in flush toilets should be encouraged, ensuring no human contact.

16.3 Urban domestic water systems need to collect and publish water accounts and water audit reports indicating leakages and pilferages, which should be reduced taking into due consideration social issues.

16.4 In urban and industrial areas, rainwater harvesting and de-salinization, wherever techno-economically feasible, should be encouraged **and incentivized** to increase availability of utilizable water. Implementation of rainwater harvesting should include scientific monitoring of parameters like hydrogeology, groundwater contamination, pollution and spring discharges.

16.5 Urban water supply and sewage treatment schemes should be integrated and executed simultaneously. Water supply bills should include sewerage charges.

16.6 Industries in water short regions may be allowed to either withdraw only the make up water or should have an obligation to return treated effluent to a specified standard back to the hydrologic system. Tendencies to unnecessarily use more water within the plant to avoid treatment or to pollute ground water need to be prevented.

16.7 Subsidies and incentives should be implemented to encourage recovery of industrial pollutants and recycling / reuse, which are otherwise capital intensive.

17. INSTITUTIONAL ARRANGEMENTS

17.1 **Uttar Pradesh Water Management and Regulatory Commission** may also have functions other than tariff systems, such as monitoring operations, reviewing performance and suggesting policy changes, etc. **It** may also assist in resolving intra-State water-related disputes.

17.2 **State Water Board should monitor and facilitate the implementation of different acts related to water sector and review its progress.**

17.3 The "Service Provider" role of the state has to be gradually shifted to that of a regulator of services and facilitator for strengthening the institutions responsible for planning, implementation and management of water resources.

17.4 Water resources projects and services should be managed with community participation. For improved service delivery on sustainable basis, the State Government and/or urban local bodies may associate private sector in public private partnership mode with penalties for failure, under regulatory control on prices charged and service standards with full accountability to democratically elected local bodies.

17.5 Integrated Water Resources Management (IWRM) taking river basin/sub-basin as a unit should be the main principle for planning, development and management of water resources. The departments/organizations at State Government level should be restructured and made multi-disciplinary accordingly.

17.6 Appropriate institutional arrangements for each river basin should be developed to **monitor water quality in both surface and ground water along with** collect and collate all data on regular basis with regard to rainfall, river flows, area irrigated by crops and by source, utilizations for various uses by both surface and ground water and to publish water accounts on ten daily basis every year for each river basin with appropriate water budgets and water accounts based on the hydrologic balances. In addition, water budgeting and water accounting should be carried out for each aquifers.

17.7 Uttar Pradesh Ground Water Department has already taken the initiative and has passed and Act for management and regulation of ground water resources in the state of Uttar Pradesh. Initially, agriculture and domestic users of ground water have been kept out of regulatory domain of the Act. But, in future, steps should be taken to regulate the non-judicious draft of ground water by agriculture and domestic users also in phased manner.

17.8 Water User Association should be established and developed as a functional institution in accordance with the Uttar Pradesh Participatory Irrigation Management Act, 2009.

17.9 The districts/blocks should be encouraged and incentivized to undertake reforms and progressive measures for innovations, conservation and efficient utilization of water resources.

18. TRANS-BOUNDARY RIVERS

18.1 Even while accepting the principle of basin as a unit of development, on the basis of practicability and easy implementability, efforts should be made to enter into agreements with neighbouring states on bilateral basis for exchange of hydrological data of the inter-state rivers on real time basis.

18.2 Negotiations about sharing and management of water of inter-state rivers should be done on bilateral basis in consultative association with riparian States keeping paramount the state/national interests. Adequate institutional arrangements should be set up to implement international/national agreements.

19. DATABASE AND INFORMATION SYSTEM

19.1 All hydrological data, other than those classified as secret on national security consideration, should be in public domain. However, a periodic review for further declassification of data may be carried out.

19.2 State Water Resource Data and Analysis Center should collect, collate and process hydrologic data regularly from all over the state/country, conduct the preliminary processing, and maintain in open and transparent manner on a GIS platform. Authenticated data should be provided by the concerned departments/institutes to such **State Water Resource Data and Analysis Center** as required from time to time.

19.3 A mechanism for the secrecy of classified data on national security consideration should be developed and periodic reviews of the need for the secrecy with regard to data may be carried out.

19.4 In view of the likely climate change, much more data about evaporation, river geometry changes, erosion, sedimentation etc. needs to be collected. A programme of such data collection needs to be developed and implemented.

19.5 All water related data, like rainfall, geo-morphological, climatic, geological, surface water, ground water, water quality, ecological, water extraction and use, irrigated area, etc., should be integrated with well defined procedures and formats to ensure online updation and transfer of data to facilitate development of database for informed decision making in the management of water.

20. RESEARCH AND TRAINING NEEDS

20.1 Continuing research and advancement in technology shall be promoted to address issues in the water sector in a scientific manner. Innovations in water resources sector should be encouraged, recognized and awarded.

20.2 It is necessary to obtain adequate grants to update technology, design practices, planning and management practices, preparation of annual water balances and accounts for the site and basin, preparation of hydrologic balances for water systems, benchmarking and performance evaluation.

20.3 It needs to be recognized that the field practices in the water sector in advanced countries have been revolutionized by advances in information technology and analytical capabilities. A re-training and quality improvement programme for water planners and managers at all levels both in private and public sectors, needs to be undertaken.

20.4 An autonomous body, after research, should evaluate the impacts of policy decisions in the water sector and evolve policy directives for changing scenario of water resources.

20.5 **A chapter related to awareness about available water resources, its conservation and efficient use etc. should be introduced in the syllabus of class IV to class XII.**

20.6 To meet the need of the skilled manpower in the water sector, regular training and academic courses in water management should be promoted. These training and academic institutions should be regularly updated by developing infrastructure and promoting applied research, which would help to improve the current procedures of analysis and informed decision making in the line departments and by the community. A State campaign for water literacy needs to be started for capacity building of different stakeholders in the water sector.

21. IMPLEMENTATION OF STAE WATER POLICY

21.1 The State Water Policy will apply to all the water resources in the State.

21.2 The stakeholder departments will be responsible to effectively implement the State Water Policy in the State. The Government of Uttar Pradesh has set up the State Water Board under the chairmanship of Chief Secretary, Govt. of Uttar Pradesh. The State Water Board will ensure the execution of State Water Policy and would monitor the integrated planning and management of water resources in the State.

21.3 The State Water Board may take policy decisions or prepare its action plans based on the recommendations of the Water Regulatory Authority established in the State.