



**Review of State Water Policy of Tamil Nadu in line with  
National Water Policy-2012 with regard to Climate  
Change**

**By:**

**INDIA WATER PARTNERSHIP**

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## **EXECUTIVE SUMMARY**

### **CONTEXT**

A National Water Policy for India was announced for the first time in September 1987. Thereafter, a revised version of the National Policy came out in 2002. And in 2012, the latest version of the National Water Policy has been announced. A distinguishing new feature of the 2012 National Water Policy is the emphasis laid on the role of climate change in the context of water resources. This was in recognition of the profound impact that climate change is now predicted to produce on socio-economic life of people. Tamil Nadu is a water scarce state. Per capita availability of water in the state in 2011 was 654m<sup>3</sup> as against 1545m<sup>3</sup> for India as a whole. This situation is better during October to December when the average figure goes up to 1254 m<sup>3</sup>.

Measures dealing with adverse effects of climate change will have better chance of success if people and functionaries at the grassroots level are also aware of them and are associated with the preparatory measures to mitigate them especially in rural areas, which are dependent on agriculture and allied activities. While there is a growing literature on dimensions of climate change, and its probable effects in different parts of the world including India, there is virtually no literature on perceptions grassroots level functionaries as well as the public, with respect to adverse effects of climate change on their livelihood as well as the preparatory measures that can be taken at the local level for mitigation of these effects.

The Indian States, however, have been lagging behind in this respect. The review revealed that there are only 14 States/UTs which have announced their water policies starting from 1994, while 2 UTs namely; Daman & Diu and Dadra & Nagar Haveli which have adopted National Water Policy-2012. The remaining States/UTs are in the process of formulating their water policies, while some of the States/UTs are in the process of revising their earlier policies. The state of Tamil Nadu was the first state to announce its state water policy. It did so in 1994 followed by U.P. in 1999, Goa in 2000, Chhattisgarh in 2001, Karnataka in 2002, Madhya Pradesh and Maharashtra in 2003, Himachal Pradesh in 2005, Orissa in 2007, Andhra Pradesh and Kerala in 2008, Sikkim in 2009, Rajasthan in 2010 and Jharkhand in 2011. But, Himachal Pradesh has been the only state to bring out a revised state water policy in 2013, which included climate change also in line with the National Water Policy of 2012. A formidable task, therefore, lies ahead. It is in this context that a study designed to a review of the state water policies in line with the National Water Policy was called for.

Realizing this need, India Water Partnership (IWP) formulated a project in 2013 to review state water policies with special reference to climate change in line with the National Water Policy - 2012 and entrusted the task to the Institute for Resource Management and Economic Development, Delhi.

### **Criteria for Selection of State**

As a first step, the IRMED reviewed water policies of all the States/Union Territories (UTs), which are in either draft or final stage. The review revealed that there are only 14 States/UTs which have announced their water policies starting from 1994, while 2 UTs namely; Daman & Diu and Dadra & Nagar Haveli have adopted National Water Policy-2012. The remaining States/UTs are in the process of formulating their water policies, while some of the States/UTs are in the process of revising their earlier policies.

In order to select two states for the study, discussions were held by IRMED study team with central government departments/agencies dealing with water resources which usually interact with their state level counterparts. These included Ministry of Water Resources (Policy Planning Division), Central Water Commission (Chairman, and Chief Engineer, Basin Planning and Management), and Planning Commission (Adviser, Water Resources and Joint Adviser, Water Resources). These indicated some of the considerations

which should be kept in view for the selection of the two states. As far as possible, states should be in different agro-climatic zones so as to capture the diversity that characterize India. States likely to be more receptive and cooperative with respect to interaction pertaining to water policy, as per perception of the central functionaries, may get preference. States, where water policies had been formulated quite early, might be more willing to revise them and may, therefore, be considered for selection. Further, states having emotionally surcharged atmosphere with respect to water related issues may be avoided.

A review of situations prevailing in different states in the light of the above considerations provided a case for the selection of Tamil Nadu and Goa for the present study. Tamil Nadu state water policy was announced in 1994. It was the first state in India to do so in the wake of the 1<sup>st</sup> National Water Policy of 1987. Its revision has been overdue. Goa's water policy is also quite old, being announced in 2000. Hence, this state too was expected to be receptive of the idea of revising its policy. Goa is a state which is highly susceptible to the effects of global warming associated with climate change because of the dominance of coastal influence. These two states are situated far from each other and belong to different agro-climatic zones. These are also currently free from controversy regarding water related issues. Hence, these provided scope for dispassionate discussion. This report deals with a review of the State Water Policy of Tamil Nadu only. Report for Goa is provided separately.

### **The State-level Workshop**

As the final step was to hold a multi stakeholder's workshop on Tamil Nadu State Water Policy was organized by the study team on 23<sup>rd</sup> July 2015 at Anna University, Chennai. It was inaugurated by Ms.Santha Sheela Nair IAS (Retd.) Hon'ble Vice Chairman, State Planning Commission, Government of Tamil Nadu, while Professor Shashanka Bhide, Director, Madras Institute of Development Studies, Chennai presided over the inaugural session. There were two technical sessions devoted exclusively to comments and suggestions by participants on Tamil Nadu State Water Policy.

The suggestions made by Ms. Santa Sheila Nair, Professor S.Mohan, during his presidential remarks in a technical session, made a plea for including wasteland and forests within the ambit of water policy.

In response to questions regarding their perception of major impacts of climate change in Tamil Nadu, most of the participants (28 out of 33) felt that drinking water situation would be very much affected by climate change induced water scarcity. The participants were also asked to indicate climate change related mitigation measures that should be included in Tamil Nadu state water policy.

### **Water resources scenario of Tamil Nadu at a Glance**

The total surface water potential of Tamil Nadu has been assessed at 853 tmcft. This includes contribution of 261 tmcft by the neighboring states. The state has several river basins of which the Cauvery is the most important. But, it is an inter-state river. Utilization of its water has been a source of major conflict with the neighboring state of Karnataka. Tamil Nadu has water disputes with Kerala also. How to manage inter-state water disputes has been an issue of major concern in this state. Tamil Nadu is a state which has already utilized a very high percentage (about 95 to 98%) of its surface water resources. This puts a sharp focus on raising water use efficiency in the state. Management of water, therefore, emerges as a key element. There is also an acute regional imbalance between the areas covered under the west flowing rivers and the drought prone southern districts. This has made Tamil Nadu an ardent supporter of inter-basin transfer of water through inter-linking of rivers project.

Irrigation is the major user of water, being responsible for about 80 percent. Other uses are industries (12%), domestic (5%) and livestock (3%). According to data provided by Tamil Nadu Government, 27.4% of irrigation is provided by canals, 19.7% by tanks, 13.1% by tube-wells and 39.5% by open wells. The state suffers from both drought and flood.

Drought is a major problem. Tamil Nadu is a water scarce state. Per capita availability of water in the state in 2011 was 654m<sup>3</sup> as against 1545m<sup>3</sup> for India as a whole. This situation is better during October to December when the average figure goes up to 1254 m<sup>3</sup>. Tamil Nadu's water resource management system, therefore, is geared accordingly.

Tamil Nadu has also a large coast line. But, water management in coastal areas, more particularly delta canal system, is neglected with adverse effect on delta agriculture. Besides, coastal areas are highly susceptible to risks of climate change associated with global warming and potential sea level rise such as intrusion of salinity on upstream sites.

After reviewing Tamil Nadu state water policy and facts and figures of the state it was found that there are several important features of the National Water Policy 2012 are, however, missing in the Tamil Nadu State Water Policy 1994. These include aspects related to good governance through transparent informed decision making, need for multi-disciplinary organizations for water resources, water ( including ground water) to be managed as a common pool community resource held by the state under public trust doctrine to be followed by modification of existing Acts, recognition of minimum ecological needs for water, emphasis on managing demand for water through changes in cropping pattern, avoiding wastage of water, focus on access to a minimum quantity of potable water for essential health and hygiene to all the citizens, integrated watershed development activities, differential pricing of water, giving statutory powers to water users associations to collect and maintain a portion of water charges and manage water allotted to them, legally empowered dam safety measures, better planning of projects with due emphasis on social and environmental aspects in consultation with project affected and beneficiary families along with concurrent monitoring, involvement of Panchayats, municipalities etc. in planning of local water resource projects, simultaneous execution of urban water supply and sewage treatment schemes, need for forum at the state level to evolve consensus among water users, associating private sector in public private sector partnership mode etc.

The Tamil Nadu Policy, however, makes no reference at all to climate change. This is understandable since there was little awareness of climate change aspects in 1994 when the Tamil Nadu Policy was announced. This aspect, however, is proposed to be taken care of in the revised policy, which is under preparation, as per details provided in the next chapter.

The detailed report is given in the following pages.

### **Major Recommendations of the Review**

Recommendations include the suggestions made by the district level officers, participants in the workshop held in Chennai on 23 July 2015 as well as in the schedules filled in by them. These also include the suggestions of the study team. In order to avoid duplication only those points are included which are not found in the existing State Water Policy document. Even then, there may be some overlap which is unavoidable. The recommendations were sent to the Principal Secretary, Water Resources PWD and other senior officers of Water Recourses on 31 October 2015.

### **Water Policy Formulation and Implementation Process**

- Policy should be people and farmers friendly and it should emerge from below. Basin-wise, region-wise considerations should be taken into account while framing policies.
- Description of water resource scenario as well as water policy should also include socio-economic, institutional and management aspects which are missing in the present policy document.
- There is a great need for awareness about water policy among people at the grass roots level through meetings, campaigns, posters, displays etc., after formulation, water policy should be made readily available at the level of village, Panchayat, Block, School, Libraries and other public places.
- There is need for creation of Web based technology for updating and disseminating knowledge on water related issues including water policy.
- There should be a provision for periodic review of the water policy. Time frame for updating and revision of policy should be specified.
- Water policy should be followed by implementation and policy statements should use the term "shall be" instead of "should be."

- In order to facilitate time bound implementation of policy measures, each line department should meticulously prepare an action to be taken document along with a time frame for implementation. Further, water policy should be kept in view while formulating projects.
- There should be a Monitoring Committee consisting of not only policy makers and administrators but also scientists, technocrats, academicians, farmers and public representatives for ensuring effective implementation of water policy.

#### **Decentralized Water Governance**

Greater stress should be laid on decentralization of water governance within the overall framework of the doctrine of public trust, to create a feeling of community ownership and involvement in management of water resources.

- Role of panchayats and municipalities in the supply and management of water and maintenance of water bodies at local levels as well as in preventing water pollution should be much enhanced.
- The authority for planning and implementing local level water resources schemes is entrusted to the local self-governance bodies, which should receive the needed support from the technical wing of the Water Resources Department of the government.
- Panchayats and other local bodies should have an important role in giving approval to factories with regard to use of local water resources as well as in cancelling the approval or imposing penalty on factories which violate the conditions related to quantum of water used.
- Laws should be amended to provide adequate power and funds to such decentralized bodies for adequate development and proper management of local water bodies such as lakes, ponds, canals, common wells etc. so as to sub serve the goal of providing safe drinking water to all within easy reach.
- Corporate control of local water resources should be prevented.
- Approval of panchayats should be obtained for construction of bore wells for industrial use of water.
- Women are the primary users of water. Hence, there should be adequate emphasis on women participation in management of water at local levels.
- Participatory Irrigation Management (PIM) should be strengthened by devising a suitable implementation strategy for the same. This should include an earmarked allocation of water for PIM.

#### **Climate Change**

- There is a need for thorough vulnerability analysis of climate change and its impact on various sectors of the state economy and how to involve the community in mitigation measures.
- Basin-wise studies on impact of climate change on water resources is necessary. It is also necessary to make a detailed study of impact of climate change on agriculture in Tamil Nadu.
- Water budgeting with reference to climate change should be done. For that, special data base for water resources need to be created.
- The adequacy of existing irrigation and flood management projects as well as flood and drought management policies should be reviewed to take care of likely impacts of climate change such as expected increase in sediment load due to higher intensity of floods.
- High priority should be assigned to (i) strengthening and creating adequate facilities for studies and research on hydrological, hydrometreological and geomorphologic aspects related to climate change within the Department of Water Resources, WALMI, Universities and other institutions including creating new institutions; (ii) modernizing and expanding instrumentation and measurement techniques and network and (iii) revising existing courses of studies, creating new subjects and introducing programmes as well as post-graduate diplomas and degrees.
- Disaster mitigation measures could also help in adaption to climate change.

- There should be adequate emphasis on strengthening of water education focusing on water conservation and management with reference to climate change, Need to sensitize other sectors on water and climate change.
- There is need to take up massive programmes of awareness generation among people at all levels about adverse effects of climate change and the mitigation measures to be taken to deal with them so as to enhance their coping capacity.
- There should be a gradual adoption of a system of water auditing specially in industries.
- There is need for integrated salinity control to deal with the problem of increasing salinity and ground water exploitation in coastal areas of Tamil Nadu.
- While planning new water bodies such as check dams, percolation tanks, other watershed management structures, the factor of climate change needs to be taken into consideration.
- There is need for a system of suitable water pricing to deal with increasing water scarcity in future due to the adverse effects of climate change.
- The different departments of the state government, whose works are related to water and climate change should have a common forum which should meet at frequent intervals to take an integral view of knowledge base and policy options. For this purpose, the Department of Water Resources should have an effective cell headed by a Chief Engineer level officer.

#### **Drinking Water to All**

- Equity in use of water should be an objective of water policy.
- Water corporates and industries, which are motivated by profit, should not be subsidized for water supplied to them.
- There is need for putting stringent restrictions on all bottled water, aerated bottled factories and high water consuming industries.
- Safe drinking water must be made access able and o all within a reasonable distance from places of abode and work so as to assure water for every family.
- The rights of users of water should be recognized. Hence, the right to water should be guaranteed specially to the marginalized and vulnerable such as Dalits, Tribals, Nomads and differentially abled persons.
- Water supply of 55 lpcd for rural, 90 lpcd for small towns and 135 lpcd for cities should be ensured.
- Proper attention should also be paid to water needs of cattle.
- Water should not be traded. In particular, commercialization or privatization of drinking water should be avoided.

#### **Water and Agriculture**

- Farmers should be sensitized about achieving higher agricultural productivity with lower use of water.
- Less water consuming traditional organic agriculture practices need to be encouraged while ensuring for higher productivity. For this purpose, higher funds may be allocated for Research and Development.
- There should be adoption of crop diversification through switching over to dry farming and short duration crops to escape stress of water.
- Awareness among farming community on alternate wetting and drying technique for water intensive crops like rice, should be created.
- Direct seeded rice cultivation in suitable areas should be promoted.
- Management of delta canal system should be streamlined to boost delta agriculture.

### **Water and Forests**

- Waste land and forest should be included within the ambit of water policy.
- There is need to Increase green cover to protect land so as to increase ground water level particularly in Eastern Ghats region.
- Forest cover should be increased through new plantations and controlling deforestation. Five percent of land area of large farmers should be reserved for growing trees as prescribed in a law in Andhra Pradesh.

### **Controlling Water Pollution**

- Control of pollution and improvement in water quality should be an important objective of water policy. Hence, there should be mandatory water testing before water is supplied in rural and urban areas.
- Role of Pollution Control Board in preventing water pollution should be strengthened.
- Penalty should be imposed on those polluting water in accordance with Polluter Pays Principle.
- Regulation of sand mining in river beds is necessary for protecting river ecology and riverbed aquifer, but traditional rights of farmers to take sand for self-use from the tank and river-bed should be recognized/restored.
- Sewer schemes should be executed along with urban water schemes.
- There should be increasing emphasis on controlling or minimizing throwing of garbage and gaseous industrial effluents in water courses/bodies.
- Use of fossil fuels and emissions of Co-1, Co-2 should be reduced.
- Need for better management of waste water including reuse of water.
- Use of recycled water should be encouraged for household flushing, car washing, gardening and similar uses.
- Use of fresh water should gradually be restricted in industries which should make increasing use of recycled water. Such use should gradually be made mandatory.

### **Ground Water**

- Illegal extraction and sale of ground water should be prohibited.
- No permission for bore-wells beyond a certain depth should be given.
- Panchayats should be empowered to regulate extraction of ground water in over exploited and critical areas
- There is need for regulation and control over extraction of ground water by water intensive industries to stop over exploitation of ground water. .
- There is need for a series of check dams to raise ground water level.
- Area near canals should have bores.
- Empty bores should be used for recharging ground water during floods.

### **Development and Management of Water Resources**

- There is a need for increase in storage of water.
- There is need to improve water use efficiency by emulating good practices and putting adequate emphasis on demand management through pricing and volumetric supply of water so as. to deal with increasing water scarcity.
- Need for constitution of effective river boards for efficient management of water.
- Adequate measures should be taken to deal with the problem of siltation in dams.
- All the major irrigation projects / systems should be re-evaluated particularly because many of these were very old and not catering to the current needs of farmers
- Traditional water bodies such as tanks should be de-silted, restored and revamped. The state should, as far as possible, avoid encroaching upon such water bodies for development activities.
- Stringent action should be taken against encroachments into catchment areas of water bodies by private agencies.

- Need for up gradation of technology through research, development and training.
- Proper attention should be paid for maintenance of all types of existing water bodies such as dams, canals, tanks, ponds etc.
- Tank water level should be measured through latest technology.
- There should be a satisfactory mechanism for distributary level monitoring and regulation.
- Need for making use of traditional knowledge, wherever it is found to be good and efficient.
- Social Impact Assessment needs to be taken up before implementing major projects.
- External evaluation of major water sources projects should receive due attention.

#### **Water Harvesting**

- Water conservation through storing of green water and artificial recharge should be promoted. Wherever commercially viable, wetlands should be preserved and developed for fishery and aquaculture.
- Rain water harvesting should be relooked and planned in a scientific manner. The current rain water harvesting structures should be evaluated. Besides, a system for monitoring of rain water harvesting structures should be established.
- Water recharge structures should be executed in an integrated and holistic manner in place of the prevailing fragmented manner by different agencies.
- Consolidated data on recharge structures in an area along with the relevant data for the catchment area should easily be made available.

#### **Data Base**

- Quality of socio-economic data needed for formulation of projects should be raised substantially.
- Updating of data related to water (surface and ground) availability in the sub basins at regular intervals.
- There should be a satisfactory mechanism for synchronization and validation of data from various sources on the status of water and irrigated area within the state.
- Government should create a transparent data bank on all types of water bodies including the related information on catchment/supply areas of water and the ecological system.

# Introduction

### 1.1 Background and Rationale

The role of water for our life and livelihood is too obvious to require any elaboration. It is the basic requirement for survival and growth of all types of living beings. That is why; most cities and commercial centres as well as rural settlements have grown in and around dependable sources of water. But, water has been coming under increasing stress due to growing population and rising per capita requirement for water, while the supply of water remains more or less fixed. Hence, the need for managing water in a sustainable manner so as to ensure water security to all, not only at present but in future also, is being articulated throughout the world including India. An effort to develop and manage this crucial resource has to be guided by clearly defined perspectives, which should be known to all the water users. Water policy, which provides a framework of such perspectives, is therefore, a very useful tool for optimum utilization of this precious resource.

It was in this context that a National Water Policy for India was announced for the first time in September 1987. Thereafter, a revised version of the National Policy came out in 2002. And in 2012, the latest version of the National Water Policy has been announced. A distinguishing new feature of the 2012 National Water Policy is the emphasis laid on the role of climate change in the context of water resources. This was in recognition of the profound impact that climate change is now predicted to produce on socio-economic life of people. Water is a principal medium through which this impact would take place. Drawing attention to likely increase in the variability of water resources due to climate change and its effects on human health and livelihood, the National Water Policy of 2012 also suggests measures to deal with them. These include enhancing the capability of community to adopt climate resilient technological options, increasing water storages in their various forms including water harvesting and revival of traditional water bodies, better management of demand for available water, stakeholders' participation in land-soil-water management etc.

Since water is viewed as a state subject in India, it is the state governments which have been playing a crucial role in the water sector in this country. It will, therefore, be more useful if the policy measures, which are included in the National Water Policy, are also taken into account in the state level water policies. Recognizing this need, the National Water Policy of 2012 ended up with the observation that "The State Water Policies may need to be drafted/revised in accordance with this policy keeping in mind the basic concerns and principles as also a unified national perspective".

#### **Ground water Scenario**

- Utilizable ground water recharge is 22,423 MCM
- Current Ground water utilization is 13.588 MCM

#### **Surface water Scenario**

- Total surface water Potential of the state is 36 km or 24864 M cum.
- There are 17 major river basins, 61 reservoirs, 41,948 tanks

The States, however, have been lagging behind in this respect. There are only 14 states, which have announced their state water policies so far, while three namely Delhi, Daman & Diu and Dadra & Nagar Haveli had adopted the national water policy. The remaining states are still in the process of formulating their state water policies, while some of the states are in process of revising their earlier policies. The state of Tamil Nadu was the first state to announce its state water policy. It did so in 1994 followed by U.P. in 1999, Goa in 2000, Chhattisgarh in 2001, Karnataka in 2002, Madhya Pradesh and Maharashtra in 2003, Himachal Pradesh in 2005, Orissa in 2007, Andhra Pradesh and Kerala in 2008, Sikkim in 2009, Rajasthan in 2010 and Jharkhand in 2011. But, Himachal Pradesh has been the only state to bring out a revised state water policy in 2013, which included climate change also in line with the National Water Policy of 2012. A formidable task, therefore, lies ahead. It is in this context that a study designed to a review of the state water policies in line with the National Water Policy was called for

Realizing this need, India Water Partnership (IWP) formulated a project in 2013 to review state water policies with special reference to climate change in line with the National Water Policy - 2012 and entrusted the task to the Institute for Resource Management and Economic Development, Delhi. Two states of Bihar and Gujarat were selected for the study in 2014. With the cooperation of the respective state governments, both the studies were completed within time during 2014. As a result, a draft of the state water policies in both the states was reported to have been prepared after taking into account the suggestions made by the study. In 2015, a similar exercise was undertaken for two more states. And, the task was again entrusted to the Institute for Resource Management and Economic Development (IRMED), Delhi.

As mentioned above, the IWP study is concerned with a review of state water policies in the context of climate change. With regard to climate change, the National Water Policy 2012 had stressed the need for preparedness at the micro level. According to it, “special emphasis should be given towards mitigation at micro level by enhancing the capabilities of community to adopt climate resilient technological options” (Para 4.1). Measures dealing with adverse effects of climate change will have better chances of success, if people and functionaries at the grassroots level are fully aware of them and are associated with the preparatory measures taken to mitigate them especially in rural areas, which are dependent on agriculture and allied activities which, in turn, are most vulnerable because of their greater dependence on climate parameters. While there is a growing literature on dimensions of climate change, and its probable effects in different parts of the world including India, there is very little literature on extent of awareness as well as perceptions of grass root level functionaries and the public with respect to adverse effects of climate change and the preparatory measures that can be taken at the local level for mitigation of these effects. Hence, an enquiry at the micro level also forms a part of this study.

## **1.2 Selection of two states**

In order to select two states for the study, discussions were held by IRMED study team with central government departments/agencies dealing with water resources which usually interact with their state level counterparts. These included Ministry of Water Resources (Policy Planning Division), Central Water Commission (Chairman, and Chief Engineer, Basin Planning and Management), and Planning Commission (Adviser, Water Resources and Joint Adviser, Water

Resources). These indicated some of the considerations which should be kept in view for the selection of the two states. As far as possible, states should be in different agro-climatic zones so as to capture the diversity that characterize India. States likely to be more receptive and cooperative with respect to interaction pertaining to water policy, as per perception of the central functionaries, may get preference. States, where water policies had been formulated quite early, might be more willing to revise them and may, therefore, be considered for selection. Further, states having emotionally surcharged atmosphere with respect to water related issues may be avoided.

A review of situations prevailing in different states in the light of the above considerations provided a case for the selection of Tamil Nadu and Goa for the present study. Tamil Nadu state water policy was announced in 1994. It was the first state in India to do so in the wake of the 1<sup>st</sup> National Water Policy of 1987. Its revision has been overdue. Goa's water policy is also quite old, being announced in 2000. Hence, this state too was expected to be receptive of the idea of revising its policy. Goa is a state which is highly susceptible to the effects of global warming associated with climate change because of the dominance of coastal influence. These two states are situated far from each other and belong to different agro-climatic zones. These are also currently free from controversy regarding water related issues. Hence, these provided scope for dispassionate discussion. This report deals with a review of the State Water Policy of Tamil Nadu only. Report for Goa is provided separately.

### **1.3 Objective**

The objective of the study is to review the Tamil Nadu State Water Policy of 1994 and provide recommendations for modifying it in line with the National Water Policy 2012 in the context of the ensuing climate change (involving awareness, preparedness, coping mechanism at the state level and down below).

### **1.4 Methodology**

An appropriate methodology was developed in the context of the above objective. Information was collected from both secondary and primary sources. The first step was to review the different versions of the National Water Policy as well as water policy of several states to prepare a tentative list of state specific issues for further deliberation with the stakeholders. Thereafter, background information on the salient features of water resources scenario and state water policy of Tamil Nadu was collected and analyzed. This information, collected mainly from secondary sources, is presented and analyzed in Chapter 2.

As a second step, considerable discussion on issues pertaining to State Water Policy took place in groups as well as individually in Chennai on 18<sup>th</sup> and 19<sup>th</sup> May, 2015 between the study team and state level senior officers of Water Resources Department of the Government of Tamil Nadu. Discussions were also held with a few Chennai based subject matter specialists and one NGO. The list of officers and others interacted with as well as two photographs are provided in Annexure 'A'. The purpose was not only to get feedback of state level officers on issues related to state water policy, but also to motivate them to modify the earlier state water policy. The findings are presented in section 3.1 of Chapter

Because of the negligible information on micro level situation available from secondary sources, the main reliance was placed on primary sources, mainly through survey by way of structured cum open ended schedules. Four schedules were developed and administered one each to (i) The participants of the state level workshop, (ii) Officers of the departments of Agriculture/ Horticulture and Krishi Vigyan Kendra (KVK) (iii) Officers of other departments of the concerned district and (iv) Farmers. The structured part of the schedules comprised of questions related to awareness and preparedness about climate change and suggestions for improvement. The schedules are provided in Annexures D, E, F, and G at the end. In addition, there were Focus Group Discussions at village level for which separate guide points were developed (Annexure – H). Enquiries were made at the district level and down below during June 25 to July 2, 2015 in a purposively selected major drought prone district of Salem. This district was selected in consultation with state officials. Interactions were held with district and block level functionaries concerned with development and management of water resources as well as Krishi Vigyan Kendra (KVK). Interactions were also held with people’s representatives, NGOs, Panchayats, Municipalities and public in two villages. The villages selected in consultation with officials at the district level were Poolampatti and Nedungulam in Edapadi block of this district. Both the villages were water stressed and drought prone. The number of villagers participating in the interactive sessions was 32 in one village (Nedungulam) and 30 in another village (Poolampathi). The objective was to have a realistic picture of the micro level perceptions about the national and state water policies and about awareness and effects of climate change. The findings and suggestions are presented in Section 3.2 of Chapter 3.

Since water is every body’s concern, it was considered important to get inputs from diverse sources. Hence, the final step was to hold a workshop of different types of stakeholders, such as senior officers of the state government, leading state level water resources professionals, NGOs, farmers, women etc. It was held in Anna University, Chennai on 23rd July, 2015. Its principal objective was to review the existing Tamil Nadu State Water Policy and give suggestions for its revision in the light of changes which had taken place in the water resource scenario as well as socio-economic and environmental setting since 1994, when the earlier State Water Policy had been announced. A copy of the proceedings of this workshop is enclosed while the suggestions are presented in section 3.3 of Chapter 3. A schedule was also filled in by the participants giving their perceptions, views and suggestions on issues related to climate change and state water policy. These were processed by the study team and findings and suggestions have been presented in section 3.4 of Chapter 3.

## Chapter 2

### Water Resources Scenario and State Water Policy of Tamil Nadu

#### 2.1 Water resources scenario of Tamil Nadu

In order to be useful for the public, water policy for any administrative unit such as a state should take into account the water resource scenario of the relevant area. Hence, information on salient features of the water resources scenario of Tamil Nadu was collected and is presented below. This was based mainly on published sources supplemented somewhat by a few observations of the participants of the workshop held on 23<sup>rd</sup> July 2015.

The total surface water potential of Tamil Nadu has been assessed at 853 tmcft. This includes contribution of 261 tmcft by the neighboring states. The state has several river basins of which the Cauvery is the most important. But, it is an inter-state river. Utilization of its water has been a source of major conflict with the neighboring state of Karnataka. Tamil Nadu has water disputes with Kerala also. How to manage inter-state water disputes has been an issue of major concern in this state. Tamil Nadu is a state which has already utilized a very high percentage (about 95 to 98%) of its surface water resources. This puts a sharp focus on raising water use efficiency in the state. Management of water, therefore, emerges as a key element. There is also an acute regional imbalance between the areas covered under the west flowing rivers and the drought prone southern districts. This has made Tamil Nadu an ardent supporter of inter-basin transfer of water through inter-linking of rivers project.

Irrigation is the major user of water, being responsible for about 80 percent. Other uses are industries (12%), domestic (5%) and livestock (3%). Recent years have witnessed an increasing conflict between agriculture and industry with respect to use of water. It was pointed out in the workshop of 23<sup>rd</sup> July, 2015 that there are no restrictions on corporate users while agriculture is becoming a residual sector. In the absence of assured supply of water, water users associations (WUAs) for irrigation have limited role in management of canal irrigation. According to data provided by Tamil Nadu Government, 27.4% of irrigation is provided by canals, 19.7% by tanks, 13.1% by tube-wells and 39.5% by open wells.

Widespread tank irrigation has been a long established peculiar feature of Tamil Nadu. But, many of irrigation tanks, ponds, and temple tanks have been silted up, encroached and left uncared. As a result, the area irrigated by traditional tanks has been declining. Accumulated silt in the dams and reservoirs has also resulted in a considerable loss of reservoir capacities. Moreover, because of its hot climate, there is considerable loss of water available in reservoirs and tanks through evaporation. One estimate puts it at 30% which is quite high.

Recent years have witnessed increasing emphasis on water recharge structures. But, there has been little integration with regard to different schemes related to such recharge structures. Different agencies tend to work more or less independently without much coordination resulting in duplication and inefficiency. Storm water drains constructed in various parts of the state have also been of little use.

The state suffers from both drought and flood. But, floods are mild as compared to those in the eastern part of the country like Bihar and West Bengal. Drought is a major problem. Tamil Nadu is a water scarce state. Per capita availability of water in the state in 2011 was 654m<sup>3</sup> as against 1545m<sup>3</sup> for India as a whole. This situation is better during October to December when the average figure goes up to 1254 m<sup>3</sup>. Tamil Nadu's water resource management system, therefore, is geared accordingly.

Tamil Nadu has also a large coast line. But, water management in coastal areas, more particularly delta canal system, is neglected with adverse effect on delta agriculture. Besides, coastal areas are highly susceptible to risks of climate change associated with global warming and potential sea level rise such as intrusion of salinity on upstream sites. But, little work had been done on a thorough analysis of climate change in Tamil Nadu especially on the hot spots.

## **2.2 Tamil Nadu State Water Policy 1994**

Taking into account the National Policy of 1987, the Government of Tamil Nadu formulated its State Water Policy and notified it in the Tamil Nadu Government Gazette on 15<sup>th</sup> July, 1994. It is this policy which continues till now. The goals and objectives of the State Water Policy are to (i) establish a Management Information System (MIS) for water resources, (ii) ensure preservation and stabilization of the existing water resources system, (iii) plan for augmentation of utilizable water resources, (iv) promote research and training facilities for water resources management, (v) establish allocation priorities for water use by different sectors with provision for drinking water being given the top priority, (vi) maximize multi-purpose benefits from surface and ground water, (vii) provide adequate water for domestic users, (viii) maximize hydro-power generation within the constraints imposed by other water users, (ix) provide adequate water for industry, (x) preserve and enhance economic fisheries, (xi) maintain water quality to established standards, (xii) promote equity and social justice among users of water from irrigation and domestic water supply, (xiii) promote economic and financial sustainability based upon the principle that those who benefit from projects and programmes should also pay for them, (xiv) provide flood protection and drainage, (xv) promote users participation in all aspects of water planning and management, and (xvi) provide mechanisms for the resolution of conflicts between users within and between intra-state river basins.

The Tamil Nadu State Water Policy calls for (i) planning of developmental activities with due regard to the constraints imposed by the configuration of land and water availability, (ii) increasing the intensity of irrigation development, (iii) meeting the drinking water needs of people, and livestock, and of water for industries and hydropower, (iv) improving quality of both surface and ground water, (v) including a drinking water component in irrigation and multi-purpose projects wherever there is no alternative source of drinking water, (vi) resorting to desalination and artificial rain making in areas of acute scarcity of drinking water, (vii) stepping up the recycling and re-use of water, (viii) increasing role of science, technology and training, (ix) diverting water from west flowing rivers which have surplus water to water deficient southern districts of Tamil Nadu, (x) allocating water in an irrigation system with due regard to equity and social justice, (xi) removing the gap between the irrigation potential created and utilized, (xii) extending adoption of command area development programmed to all irrigation projects, (xiii) increasing the storage capacity of tanks, (xiv) increasing emphasis on maintenance of all types of irrigation structures, (xv) promoting water conservation consciousness through

education, regulation, incentives and disincentives, (xvi) raising irrigation efficiency and (xvii) modernizing canal structures.

With regard to allocation of water, the Policy assigns the first priority to drinking water followed by irrigation, hydropower, industrial and other uses. However, it also states that these priorities might be modified, if necessary, in particular tracts with reference to area-specific considerations. It underscores the need for a massive programmed for maintenance and standardization of tanks and channels to make up for the accumulated deficits over the years. Other aspects included in the Policy are on-farm development works, conjunctive use of surface and ground water, enactment of suitable legislation for preventing over extraction of ground water, recycling and re-use of water, wherever possible, for intensive water using industries and other appropriate uses, minimizing evaporation loss and taking up of drainage improvement works.

For flood control and management, it recommends master plan for each flood prone basin to be included in the basin plans, extensive soil conservation and catchment area treatment, provision of adequate flood-cushion in water storage projects wherever feasible, establishment of an extensive network of flood forecasting stations, flood plain zoning, and construction of embankments and dykes. Drought management policies advocated include soil-moisture conservation measures, water harvesting practices, minimization of evaporation losses, development of ground water potential, transfer of surplus water from surplus areas and preparation of drought management plan for each of the river basins. The Policy recommends introduction of a system of rotational water supply for irrigation called “Warabandhi”, avoiding wastage of water, adoption of sprinkler and drip irrigation, and involvement of farmers in management of irrigation system through farmers associations.

The State Water Policy, 1994, recognizes the important role of water pricing and provides an elaborate set of policy measures for the same. It recommends that water rates collected should be such as to convey the scarcity value of water to foster a sense of economy in water use. The rates should be close to the annual operation and maintenance cost and indicates that the long term objective should be to realize even a part of the fixed costs. The rates should be periodically reviewed and revised. It also recommends that betterment levies for improvement to works should be imposed and collected effectively. It pleads for rationalization of water rates for both surface and ground water with due regard to the interests of small and marginal farmers. In the long run, water rates should be on volumetric basis. Meanwhile, these rates could vary for different crops depending upon the intensity of water use. The Policy also recommends a management information system based on constantly updated database of the water courses of the state. Finally it lays down an action plan for implementation of its provisions.

### **2.3 A Critical Review of Tamil Nadu State Water Policy, 1994.**

An in-depth study of the Tamil Nadu State Water Policy 1994 made in the light of the provisions in the National Water Policy of 2012, found that there are several aspects on which there is a broad similarity (with some differences in emphasis and details) between the State Policy and the National Policy. These include need for a basin approach and a master or integrated plan for development of water resources, need for augmentation of water resources and types of measures to be adopted for that purpose, concern over over-exploitation of ground water, introduction and strengthening of

community participation in irrigation projects, controlling water pollution and improving water quality, emphasis on water conservation, adoption of improved water application devices and water pricing, improvement in data collection, processing and dissemination, more emphasis on research for up-gradation of technology and training, policies for management of floods and droughts, emphasis on principle of equity and social justice, recycling and reuse of water, etc. It is not surprising to find these similarities in view of the frequent interactions which take place among the water resource professionals working at state and national levels, apart from the fact that most of such policy measures have been in the air for a long time. Besides, many of the policy measures included in the 2012 National Water Policy have also been carried forward from the 1987 version of the national policy, which had been used as a benchmark while formulating the 1994 water policy of Tamil Nadu.

Several important features of the National Water Policy 2012 are, however, missing in the Tamil Nadu State Water Policy 1994. These include aspects related to good governance through transparent informed decision making, need for multi-disciplinary organizations for water resources, water ( including ground water) to be managed as a common pool community resource held by the state under public trust doctrine to be followed by modification of existing Acts, recognition of minimum ecological needs for water, emphasis on managing demand for water through changes in cropping pattern, avoiding wastage of water, focus on access to a minimum quantity of potable water for essential health and hygiene to all the citizens, integrated watershed development activities, differential pricing of water, giving statutory powers to water users associations to collect and maintain a portion of water charges and manage water allotted to them, legally empowered dam safety measures, better planning of projects with due emphasis on social and environmental aspects in consultation with project affected and beneficiary families along with concurrent monitoring, involvement of Panchayats, municipalities etc. in planning of local water resource projects, simultaneous execution of urban water supply and sewage treatment schemes, need for forum at the state level to evolve consensus among water users, associating private sector in public private sector partnership mode etc.

As regards climate change related aspects, the 2012 National Policy has a separate section on it wherein coping strategies to be adopted to deal with the challenge of climate change are indicated. In addition, references to climate change are made at several other places in the policy document. These throw light on water related impacts of climate change and the need to keep these impacts in mind while taking decisions related to planning and management of water resources. The Tamil Nadu Policy, however, makes no reference at all to climate change. This is understandable since there was little awareness of climate change aspects in 1994 when the Tamil Nadu Policy was announced. This aspect, however, is proposed to be taken care of in the revised policy, which is under preparation, as per details provided in the next chapter.

## Chapter 3

### Findings and Suggestions from Primary Sources

#### 3.1 Interactions with State Level Officers

During the interactive sessions of the study team with officers of Tamil Nadu Government on 18



Project Director IWP speaking in the first session on 18 May, 2015 in the presence of Mrs.B.Rajeshwari, Chief Engineer, Ground Water and Mrs.Lalitha Rani, Chief Engineer and Director, Institute for Water Studies, Government of Tamil Nadu

and 19 May, 2015, it came to be known that Tamil Nadu had made an attempt to revise its water policy of 1994 after the announcement of the National Water Policy, 2002. A draft had been prepared by the year 2010. But this draft was abandoned after it came to be known that the National Water Policy of 2002 was being revised. It was learnt further that based on the National Water Policy 2012, an attempt is being made currently to revise the State Water Policy of 1994. A committee for this purpose was constituted on

14 August, 2013. This Committee, however, consisted only of the Chief Engineers of the department. It is understood that the Committee has finalized its work. But, its report has been kept

strictly confidential.

Another point that came to light during their interaction was that the senior officers were critical of the manner in which the National Water Policy 2012 had been finalized ignoring the viewpoints of Tamil Nadu Government. The objections of the state government against the National Water Policy, 2012, highlighted by the officers, included the following:-

1. Water is a state subject. But, views of the Tamil Nadu Government on this state subject were not taken into confidence.
2. The National Policy, 2012, does away with the priorities for water allocation mentioned in 1987 and 2002 versions of the National policy.
3. According to the perception of the state government, the main emphasis of the National Water Policy, 2012, is to treat water as an economic good for promoting conservation of water and its efficient use. This was vehemently criticized. It was pointed out that this provision was intended for the privatization of water delivery services. This amounted to a paradigm shift in approach from service provider of water to facilitator of service. Further, this provision was viewed as a clear infringement on the powers of the state governments. The state government itself could decide whether water should be priced as an economic good or not. The state government was apprehensive that water pricing would lead to social unrest. The state government also felt that there was no sufficient studies establishing linkages between water use efficiency and pricing. It was also pointed out that the revenue

generated from water tariff would be much less than the cost to be incurred on personnel for collecting the tariff.

4. The National policy does not follow Polluter Pays Principle; rather it gives incentives for effluent treatment.
5. There was no need to evolve a national legal framework as stated in the National Water Policy, 2012. Instead, authority for legislation on water should vest entirely with the state government.
6. Objection was also raised against the National Policy provision that “state should be encouraged and incentivized to undertake reforms and progressive measures”. It was pointed out that this would lead to tying up of release of central funds to the so called reform measures like imposing water tariff on agricultural use or creating a Water Authority to fix tariff. This was regarded as “a clear violation of the rights of the state governments to decide on such issues”.
7. Water budgeting and water accounting as advocated in Para 12.5 of NWP was considered not feasible because aquifers are said to be widespread and interconnected.
8. Tamil Nadu did not agree with the National Water Policy, 2012, with respect to its recommendation for establishing a permanent Water Disputes Tribunal at the Centre because of vast differences in the characteristics of different river basins and the complex nature of water disputes. The state was in favor of continuance of the existing system of different tribunals for different river disputes.

Some of the objections may be justified such as absence of a defined set of priorities for use of water and advocacy for national legal framework. Some may be due to misunderstanding such as the views of the state on Polluter Pays Principle or encouragement and incentives for reforms and progressive measures or permanent Water Disputes Tribunal. But Tamil Nadu stand on water pricing cannot be justified. Many of the reasons given by it do not have a firm footing. The center is in no way infringing on the right of the state in this respect. Its recommendation is merely suggestive and not binding. Water pricing is recognized as an important tool throughout the world for dealing with water scarcity which is an acute problem in Tamil Nadu. It may also be noted that the current vehement opposition to water pricing or tariff by the Government of Tamil Nadu is a departure from the 1994 policy, wherein adequate emphasis had been laid on water pricing for managing water resources.



**Project Director IWP in discussion with Er.S.S.Rajagopal, Director, SWarMA and former Engineer-in-Chief, Water Resources, Government of Tamil Nadu, during the 2<sup>nd</sup> session on 19<sup>th</sup> May, 2015**

Another point that came to be known during the interactive sessions was that the government of Tamil Nadu is now fully aware of the impacts of climate change and policy measures to deal with them. The presentation made by them had the following elements related to climate change. These are

understood to have been included in the revised draft of the State Water Policy prepared by the committee of chief engineers referred to earlier.

- During the southwest monsoon season, limited quantity of surface water will be available resulting in water scarcity, but during the northeast monsoon season, intense and erratic rainfall will result in flood and drainage problems.
- Groundwater will be extensively used to supplement the lack of surface water and this will lead to the issues of overexploitation of groundwater and sea water intrusion in the coastal area.



- One of the impacts of climate change will be sea level rise in the coastal area

- Hence, suitable measures are to be taken to divert water from surplus to deficit basins by adopting suitable strategies like inter basin transfer, pumping schemes etc.

- The adaptation strategy is drought mitigation during south west

monsoon period (June to September) and flood mitigation during north east monsoon period (October to December) and harnessing the excess rain water

### **The required actions proposed for adaptation strategy are:**

- Growing more trees
- Rehabilitation of Tanks
- Desilting of Reservoirs
- Construction of tail end regulators and rehabilitation of dilapidated tail end regulators across rivers and drains in order to ensure proper drainage of flood water and control of sea water intrusion
- Desilting and widening of channels and strengthening of bunds
- Development of lift and drip irrigation schemes

### **3.2 Status assessment in a district**

As already mentioned in Chapter I, an attempt was made to obtain information about awareness of local level functionaries and public with regard to National and State Water Policies and also about climate change in Salem district of the state. The range of interaction with officers and public has already been indicated in Chapter 1. The findings are presented below.

Awareness about the State as well as the National Water Policy was found to be poor among most of the officers except those from Krishi Vigyan Kendra (KVK), agriculture and water

resources departments, but only at the higher levels. As regards climate change, almost all the officers at the district, block and other levels were found to be aware of it as well as about coping measures such as storing of water which can be used during scarcity, use of improved water application methods i.e., drip/sprinkler system etc., to be adopted in the event of ensuing climate change.

Villagers in general and farmers in particular were not aware about any of the two water policies, whether National or State. But, as regards climate change, the villagers including females were fully aware and sufficiently geared to meet its challenge. Their awareness came from the days of Tsunami in 2005, when the entire area in their belt came under its influence affecting livelihood, cattle wealth and the like. Since then, people in the village started realizing that there were some changes in the weather condition as reflected from variability in the availability of water due to variability in the rainfall in quantum, time and space.

The officials of the department of Agriculture, KVK as well as Tamil Nadu Agriculture University (TAU), Coimbatore, have been propagating about coping strategies to deal with climate change. They were suggesting shorter duration crop varieties for adoption among farmers under dry condition. Dry farming techniques developed by TAU for short duration pulses like green gram, black gram, red gram etc., short duration paddy which matures between 90 to 105 days requiring less water, such as ADT-43, 45,49, Co-51, oilseeds, maize etc. Were propagated by KVK with the help of the area agriculture officers. The farmers were also advised to follow zero tillage method in the case of paddy maturing within 90 days. The KVK, after considerable field trial, re-introduced cultivation of millet varieties like Kumbu, Napier Co-4, Core FS-31 etc. Requiring less water and maturing in 75-80 days. There was some initial hesitation among farmers but later on, realizing the usefulness through demonstrations in their fields, they became inclined and started adopting. For example, millet cultivation became popular among small and marginal farmers. This crop has a high nutritional value. Farmers also appreciated the work done in this direction by the Tamil Nadu Agriculture University, (TAU) Coimbatore, in association with Krishi Vigyan Kendra (KVK) of Salem district in respect of developing new crop varieties which can withstand or escape the adverse effects of climate change.



The district level officers also mentioned the following measures taken in the district to mitigate the adverse effects of climate change.

- Exploiting more of ground water while ensuring adequate recharge.
- Plugging leakages in pipelines while replacing old pipelines.

- Construction of more checks dams wherever feasible.
- Recharging of aquifers.
- Conversion of solar energy to electrical energy.
- Construction of more recharging structures like vertical shafts in tanks.
- Adoption of area specific cropping pattern.
- Growing of rain fed fodder crops.
- Use of water minimizing devices. Such as sprinklers, drip irrigation etc.

The officers gave the following additional suggestions to cope up with the adverse effects of climate change

- To check deforestation and encourage afforestation.
- To reduce use of fossil fuels.
- Dumping of urban and Industrial wastes into rivers, streams should be stopped.
- De-silting all water bodies, strengthening bunds, clearing bushes so as to store more water and help in recharge of ground water.
- Eviction of catchment areas from encroachment.
- Putting a check on depth of new bore wells.
- To educate farmers to grow crops which require less of water.

### **3.3 Issues and suggestions during the state level stakeholder's workshop**

As mentioned earlier in chapter 1, a multi stakeholder's workshop on Tamil Nadu State Water Policy was organized by the study team on 23<sup>rd</sup> July 2015 at Anna University, Chennai. It was inaugurated by Ms.Santha Sheela Nair IAS (Retd.) Hon'ble Vice Chairman, State Planning Commission, Government of Tamil Nadu, while Professor Shashanka Bhide, Director, Madras Institute of Development Studies, Chennai presided over the inaugural session. There were two technical sessions devoted exclusively to comments and suggestions by participants on Tamil Nadu State Water Policy. The issues and suggestions are presented below while the proceedings of the workshop are in Annexure. B.

At the outset, Professor Kamta Prasad, the workshop coordinator raised several issues for deliberation during the workshop by the participants. These related in particular to raising of canal water use efficiency with a focus on incentives to farmers and lower bureaucracy for saving water, need for establishing water resources regulatory authorities, proliferation and spillover of projects, measures for tackling the adverse effects of climate change in different parts of Tamil Nadu, how to move from mere supply augmentation to demand management in the water sector, specific measures for promoting equity, efficiency and environmental sustainability in management of water

resources, how to make decentralized institutions like panchayats and municipalities effective partners in management of water resources, how to ensure supply of a fixed quantum of water for irrigation and drinking purposes to community based associations, need for a well-documented regime of water rights, need for consolidation of state water laws into one legal document, how to develop a more reliable data system and to streamline and strengthen procedure for formulation and clearance of projects, how to ensure evaluation of completed projects by independent agencies, how to make women a part of local decision making process related to water, need for awareness generation on water policy and climate change, need to involve academic institutions, civic societies and public in general in formulation of state water policy. Professor Prasad also presented a comparative picture of National Water Policy 2012 and Tamil Nadu State Water Policy 1994 indicating both similarities and dissimilarities. He ended by calling upon participants to raise additional issues and give suggestions which should be implementable.

The suggestions made by Ms. Santa Sheila Nair included (i) proper attention should be given to existing water bodies, which should be well maintained, (ii) emphasis on women participation in management of water at the local level, (iii) equity should be an objective of water policy, (iv) pricing has an important role in management of water but water should not be traded, (v) need for volumetric management of water, (vi) sewerage system, which is quite costly, was not the answer for sanitation, (vii) need for better waste water management including reuse of water, (viii) industry should get only reused water, (ix) need for managing demand for water to deal with water scarcity, (x) need for research to achieve higher agricultural productivity with lower water use and sensitizing farmers for the same, (xi) measures enhancing the role of panchayats and municipalities in management of water, and (xii) Local bodies should be retail suppliers of water. Professor Shashanka Bhide, while giving the presidential remarks, laid great emphasis on time bound implementation of policy measures. He also emphasized the role of demand management in the water sector and enhanced role of community in management of water.

Professor S.Mohan, during his presidential remarks in a technical session, made a plea for including wasteland and forests within the ambit of water policy. He underlined the need for making a detailed study of impact of climate change on agriculture in Tamil Nadu. He held the view that river water boards should be constituted for efficient management of water. Professor K.Ramaswamy, during his presidential observations in another technical session, made a strong case for increasing the green cover, which he described as different from forest cover. It protects the land and increases ground water also. This was especially needed in Eastern Ghats which, according to him, had been neglected in this respect by Government of India. Other points made by him were importance of paying attention to water needs of cattle, assuring water for every family and metering it, implementation of Polluter Pays Principle, use of recycled water for households for

flushing and for industries, utilizing empty bore wells for recharging through flood water. He also felt that desalinated water should be 15% of total Tamil Nadu's requirement. Professor S.Janakarajan observed that policy should be backed by implementation and that policy statements should use the term 'shall be' instead of 'should be'. He also underlined the need for making use of traditional knowledge.

Suggestions made by the participants, grouped around a few themes, are mentioned below, without repetition. A majority of these suggestions were made by one participant each. But a few of these were made by more than one participant.

There was a need for a thorough vulnerability analysis of climate change and its impact in different parts of Tamil Nadu showing the hot spots and how to involve the community in mitigation measures. It is often said that climate change would result in rise in sea level. But, it is not known as to which villages will be affected by a one meter rise in the sea level. How to reduce evaporation should be indicated in policy. Documentation on current coping and adaptive strategies was necessary. There was need for soil-moisture conservation as well as green water conservation through watershed management. Checks should be exercised on deforestation. There should be increase in forest area. 5% of land of large farmers should be reserved for growing trees as in an Andhra Pradesh law. Cooperation of Forest Department was needed in water management

A review of the 1994 policy was needed since it had become outmoded. The achievements of this policy should be examined and known to public. There was need for awareness about the policy among people through posters, displays etc. There was need for monitoring and transparency and for using web based technology to show how water is managed and funds are utilized. All concerned agencies, including villagers should be involved in discussions related to policy formulations. In fact water policies should evolve from below. Multi-stakeholders meetings should be held in different areas before water policy is finalized. Policy should be people and farmers friendly. It should be based on good practices. Policy should be implemented. Some laws for facilitating implementation are enacted. It was not necessary to follow national policy in every respect. Basin wise and region wise considerations should be taken into account while framing policies. Traditional water practices should be validated in terms of science and technology.

Define properly and evaluate the current rain water harvesting structures. Water recharge structures should be executed in an integrated and holistic manner in place of the prevailing fragmented manner by different agencies. Consolidated data on such structures in an area along with the relevant data for the catchment area should easily be made available. Rain water harvesting to be relooked. Management of delta canal system should be streamlined to boost up delta agriculture. All the irrigation projects / systems should be re-evaluated particularly because many of these were very old and not catering

to the current needs of farmers. Traditional water bodies such as tanks should be revamped. State should avoid as far as possible encroaching upon water bodies for developmental activities. Storm water drains should be made more meaningful by linking them to tanks. There was need for desilting of dams, reservoirs, canals, lakes, tanks and smaller ponds especially in forest areas. There was need for a series of check dams to raise ground water level. There was need for increase in storage of water. High priority is given to proper management and protection of the hitherto neglected small or first order streams. Areas near canals should have bores. There was need for regulating or even banning of sand mining in river beds with a view to protecting the river ecology and riverbed aquifer. The traditional rights of farmers to take sand from the tank-bed should be restored. This will also help desalting of tanks at no extra cost.

Activities should be managed with respect to water that is available. There were limits beyond which technology would not solve the water problem. Desalination, for example, would not work. It requires more energy. How to save water was the main question. There was need to improve efficiency in water use through emulating good practices and putting emphasis on demand management. Inter-sectorial competing demand for water needed to be regulated. Water intensive industries in particular should be restricted.

Government has no right over water. It should hand over this right as well as management to people, especially farmers. There should be local water management committees which should be given effective power. There should be Public Partnership in place of Public Private Partnership. Water is not a commodity. It is a right. Hence, no price for water. Water markets needed to be regulated. There was need for regulation and control over water companies to stop depletion of ground water table.

### **3.4 Perceptions and views of Workshop Participants**

During the workshop on Tamil Nadu State Water Policy in the context of Climate Change held in Chennai on 23<sup>rd</sup> July, 2015 a schedule on the subject prepared by the study team was administered to 33 workshop participants. The filled in schedules throw light on the status of awareness of the workshop participants on national and state water policies, climate change as well as their perception of awareness of the above at district, block, village and town levels. The responses also included information on the perceived effects of climate change and mitigation measures to be taken. In view of the current controversy about the role of water pricing, especially in Tamil Nadu, where the state authorities are opposing this measure, a specific question was asked whether water pricing is an appropriate tool for dealing with water scarcity which is expected to increase due to climate change. It is significant to note that 25 out of 33 participants (i.e. 76%) have expressed their views in favor of water pricing while only 7 of them (i.e. 21%) have disapproved it and one participant did not respond.

A group like the one that participated in the workshop was expected to be aware of climate change and national as well as state water policy. This is more or less borne out by the data given in Table 3.1 below. But what is surprising is that a few members were not aware of the above. And a sizable number were not aware of the details of both the national and state water policies.

**Table 3.1**  
Participants Awareness of Water Policy and Climate Change (No. of responses)

Type of awareness	Yes	No
Awareness about National Water Policy 2012	29	4
Awareness about provisions related to climate change in National Water Policy	24	9
Awareness about Tamil Nadu state water policy	30	3
Knowledge about the year in which Tamil Nadu state water policy was announced	19	14
Awareness about provision related to climate change in Tamil Nadu state policy	8	25

A question was also asked about the participants' perception of the extent of awareness and preparedness with respect to impacts of climate change at district, block, village and town levels. The findings given in Table 3.2 below indicate that the extent of awareness is perceived to be not much even at the district level and is poor at the village level. The extent of preparedness is perceived to be still less. Hardly two to three respondents have considered it adequate whereas it is Nil, according to many. This highlights the task that lies ahead for policy makers and administrators.

**Table 3.2**  
Participants Perception of Extent of Awareness and Preparedness at different levels

Levels	Extent of awareness			Extent of preparedness		
	Nil	Not much	Adequate	Nil	Not much	Adequate
District	4	16	6	12	13	3
Block	8	16	4	12	14	2
Village	12	13	3	19	6	2
Town	10	14	4	15	12	-

In response to questions regarding their perception of major impacts of climate change in Tamil Nadu, most of the participants (28 out of 33) felt that drinking water situation would be very much affected by climate change induced water scarcity. Other water related impacts mentioned by them included adverse effects on agriculture such as increased crop damages due to increased frequency and intensity of floods, less production of water intensive crops

due to increased frequency of drought and less number of rainy days, adverse effects on cattle rearing due to reduced yield of fodder for livestock leading to reduced cattle population and more cattle diseases, adverse effects on inland fishery and fishermen due to drying of inland water bodies, loss of agro-biodiversity and changes in eco-system, adverse effect on ground water recharge resulting in depletion in ground water resources, increased possibility of sea water intrusion due to rise of sea level as a result of global warming, increased storm intensities in coastal areas leading to damages, water stagnation and spread of diseases. They also mentioned that different areas and different sectors would be differently affected. Agriculture and allied activities such as animal husbandry, fishery etc. would be affected the most. Drought prone areas would be affected more than flood prone areas in Tamil Nadu.

The participants were also asked to indicate climate change related mitigation measures that should be included in Tamil Nadu state water policy. Their responses to the structured questions in this respect are given below in Table 3.3.

**Table 3.3: Mitigation Measures to deal with Climate Change**

Types of mitigation measures	(No. of responses)		
	Yes	No	No response
Increased water storage	32	1	Nil
Demand management	29	3	1
Improved water application methods	30	2	1
Suitable water pricing	25	7	1

The first three responses are as per usual expectations. Increased water storage in various forms such as soil moisture, pond, ground water, small and large dams, demand management through use of less water intensive crops in drought prone areas and growing flood resistant crops in flood prone areas, improved water application methods such as use of sprinkler or drip irrigation, rescheduling of crop activities etc. Are well accepted methods for dealing with water scarcity on which there is virtually no controversy? What is of special significance is the last finding in the context of strongly articulated views of farmers and activists against use of water pricing and also views of the Tamil Nadu State Government against water pricing. Against these, there seems to be a near consensus among workshop participants that suitable water pricing would have greater role in future in mitigating the adverse effects of climate change.

Other suggestions related to water policy in the context of mitigating the adverse effects of climate change given by the participants were as below.

- Water budgeting with reference to climate change should be done. For that, special data base for water resources needed to be created.

- Basin-wise studies on impact of climate change on water resources are a necessity.
- Disaster mitigation measures could also help in adaptation to climate change.
- Strengthening of water education focusing on water conservation and management with reference to climate change. Need to sensitize other sectors on water and climate change.
- Awareness among people about adverse effect of climate change.
- Existing storage structures need to be preserved, desalted, strengthened and maintained suitably.
- Rainwater harvesting should be done in a scientific manner through integrated watershed management, construction of check dams, constructing bore wells in river beds, canals, artificial recharge pits and rooftop water harvesting.
- Urban water supply schemes should be executed along with sewer schemes.
- Water supply of 55 Plod for rural, 90 Plod for small towns and 135 Lpcd for cities will be needed for drinking and cooking purposes while ground water may be used for other purposes.
- Restricting industrial use of fresh water while increasing use of recycled water for industries.
- Illegal extraction and sale of ground water should be stopped.
- All bottled water, aerated bottle factories and high water consuming industries should be closed.
- Increase the forest cover through new plantations and controlling deforestation.
- Sand mining in the river beds should be banned.
- Need for control of pollution and improvement in water quality.
- Up gradation of technology through research, development and training is needed.
- Tank water level should be measured through latest technology.
- Need for mapping of existing reservoir, storm drains etc.
- Establish drip irrigation centres like rain centres, to popularize the concept.
- Adopt crop diversification through switching over to dry farming and short duration crops to escape stress of water.
- Create awareness among farming community on alternate wetting and drying techniques for water intensive crops like rice.
- Direct seeded rice cultivation in suitable areas should be promoted.
- Need for distributary level monitoring and regulation through canal modernization.
- Water conservation through storing of green water and artificial recharge should be promoted.
- Most of the temporary or permanent water bodies, whether rantic or otherwise, should be improved, protected and restored.
- Water governance and management should be decentralized.
- There was need to create community ownership in management of water resources. This can be done by entrusting water supply to community and maintenance of the water bodies to Gram Sabha and delegating funds and powers to local bodies for water related activities.
- Each line department should prepare an action taken document. These should be meticulously prepared to ensure that policy is followed by implementation.
- Water pricing should also be fixed for domestic uses.

## Chapter – 4

### The Outcome

#### 4.1 Recommendations for Tamil Nadu State Water policy made by the

A consolidated list of recommendations prepared by the IWP study team for revising Tamil Nadu State Water Policy is given below. These include the suggestions made by the participants in the workshop held in Chennai on 23 July 2015 as well as in the schedules filled in by them and those sent subsequently to the Project Director. These also include the suggestions of the study team. In order to avoid duplication, only those points are included which are not found in the existing State Water Policy document. Even then, there may be some overlap which is unavoidable. The recommendations were sent by E-mail to the Principal Secretary, Water Resources PWD and other senior officers of Water Recourses on 31 October 2015.

#### Water Policy Formulation and Implementation Process

1. There should be multi-stakeholders meetings in different areas before water policy is finalized. Policy should be people and farmers friendly and it should emerge from below. Basin-wise, region-wise considerations should be taken into account while framing policies.
2. Description of water resource scenario as well as water policy should also include socio-economic, institutional and management aspects which are missing in the present policy document. Socio-economic aspects should also be specifically mentioned in the sections dealing with research and data.
3. There is a great need for awareness about water policy among people at the grass roots level through meetings ,campaigns, posters, displays etc., After formulation, water policy should be made readily available at the level of village, Panchayat, Block, School, Libraries and other public places.
4. There is need for creation of Web based technology for updating and disseminating knowledge on water related issues including water policy.
5. There should be a provision for periodic review of the water policy. Time frame for updation and revision of policy should be specified.
6. Water policy should be followed by implementation and policy statements should use the term “shall be” instead of “should be.”
7. In order to facilitate time bound implementation of policy measures, each line department should meticulously prepare an action to be taken document along with a time frame for implementation. Further, water policy should be kept in view while formulating projects. .

8. There should be a Monitoring Committee consisting of not only policy makers and administrators but also scientists, technocrats, academicians, farmers and public representatives for ensuring effective implementation of water policy.

### **Decentralized Water Governance**

9. Greater stress should be laid on decentralization of water governance within the overall framework of the doctrine of public trust, to create a feeling of community ownership and involvement in management of water resources.
10. Role of panchayats and municipalities in the supply and management of water and maintenance of water bodies at local levels as well as in preventing water pollution should be much enhanced.
11. The authority for planning and implementing local level water resources schemes be entrusted to the local self governance bodies, which should receive the needed support from the technical wing of the Water Resources Department of the government.
12. Panchayats and other local bodies should have an important role in giving approval to factories with regard to use of local water resources as well as in cancelling the approval or imposing penalty on factories which violate the conditions related to quantum of water used.
13. Laws should be amended to provide adequate power and funds to such decentralised bodies for adequate development and proper management of local water bodies such as lakes, ponds, canals, common wells etc. so as to subserve the goal of providing safe drinking water to all within easy reach.
14. Corporate control of local water resources should be prevented.
15. Approval of panchayats should be obtained for construction of bore wells for industrial use of water.
16. Women are the primary users of water. Hence, there should be adequate emphasis on women participation in management of water at local levels.
17. Participatory Irrigation Management (PIM) should be strengthened by devising a suitable implementation strategy for the same. This should include an earmarked allocation of water for PIM.

### **Climate Change**

18. There is a need for thorough vulnerability analysis of climate change and its impact on various sectors of the state economy and how to involve the community in mitigation measures.
19. Basin-wise studies on impact of climate change on water resources is necessary. It is also necessary to make a detailed study of impact of climate change on agriculture in Tamil Nadu.
20. Water budgeting with reference to climate change should be done. For that, special data base for water resources need to be created.

21. The adequacy of existing irrigation and flood management projects as well as flood and drought management policies should be reviewed to take care of likely impacts of climate change such as expected increase in sediment load due to higher intensity of floods.
22. High priority should be assigned to (i) strengthening and creating adequate facilities for studies and research on hydrological, hydro-metrological and geomorphologic aspects related to climate change within the Department of Water Resources, WALMI, Universities and other institutions including creating new institutions; (ii) modernizing and expanding instrumentation and measurement techniques and network and (iii) revising existing courses of studies, creating new subjects and introducing programmes as well as post-graduate diplomas and degrees.
23. Disaster mitigation measures could also help in adaption to climate change.
24. There should be adequate emphasis on strengthening of water education focusing on water conservation and management with reference to climate change, Need to sensitize other sectors on water and climate change.
25. There is need to take up massive programmes of awareness generation among people at all levels about adverse effects of climate change and the mitigation measures to be taken to deal with them so as to enhance their coping capacity.
26. There should be a gradual adoption of a system of water auditing specially in industries.
27. There is need for integrated salinity control to deal with the problem of increasing salinity and ground water exploitation in coastal areas of Tamil Nadu.
28. While planning new water bodies such as check dams, percolation tanks, other watershed management structures, the factor of climate change needs to be taken into consideration.
29. There is need for a system of suitable water pricing to deal with increasing water scarcity in future due to the adverse effects of climate change.
  
30. The different departments of the state government, whose works are related to water and climate change should have a common forum which should meet at frequent intervals to take an integral view of knowledge base and policy options. For this purpose, the Department of Water Resources should have an effective cell headed by a Chief Engineer level officer.

### **Drinking Water to All**

31. Equity in use of water should be an objective of water policy.
32. Water corporates and industries, which are motivated by profit, should not be subsidized for water supplied to them.
33. There is need for putting stringent restrictions on all bottled water, aerated bottled factories and high water consuming industries.

34. Safe drinking water must be made access able and o all within a reasonable distance from places of abode and work so as to assure water for every family.
35. The rights of users of water should be recognized. Hence, the right to water should be guaranteed specially to the marginalized and vulnerable such as Dalits, Tribals, Nomads and differentially abled persons.
36. Water supply of 55 lpcd for rural, 90 lpcd for small towns and 135 lpcd for cities should be ensured.
37. Proper attention should also be paid to water needs of cattle.
38. Water should not be traded. In particular, commercialization or privatization of drinking water should be avoided.

### **Water and Agriculture**

39. Farmers should be sensitized about achieving higher agricultural productivity with lower use of water.
40. Less water consuming traditional organic agriculture practices need to be encouraged while ensuring for higher productivity. For this purpose, higher funds may be allocated for Research and Development.
41. There should be adoption of crop diversification through switching over to dry farming and short duration crops to escape stress of water.
42. Awareness among farming community on alternate wetting and drying technique for water intensive crops like rice, should be created.
43. Direct seeded rice cultivation in suitable areas should be promoted.
44. Management of delta canal system should be streamlined to boost delta agriculture.

### **Water and Forests**

45. Waste land and forest should be included within the ambit of water policy.
46. There is need to Increase green cover to protect land so as to increase ground water level particularly in Eastern Ghats region.
47. Forest cover should be increased through new plantations and controlling deforestation. Five percent of land area of large farmers should be reserved for growing trees as prescribed in a law in Andhra Pradesh.

### **Controlling Water Pollution**

48. Control of pollution and improvement in water quality should be an important objective of water policy. Hence, there should be mandatory water testing before water is supplied in rural and urban areas.
49. Role of Pollution Control Board in preventing water pollution should be strengthened.

50. Penalty should be imposed on those polluting water in accordance with Polluter Pays Principle.
51. Regulation of sand mining in river beds is necessary for protecting river ecology and riverbed aquifer, but traditional rights of farmers to take sand for self-use from the tank and river-bed should be recognized/restored.
52. Sewer schemes should be executed along with urban water schemes.
53. There should be increasing emphasis on controlling or minimizing throwing of garbage and gaseous industrial effluents in water courses/bodies.
54. Use of fossil fuels and emissions of Co-1, Co-2 should be reduced.
55. Need for better management of waste water including reuse of water.
56. Use of recycled water should be encouraged for household flushing, car washing, gardening and similar uses.
57. Use of fresh water should gradually be restricted in industries which should make increasing use of recycled water. Such use should gradually be made mandatory.

### **Ground Water**

58. Illegal extraction and sale of ground water should be prohibited.
59. No permission for bore-wells beyond a certain depth should be given.
60. Panchayats should be empowered to regulate extraction of ground water in over exploited and critical areas
61. There is need for regulation and control over extraction of ground water by water intensive industries to stop over exploitation of ground water. .
62. There is need for a series of check dams to raise ground water level.
63. Area near canals should have bores.
64. Empty bores should be used for recharging ground water during floods.

### **Development and Management of Water Resources**

65. There is a need for increase in storage of water.
66. There is need to improve water use efficiency by emulating good practices and putting adequate emphasis on demand management through pricing and volumetric supply of water so as. to deal with increasing water scarcity.
67. Need for constitution of effective river boards for efficient management of water.
68. Adequate measures should be taken to deal with the problem of siltation in dams.
69. All the major irrigation projects / systems should be re-evaluated particularly because many of these were very old and not catering to the current needs of farmers
70. Traditional water bodies such as tanks should be de-silted, restored and revamped. The state should, as far as possible, avoid encroaching upon such water bodies for development activities.
71. Stringent action should be taken against encroachments into catchment areas of water bodies by private agencies.

72. Need for up gradation of technology through research, development and training.
73. Proper attention should be paid for maintenance of all types of existing water bodies such as dams, canals, tanks, ponds etc.
74. Tank water level should be measured through latest technology.
75. There should be a satisfactory mechanism for distributary level monitoring and regulation.
76. Need for making use of traditional knowledge, wherever it is found to be good and efficient.
77. Social Impact Assessment needs to be taken up before implementing major projects.
78. External evaluation of major water sources projects should receive due attention.

### **Water Harvesting**

79. Water conservation through storing of green water and artificial recharge should be promoted. Wherever commercially viable, wetlands should be preserved and developed for fishery and aquaculture.
80. Rain water harvesting should be relooked and planned in a scientific manner. The current rain water harvesting structures should be evaluated. Besides, a system for monitoring of rain water harvesting structures should be established.
81. Water recharge structures should be executed in an integrated and holistic manner in place of the prevailing fragmented manner by different agencies.
82. Consolidated data on recharge structures in an area along with the relevant data for the catchment area should easily be made available.

### **Data Base**

83. Quality of socio-economic data needed for formulation of projects should be raised substantially.
84. Updating of data related to water (surface and ground) availability in the sub basins at regular intervals.
85. There should be a satisfactory mechanism for synchronization and validation of data from various sources on the status of water and irrigated area within the state.
86. Government should create a transparent data bank on all types of water bodies including the related information on catchment/supply areas of water and the ecological system.

## Chapter – 5

### Conclusions

#### 5.1 Backdrop

The present study is the outcome of the need to review state water policies in line with the National Water Policy, 2012, in the context of climate change. Its objective was to review the Tamil Nadu State Water Policy, 1994 so as to provide suggestions for modifying it in line with the National Water Policy in the context of the ensuing climate change, involving awareness, preparedness, coping mechanism at the state level and down below.

Apart from using information from secondary sources, the study team conducted wide ranging interactive sessions with government departments and other stakeholders at the state, district and panchayat levels followed by state level workshop to get suggestions for modifying the earlier state water policy of 1994 in the light of the National Water Policy, 2012, keeping in view the ensuing climate change and other changes which had taken place in the state's water resources scenario as well as socio-economic and environmental setting since 1994. Written responses of perceptions and views of the workshop participants were also obtained, analyzed and used for the purpose. There was a continuous dialogue between the study team and the state government. The suggestions were transmitted to the state government at the end of the study.

#### 5.2 The Process

The state of Tamil Nadu was selected for the study on the basis of certain criteria which were evolved after considerable discussion of the study team with central government departments/ agencies dealing with water resources such as the Ministry of Water Resources, G.R and R.D, the Central Water Commission, the Planning Commission, etc. A critical review of Tamil Nadu State Water policy, 1994, was made with respect to the water resources scenario of the state as well as the National Water Policy, 2012. Considerable discussion on issues pertaining to Tamil Nadu State Water Policy took place in Chennai between the study team and state level senior officers of Water Resources Department of Government of Tamil Nadu as well as other stakeholders on May 18 and 19, 2015. Members of the study team also interacted with relevant district level and other officers, Panchayat representatives, Krishi Vigyan Kendra and general public in two villages of Salem district of the state from June 23 to July 2, 2015. Finally, a multistakeholders workshop on Tamil Nadu State Water Policy attended by 50 participants was held on 23<sup>rd</sup> July, 2015 at Anna University, Chennai. Findings of the schedules filled in by the participants of the workshop, giving their perceptions, views and suggestions on issues related to climate change and water policy, were processed and analyzed. Thereafter, the recommendations emerging from different sources including

those of the study team were finalized and communicated to the Government of Tamil Nadu for taking them into account while revising the earlier policy of 1994.

### **5.3 The Outcome**

A consolidated list of 86 recommendations prepared by the IRMED study team to be considered for inclusion in the revised version of Tamil Nadu State Water Policy was sent by E-mail to the Principal Secretary, and other senior officers of Water Resources, Government of Tamil Nadu, on 31 October 2015. These include the suggestions made by the participants in the workshop held in Chennai on 23 July, 2015, as well as in the schedules filled in by them and also those sent subsequently to the Project Director. These also include the suggestions of the study team. The aspects covered by the recommendations include water policy formulation and implementation process, decentralized water governance, climate change, drinking water to all, water and agriculture, water and forest, controlling water pollution, ground water, development and management of water resources, water harvesting and data base. In order to avoid duplication, only those points are included which are not found in the existing State Water Policy document. Even then, there may be some overlap which is unavoidable.

**Thus, the tasks assigned for the study were successfully completed and the objective of the study fully achieved. Now, it is for the Government of Tamil Nadu to take the follow up action and prepare a revised version of the Tamil Nadu State Water Policy, 1994.**

## Annexure – A

### List of senior officers of Government of Tamil Nadu interacted with by the study team on 18 and 19 May, 2015

1. Er.E.Thirumaran, Engineer-in-Chief, Water Resources, PWD.
2. Er.Mrs.Lalitha Rani. Chief Engineer, PWD, Water Resources Department and Director Institute for Water Studies (IWS).
3. Er.Ms.B.Rajeshwari. Chief Engineer, PWD, Ground Water
4. Er.S.S.Rajagopal, Director, State Water Resources Management Agency,(SWaRMA). and former Engineer-in-Chief.
5. Er.I.Kanthimanthinathan, Joint Chief Engineer, Irrigation, PWD.
6. Er.S.Antony Anbarasu, Executive Engineer, Gauging Division, PWD
7. Er.P.Logarajan, Executive Engineer, PWD, IWS
8. Er.D.Panneer Selvam, Executive Engineer, PWD,SWaRMA
9. Er.A.Dhanapal, Executive Engineer, SWaRMA
10. Dr.M.Senthil Kumar, Scientist `C`, Central Ground Water Board, (CGWB), Government of India, Chennai
11. Er.A.Sakthivel, AHG, CGWB, Chennai
12. Er.P.L.Karuppiah, Deputy Director (Geology), IWS
13. Er.R.Srinivasan, Hydrologist, TWAD
14. Er.S.Prabhu, G1 Specialist, SWaRMA
15. Er.R.Vetriselvan, IT Specialist, SWaRMA
16. Er.A.Senthil Kumar, Environmentalist, SWaRMA
17. Er.M.Suganthi, AEE, IWS
18. Er.S.Raja, , AEE, IWS
19. Er.P.Gunasekaran, AEE, IWS
20. Er.T.Sripriya Dharshini, AE, SWaRMA
21. Er.P.Pugalendhi, AEE, IWS i
22. Er.N.Mangayarkarasi, AEE, IWS
23. Er.R.Raman, AEE, SWaRMA
24. Er.A.Mahendran, AEE/IWS
25. Er.S.Shenbagadevi, Asstt. Engineer, INS

## **Interaction with Academicians and others**

1. Prof.S.Janakarajan, Madras Institute of Development Studies, Chennai and President, SACI Waters India.
2. Prof.N.K.Ambujam, Director Centre for Water Resources, Anna University, Chennai along with four other faculty members of the Centre for Water Resources.
3. Ms.L.Susithra and Shri V.Rajesh of Terra Firma, Chennai, a partner of IWP specializing in recycling of water.

## Annexure – B

### Proceedings of GWP-IWP sponsored workshop on Tamil Nadu State Water Policy with special reference to climate change along with list of participants

As a part of the IWP project, a workshop on Tamil Nadu State Water Policy with Special Reference to Climate Change, was organized by the Institute for Resource Management and Economic Development (IRMED), Delhi, in Koodal Hall of Anna University, Chennai, on July 23, 2015 from 10.30 AM to 4.30 PM in collaboration with the Centre for Water Resources, Anna University, Chennai. A copy of the Tamil Nadu State Water Policy 1994 was sent by email by IRMED to all the confirmed participants with a request to read it and give relevant comments and suggestions in the workshop. They were also requested to go through the National Water Policy 2012 which was easily accessible on the website of the Ministry of Water Resources, R.D. and G.R., Government of India. In addition, a Background Note was circulated by the Study Team during the workshop giving the rationale and context of the workshop and raising a number of relevant issues on which the views of the participants were solicited.



**Inaugural Session: Dr.N.K.Ambujam of Anna University offering bouquet to the Chief Guest, Ms.Santha Sheela Nair. Dr.Shashanka Bhide, the President of the Session and Professor Kamta Prasad, the Workshop Coordinator is on her right**

Another note circulated by the Study Team made a comparative analysis of National and Tamil Nadu Water Policies, under discussion in the workshop.

The workshop started with a welcome address by Dr.N.K.Ambujam, Director, and Centre for Water Resources, Anna University, and Chennai. Thereafter, Professor Kamta Prasad, the Director, IWP study and Workshop Coordinator, provided a brief historical background of the national and state water policies including the Tamil Nadu State Water Policy. He underlined the urgent need for a review of the existing Tamil Nadu Water Policy in view of several changes in water resource scenario and socio-economic situation which had taken place since 1994 when the State Policy was announced. He then raised a number of pertinent issues on which the views/ suggestions of the participants were solicited. These have been reported in section 3.3 of Chapter 3.



**Professor Kamta Prasad, the Workshop Coordinator raising issues to be considered by the Workshop. Seated on his Right are Dr.N.K.Ambujam, Sh.R.K.Jain, Ms.Santha Sheela Nair and Dr.Shashanka Bhide.**

The workshop was inaugurated by Ms.Santha Sheela Nair, IAS (Retd.), Hon'ble Vice Chairman, State Planning Commission, Government of Tamil Nadu while Professor Shashanka Bhide, Director, Madras Institute of Development Studies, Chennai presided over the inaugural session. Delivering her inaugural address, Ms.Nair drew attention to the current water resource scenario in Tamil Nadu marked by scarcity of water. In order to deal with the problem, water recharging had been taken up on a grand scale in Tamil Nadu. She regarded this as a major achievement. Thereafter, she gave a number of suggestions related to the State Water Policy, which are included in the list of suggestions in Section 3.3 of Chapter 3.

Shri R.K.Jain, Chief Engineer, Central Water Commission, Government of India in a Key Note address dwelt upon the salient features of the National Water Policy, 2012 drawing special attention to changes made in it as compared to the earlier National Water Policy of 2002. This was followed by presentation on Tamil Nadu State Water Policy of 1994. Dr.Veena Khanduri, Executive Secretary, IWP gave a vote of thanks.

The subsequent two technical sessions were devoted exclusively to participants comments and suggestions regarding Tamil Nadu State Water Policy. There were 50 participants as per list attached. This included a few leading farmers also, who had come from different parts of Tamil Nadu. The first technical session, which was held before lunch, was presided over by Dr.S.Mohan, Professor, Environmental and Water Resources Engineering Division, IIT, Madras, while the second session, which was scheduled after the lunch, was presided over by Professor K.Ramaswamy, Vice Chancellor, Tamil Nadu Agricultural University, Coimbatore. Professor S.Janakarajan of Madras Institute of Development Studies, Chennai and President SACI Waters (India), Hyderabad helped as discussion coordinator in both the technical sessions, each of which was of one hour and 15 minutes duration. He also provided a brief summary of English version of the points made by a few speakers in Tamil.



**A view of the workshop participants**

The discussion in the technical sessions was so conducted that almost every participant got an opportunity to take part in it. Hence, it is not necessary to mention the names of the speaker. During their interventions, a few speakers, before giving their suggestions, also drew attention to the prevailing water resource scenario as well as water policy

formulation process in Tamil Nadu which they felt should be taken note of while reviewing Tamil Nadu State Water Policy. These have been taken into account while presenting salient features of water resources scenario of Tamil Nadu in Chapter 2. Other points made were the following:



1. There was no official document released by the Government of Tamil Nadu showing what actions had been taken with respect to the Water Policy of 1994. Which provisions were implemented and which were not? What was the need for one more water policy when the earlier water policies have had no desired impact?
2. Water policies were framed by bureaucrats and water engineers without any involvement of water users.
3. There was acute shortage of field level canal staff.

The discussion sessions ended with concluding observations and vote of thanks by Professor Kamta Prasad, the Workshop Coordinator. He thanked all the participants in the workshop for taking keen and lively interest in its deliberations. He also thanked both the resource persons who presided over the technical sessions and Dr.S,Janakarajan and Dr.N.K.Ambujam for providing assistance in organizing the workshop. He observed that the several points of view mentioned by the participants would be taken into account while finalizing recommendations / suggestions to be sent to the Tamil Nadu Government for consideration as well as to IWP. These would be looked into from the points of view of implementability, relevance and usefulness.





## List of Participants

1. Ms.Santha Sheela Nair, Vice Chairman, Tamil Nadu State Planning Commission, Chennai
2. Shri K.Balakrishnan, MLA, President, Tamil Nadu Farmers Union , Chidambaram
3. Dr.Shashanka Bhide, Director, Madras Institute of Development Studies, Chennai-20
4. Professor Kamta Prasad, Chairman, Institute for Resource Management and Economic Development, Delhi
5. Dr.K.Ramasamy, Vice Chancellor, Tamil Nadu Agricultural University, Coimbatore
6. Professor S.Janakarajan, Madras Institute of Development Studies, Chennai
7. Dr.N.K.Ambujam, Director, Centre for Water Resources, Anna University, Chennai
8. Dr. R.K.Jain, Chief Engineer, Central Water Commission, Government of India,, New Delhi
9. Sh. J.Chandrasekhar Iyer, Chief Engineer, Central Water Commission, Government of India, Coimbatore
10. A.Subburaj, Regional Director, Central Ground Water Board, Govt. of India, Chennai
11. Dr.S.Mohan, Environment and Water Resources Division, Deptt. of Civil Engr. IIT, Madras, Chennai
12. Dr.Veena Khanduri, Executive Secretary, IWP, Gurgaon
13. Mr.T.A.Mohamed Ibrahim, Joint Chief Engineer, Tamil Nadu Water Supply and Drainage, (TWAD) Board, Govt. of Tamil Nadu, Chennai
14. Shri S.Ramar, Senior Hydrologist, Tamil Nadu Water Supply and Drainage, (TWAD) Board, Govt. of Tamil Nadu, Chennai
15. Dr.M.Krishnaveni, Professor, Centre for Water Resources (CWR), Anna University, Chennai
16. Dr. B.V.Mudgal, Professor, CWR, Anna University, Chennai
17. Ms.Ahana Lakshmi, Trinnet, Bhoomica Trust, Alwarpet, Chennai
18. Dr.R.Sakthivadivel, Emeritus Professor, CWR, Anna University, Chennai
19. Shri K.Palanivelu, Director, CCCAR, Anna University, Chennai
20. Dr.Balaji Narasimhan, Environment and Water Resources Division, IIT, Madras
21. Prof. K.Venugopal, Chief Scientist, Sathyabama University, Chennai
22. Dr.Indumathi Nambi, Environment and Water Resources Division, IIT, Madras
23. Shri L.Venkatachalam, Associate Professor, Madras Institute of Development Studies, Chennai
24. Shri N.Venkatesan, Chief Executive, Dhan Vayalagam (Tank) Foundation, (Dhan Foundation), Madurai
25. Shri K.Krishna Reddy, Researcher, International Water Management Institute, (IWMI)C/o ICRISAT, Hyderabad
26. Shri R. Ramaraj , Executive Engineer, National Water Development Agency, Govt. of India, Chennai
27. Shri C.R.Srinivasan, Senior Estate Officer (Retd.), Chennai Metropolitan Development Authority, Govt. of Tamil Nadu,, Chennai

28. Shri N.Raman, Senior Engineer, WAPCOS Limited, Chennai
29. Shri V.Saithanyamurthy, Consultant, WAPCOS, Chennai
30. Shri R.Elango, Panchayat President, Kuthambakkam village, Poonamalle block, Tiruvallur district, Tamil Nadu
31. Shri Thusali Narayan, AIKS, Dist.Secy, Turuvellore , Gummdipoondi, Tamilnadu-601201
32. Shri Sami Nataraj AIKS, Tanjore District Secretary, Tanjore
33. Dr.R.S.S.Hopper, M.S.Swaminathan Research Foundation, Chennai
34. Dr.T.Sundaramoorthy, CPR Environmental Education Centre, Alwarpet, Chennai
35. Shri G.Baskar Professor, SRM University, Kattankulathur-603203
36. Dr.M.Arunachalam, Professor, M.S.University, Tirunelveli
37. Shri S.Annadurai, Vaigai Trust, 8/3, Kamaraj 1<sup>st</sup> Streret, Nilakottai 624208
38. Dr.R.Krishnan, Dy.Chief Engineer, WAPCOS Ltd. Chennai
39. Dr.Ms.Carolin Arul, CWR, Anna University, Chennai
40. Shri S.Manoharan, Research Associate, Centre for Law, Policy & Research, Chennai
41. Dr.R.Saravanan, Associate Professor, CWR, Anna University, Chennai
42. Shri A.S.Bhuvaneshwaran, Advocate, High Court, Chennai
43. Shri V.Lenin Kalyana Sundaram, Assistant Professor, CWR, Anna University, Chennai
44. Dr.P.K.Suresh, Consultant Coastal Engg., Retd. Engineer PWD, Govt. of Tamil Nadu, Chennai
45. Shri G.Sundaram, Poovalagir Nanbayal, Vadapalani, Chennai
46. Shri Sekhar Raghavan, Rain Centre, Chennai
47. Shri S..P.Nagayam, Central Ground Water Board, Govt. of India, Chennai
48. Shri S.Rajendran, CASA, 4, Church Road, Vapery, Chennai
49. Shri George,J, Vadapalani, Chennai
50. Shri John Milton, Loyola College, Chennai

## Annexure - C




### Scanned copy of list of registration sheets

TAMILNADU STATE WATER POLICY WITH SPECIAL REFERENCE TO CLIMATE CHANGE					
Venue: Koodal Hall, Anna University, Chennai -25				Date: 23 July, 2015,	
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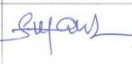

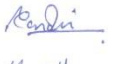



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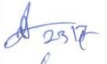

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## Annexure – D

### Review of Tamil Nadu State Water Policy in the Context of Climate Change by India Water Partnership

#### Schedule for Workshop Participants

1. Name and contact details of the respondent
2. Before being contacted for this Workshop, were you aware of the National Water Policy, 2012?  
Yes                      No
3. If yes, were you aware of the provisions related to climate change?  
  
Yes                      No
4. Were you also aware about Tamil Nadu state having a water policy?  
  
Yes                      No
5. If yes, were you also aware about Tamil Nadu state having a water policy?
6. Were you aware whether the state policy contained any provision dealing with climate change related issues?  
Yes                      No
7. What is the extent of **awareness** and **preparedness** with respect to impacts of Climate Change related to water resources at local levels (District, Block, Village and Town). Please tick:

Levels	Extent of awareness:			Extent of Preparedness		
	Nil	Not Much	Adequate	Nil	Not Much	Adequate
District	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Block	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Village	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
Town	[ ]	[ ]	[ ]	[ ]	[ ]	[ ]
8. Please indicate how the water related impacts of climate change will be different in different types of areas such as flood prone, drought prone,



## **Annexure – E**

### **Review of Tamil Nadu State Water Policy in the Context of Climate Change by India Water Partnership**

#### **Review of Tamil Nadu State Water Policy in the Context of Climate Change**

#### **Schedule for Krishi Vigyan Kendra (KVK) and district agriculture and horticulture officer**

Respondent: KVK, DAO, BAO (Please tick)

Location:                      District:

Name, Designation and contact details:

1. Are you aware about of National Water Policy, 2012?

Yes                      No

2. Does your state have state a water policy? If yes, in which year was it announced?

Yes                      No

3. If yes, does it contain climate change related issues?

Yes                      No                      Not sure

4. Are you aware that Climate Change due to global warming is going to pose a serious threat for water resources sector and thereby to agricultural activities?

Yes

No

5. If yes, What mitigation measures are taken by your agency to counter the adverse effect of climate change?

1.

2.

3.

6. Are these measure adequate?

Yes

No

Not sure

7. Have you developed appropriate crop varieties for adoption by farmers in anticipation of climate change?

Yes

No

Not sure

8. If yes, what are these varieties?

1.

2.

3.

9. Have you also carried out field demonstrations of these varieties on farmers' fields?

Yes      No

10. If yes, what crops have been demonstrated?

1.

2.

3.

11. Did farmers follow the advice given by you?

Yes      No

12. If no, why?

13. Will you suggest for adoption of improved water application methods (drip or sprinkler irrigation) to enhance water use efficiency?

Yes      No

14. What additional measures you think should be taken to minimize the adverse effect of climate change on agriculture?

1.

2.

3.

15. Any other suggestion you would like to give.

## Annexure – F

### Review of Tamil Nadu State Water Policy in the Context of Climate Change by India Water Partnership

#### Schedule to be canvassed at the level of other departments/ agencies at the District Level

Name of the district:

State:

Name and contact details of government department/agency

1. Are you aware of the National Water Policy, 2012?

Yes

No

2. Are you aware of the state water policy?

Yes

No

3. If yes, in which year was it announced?

4. Has it any provision related to climate change?

Yes

No

Not sure

5. Have you attended any seminars, workshop, training programmes etc. related to climate change during the past 5 Years?

Yes

No

6. Are you aware that Climate change due to global warming is going to pose a serious threat for water resources sector?

Yes

No

7. If yes, how much of the following are likely to be affected?

Source	Very much	To some extent	No effect	No idea
Surface irrigation				
Groundwater irrigation				
Drinking water, rural				
Drinking water, urban				
Flood Management				
Agriculture				
Fodder				
Fishery				
Horticulture				
Animal Husbandry				
Other (specify)				

8. Has your state/ agency adopted climate change resilient technological option to counter the adverse effects of climate change?

Yes

No

9. If yes, what measures are being taken? Are these adequate?

Measures  
adequate

Adequate

Not

- 1.
- 2.
- 3.

10. What additional measures should be taken to minimize the effect of climate change in your area?

## Annexure – G

### Review of Tamil Nadu State Water Policy in the Context of Climate Change by India Water Partnership

#### Schedule to be canvassed at farmers level

Name of the farmer:                      Village:

Name of Panchayat :                      Block:

District:                                      State:

1. Are you aware of the National Water Policy, 2012?

Yes                      No

2. Are you aware of the state water policy 19941/

Yes                      No

3. If yes, has it any provision related to climate change?

Yes                      No                      Not sure

4. Are you aware that climate change due to global warming is going to pose a serious threat for water resources sector?

Yes                      No                      No idea

5. Do you know that climate change has adverse effect on agriculture and allied activities.

Yes                      No                      NA

6. If yes, are you aware of coping measures?

Yes            No

7. how much of the following are likely to be affected?

Source	Very much	To some extent	No effect	No idea
Surface irrigation				
Groundwater irrigation				
Drinking water rural				
Drinking water urban				
Flood Management				
Agriculture				
Fishery				
Horticulture				
Others (Specify)				

8. Have you adopted any climate change related coping measures such as storing of water in various forms, re-scheduling of crop activities such as growing crops which need less of water, early/ late sowing of crop to escape water stress etc, to counter the adverse effects of climate change?

Yes            No            NA

9. Are you aware of improved water application methods such as drip or sprinkler irrigation:

Yes            No

10. If yes, are you adopting such methods?

Yes            No            NA

11. Have you modified your crop and other activities to overcome the adverse effect of climate?

Yes            No            NA

12. If yes, what measures are being taken? Are these adequate?

Measures            Adequate            Not adequate

1.

2.

3.

13. What additional measures should be taken to minimize the effect of climate change in your area?

## **Annexure – H**

### **Review of Tamil Nadu State Water Policy in the Context of Climate Change by India Water Partnership**

#### **Guide points for discussion with the villagers**

- a. Awareness about National Water Policy, 2012.
- b. Awareness about State Water Policy.
- c. Awareness about climate change.
- d. Its effect on
  - i. Agriculture and allied activities.
  - ii. Drinking water.
- e. Coping strategy
  - i. Agriculture and allied activities
  - ii. Drinking water.