3.1. Introduction

Water is the elixir of life, a precious gift of nature to mankind and millions of other species living on the earth. It is fast becoming a scare commodity in most part of the world. Water resources comprising of surface water (river and lakes), ground water and marine and coastal waters, support all living things including human beings. Though water is available in the universe in huge quantity in the order of 1400 x 10^6 km^3, only 3% of the waters in the universe is fresh water. Among the fresh waters, only about 5% of them or 0.15% of the total world waters are readily available for beneficial use. The total water resources available in India is 1850 km^3, which is roughly 4% of the world's fresh water resources[1].

Tamil Nadu accounts for 4 per cent of the land area and 6 per cent of the population, but only 3 per cent of the water resources of the country. Most of Tamil Nadu is located in the rain shadow region of the Western Ghats and hence receives limited rainfall from the south-west monsoon.[2]

3.2. Rainfall

The State gets relatively more rainfall during north east monsoon, especially, in the coastal regions. The normal rainfall in south west and north east monsoon is around 322 mm and 470 mm which is lower than the National normal rainfall of 1250 mm. Similarly, the per capita water availability of the State is 800 cubic meters which is lower than the National average of 2300 cubic meters.[3]

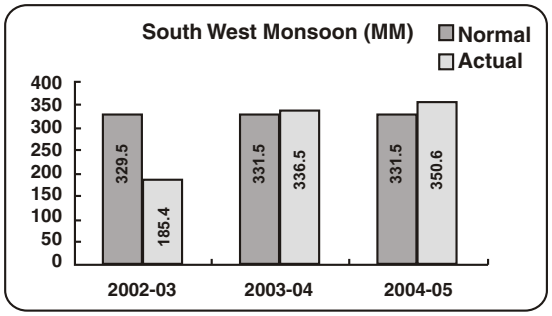

Fig 3.1 South West Monsoon[3]

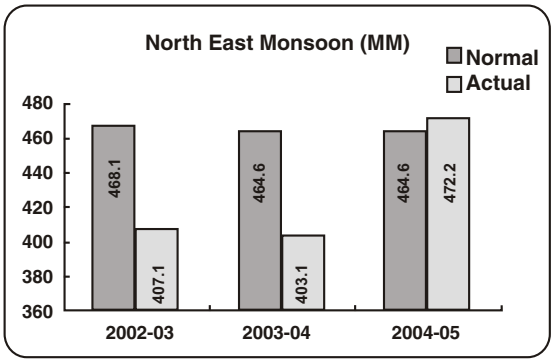

Fig 3.2 North East Monsoon[3]

3.3 Surface water resources of Tamil Nadu

The total surface water potential of the state is 36 km^3 or 24864 M cum.[1] There are 17 major river basins in the State with 61 reservoirs and about 41,948 tanks. Of the annual water potential of 46540 million cubic metres (MCM), surface flows account for about half. Most of the surface water has already been tapped, primarily for irrigation which is the largest user. There are about 24 lakh hectares are irrigated by surface water through major, medium and minor schemes. The utilisation of surface water for irrigation is about 90 percent.[2]

3.4 Ground Water resources of Tamil Nadu

The utilisable groundwater recharge is 22,423 MCM The current level of utilisation expressed as net ground water draft of 13.558 MCM is about 60 percent of the available recharge, while 8875 MCM (40 percent) is the balance available for use. Over the last five years, the percentage of safe blocks has declined from 35.6 per cent to 25.2 percent while the semi-critical blocks have gone up by a similar percentage. Over-exploitation has already occurred in more than a third of the blocks (35.8 percent) while eight blocks (2 percent) have turned saline. The water level data reveals that the depth of the wells range from an average of 0.93 metres in Pudukottai district to 43.43 metres in Erode. According to the Central Groundwater Board, there has been a general decline in groundwater level in 2003 due to the complete desaturation of shallow aquifers. There has been a

considerable failure of irrigation wells in Coimbatore District.[2]

Table 3.1. Surface and Ground Water

Sl. No	Major River Basins	Minor River Basins	Water resource potential of the basin (Mcum)	
			Surface Water	Ground Water
1.	Chennai	1.Araniyar	849	1119
		2.Kosaithalaiyar		
		3.Cooum		
		4.Adyar		
2.	Palar	5.Palar	1772	3416
3.	Varahanadhi	6.Ongur	545	1237
		7.Varahanadhi		
4.	Ponnaiyar	8.Malattar	820	1499
		9.Ponnaiyar		
		10.Gadilam		
5.	Vellar(n)	11.Vellar(n)	1027	1021
6.	Cauvery	12.Cauvery	7067	10573
7.	Agniyar	13.Agniyar	447	555
		14.Ambuliyar		
		15.Vellar (S)		
8.	PAP	16.Parambikulam Basin Complex	866	899
9.	Pambar	17.Koluvanar	551	879
		18.Pambar		
		19.Manimuthar		
10.	Kottakaraiar	20.Kottakaraiar	218	398
11.	Vaigai	21.Vaigai	1272	760
12.	Gundar	22.Uttarakosaamangai	451	866
		23.Gundar		
		24.Vembar		
13.	Vaippar	25.Vaippar	310	669
14.	Kallar	26. Kallar	203	37
		27.Korampallamar		
15.	Tambaraparani	28.Tambaraparani	1706	827
16.	Nambiyar	29. Nambiyar	194	276
		30.Karimaniar		
		31.Hanumanadhi		
17	Valliar	32.Palayaru	421	241
		33.Valliar		
		34.Kodaiyar		
		Others	6145	
		Total	**24864**	**25291**

Source T.N Development Report 2005

3.5 Water Balance

The Water Resources Organisation prepared a State Framework Water Resource Plan of Tamil Nadu. The annual water potential of the State including surface and groundwater is assessed as 46,540 MCM (1643 TMC) while the estimated demand is 54,395 MCM (1921 TMC) in 2001 which is likely to go up to 57,725 MCM in 2050. The various sectors are[2].

- Domestic use (urban and rural) is projected to go up from 4 per cent to 6 per cent due to increase in population and due to urbanisation. The domestic requirement would increase by 55.72 percent.
- Agriculture use will remain stagnant or may even decrease due to progressive urbanisation.
- The share of industry may not change much, but in absolute terms the increase will be about 27.7 per cent.
- Provision of 1600 MCM in 2050 would be made for minimum flow in rivers for ecological purpose, which is a new category for water resource planning.

3.6 Sectoral Demand

3.6.1 Irrigation

Out of a net sown area of 56 lakh hectares, about 30 lakh hectares (54 per cent) of arable land are irrigated. Since irrigation may take place more than once, the gross irrigated area is of the order of 36 lakh hectares or an irrigation intensity of 120 per cent. Canals account for about 29.2 per cent, tanks for 21.3 per cent and wells for 48.9 per cent of net irrigated area. In 1998-99 the foodgrain output reached a peak of 94 lakh tonnes due to the availability of irrigation[2].

Surface irrigation potential has largely been exhausted. Area under canal irrigation has remained almost stagnant since the sixties at about 8.5 lakh hectares. Modernisation of several of the canal system has been taken up under the National Water Management Project and the World Bank funded Water Resources Consolidation Project.

The efficiency of many of the canal systems has declined due to seepage and silting. Irrigation efficiency can be improved through command area development, participatory irrigation management, conjunctive use of surface water and groundwater, introduction of advanced methods of irrigation such as drip and sprinkler systems, and reduction in the wastage of water due to over irrigation[2].

The area under tank irrigation has fallen by a third from 9 lakh hectares in sixties to 6.3 lakh hectares in 1999-2000. The average net area irrigated by a tank has decreased from 19.2 ha in 1981-82 to 15.1 ha in 1999-2000. The proportion of area irrigated by tanks has fallen from 36.8 per cent in the sixties to only 21.3 per cent in 1999-2000. Modernisation of tanks with assistance from the European Economic Commission has been taken up since 1984. Non-governmental organisations are also involved in implementing the scheme through active participation of water user associations[2].

Wells have become the predominant source of irrigation accounting for nearly half of the irrigated area. The total number of wells has increased from 5.39 lakh in 1970-71 to 16.79 lakh in 1999-2000. During this period, the area irrigated by wells has increased from 9.18 lakh hectares to 14.53 lakh hectares. The number of open wells and dry wells energised was only 42.4 per cent in 1970-71 but increased to 91.1 per cent in 1999-2000, due to the free supply of electricity to farmers. 16,000 wells could not be used due to well failure. The fact that there is well failure is an indicator of the over-extraction of groundwater in certain parts of the State. As mentioned earlier, the groundwater in 138 out of 385 blocks is over-exploited[2].

3.6.2 Watershed Management

Given that 45 per cent of the net sown area is not irrigated, it is essential to take up watershed management and in *situ* water harvesting. There are 19,330 micro-watersheds in the State where watershed development can be taken up. Check dams, percolation ponds. contour bunding and other soil and water conservation measures can be implemented. It may also be necessary to take up catchment protection works. Recharge of groundwater is particularly important given the heavy dependence on wells. There are a number of programmes such as the Drought Prone Area Programme (DPAP), Integrated Watershed Development Programme (IWDP) and the National Watershed Development Programme for Rainfed Areas (NWDPRA) which provide funding for watershed management. Some NGOs have also been active in promoting watershed management in the rainfcd areas of the State which do not have access to irrigation. The newly established TN Watershed Development Agency (TAWDEV) can serve as the nodal agency for implementing watershed programmes in cooperation with other State departments[2].

3.6.3 Domestic Sector

Although population growth has slowed down, Tamil Nadu is urbanising rapidly. Consequently, the domestic water requirements are projected to increase by more than 50 per cent from 2222 MCM in 2001 to 3460 MCM'in 2050. Water quality is also becoming a serious concern due to pollution by industrial effluents, sewage, etc. and also due to naturally occurring phenomena. The Government of Tamil Nadu has indicated that water security, i.e. provision of drinking water to the people will be the highest priority of the Government[2].

3.7 Rural Water Supply

The latest survey in April 2002 indicates that there are 80,421 rural habitations in the State. A habitation is smaller than a village and includes hamlets/clusters of households which have a common water source. A fully covered habitation means that the entire population has access to safe assured drinking water at the level of 40 litres per capita per day (lpcd). The source should be within a distance of 1.6

kilometres of the habitation for plain areas and within an elevation of 100 metres in the case of hilly areas. Partially covered habitations provide potable water but at levels less than 40 Ipcd. Non-covered habitations have no potable supply accessible to the habitation. Under this classification of coverage, 28,623 habitations were fully covered, 51,294 partially covered, and 504 habitations had no reliable source. The Tamil Nadu Water Supply and Drainage Board (TWAD) has been taking up the no source and partially covered habitations to make them fully covered, Particular attention is paid to SC/ST habitations[2].

3.8 Rural Sanitation

The level of sanitation is poor in Tamil Nadu. Less than 15 per cent of households have access to toilets. Only 27 per cent have drainage facilities, of which only 4 per cent have covered drainage. Solid waste collection and disposal is virtually non-existent. The Department of Rural Development has been implementing the 'Restructured Central Rural Sanitation Programme' since 1999. The components include the construction of individual toilets, sanitary complexes for women, school sanitation and rural sanitary marts. They have also initiated the 'Total Sanitation Campaign' in phases in many of the districts of Tamil Nadu. TSC emphasises Information, Education and Communication, Human Resource Development and Capacity Development activities to increase awareness[2].

3.9 Industrial Water Use

Industrial water demand is projected to increase by 27 per cent from 1555 MCM in 2001 to 1985 MCM by 2050. Thermal power plants account for the highest proportion of water use. Other industries include chemicals, distilleries, oil refinery, textile dyeing, steel, fertilisers, pharmaceuticals, petrochemicals, paper and pulp, sugar, electroplating etc. Most industries pay a user charge to the Government if they draw water from rivers, and lakes. Industries which receive municipal supply pay a water tariff to the concerned local body. Since the availability of water is limited, many industries have themselves adopted conservation and recycling measures. Two industries in Chennai, CPCL and MFL purchase and treat sewage from Metrowater to meet their water requirements[2].

3.10 Pressures

Water resource is a vulnerable resource and its quality changes because of the following factors[1]:

1. Deforestation and poor land use practices in the catchment area, which disturb topsoil and vegetative cover resulting in decreased infiltration rates, increased runoff, sediment transport and deposition in rivers and storage reservoirs.
2. Over abstraction of surface water sources at the upstream reduces the minimum flow required in the downstream sections for the sustenance of ecosystems and mangroves.
3. Over pumping of groundwater induces saline water intrusion into fresh water aquifer resulting changes in groundwater quality with increased TDS.
4. Water pollution due to discharge of untreated/partially treated industrial and municipal wastewater into water sources depletes dissolved oxygen and affects fish and other aquatic life.
5. Agricultural drainage, which is carrying residues of chemical fertilizers and pesticides, affects the water quality, promoted weed growth and renders the water resources unfit for other uses.
6. Encroachment of agricultural land and water sheds for urbanization and industrial development has impact on wetlands and important watershed areas and affects recharging areas and reservoir capacities.

3.11 Environmental Concerns

As environmental issues are complex in nature, coordinated, interdisciplinary and holistic approach is required for addressing the environmental issues. Key environmental issues that are to be addressed in the water resources project planning as well as in evaluation of the river basins include:

3.11.1 Industrial effluent discharge

There are more than 3000 industrial units in Tamil Nadu which have been classified under the highly polluting or "red" category. The total effluent generated is about 6 lakh litres per day of which more than 5 lakh litre (85 per cent) is generated by large industries. About 400 units discharge directly into rivers. Of particular concern are the nearly 1000 tanneries which are located in Vellore, Kancheepuram, Dindigul and Erode districts. The effluents have caused serious problems in the Palar basin. Similarly, there are a large number of textile bleaching and dyeing units in Tiruppur, Erode, and Karur, which have contaminated the Noyyal, Amaravathy and other water bodies[2].

There are five main industrial complexes in Tami Nadu: Manali/Ennore, Ranipet, Cuddalore, Mettur and Tuticorin which have chemical, petro-chemical and other industries. These complexes have also become environmental hotspots. There are cement units, distilleries, sugar, sago, paper, dairying, electroplating, chemical and fertilisers (Agro chemicals), mining industries, ores/mineral processing industries and a variety of other industries which are water consuming and also generate large quantities of effluent. Some of the industries have also provided the treated effluent for irrigation with some degree of success. However, other industries, particularly a pulp plant faced serious problems when the effluent used for irrigation contaminated the surrounding wells[2].

All the industries discharging effluents are regulated by the Tamil Nadu Pollution Control Board. They have to meet the effluent standards fixed by the Board. Industries pay a cess based on their water consumption to the Tamil Nadu Pollution Control Board. Most of the industries have constructed effluent treatment plants. In small industrial clusters, although the units are connected to common effluent treatment plants, the level of treatment is often not satisfactory[2].

3.11.2 Surface Water pollution

Industries cannot be set up within 1 km of a river or waterbody. However, the effluents often flow through *nallahs* or open drains and reach the rivers, lakes, etc. Since the river water is used downstream for irrigation or drinking by people/livestock, contamination of the river has increasingly become a serious problem in many of the river basins of the State. River basins like Palar, Tamiraparani, Cauvery, Noyyal, Bhavani and Amaravathy face serious pollution problems due to industrial effluents. Sewage and sullage from municipalities and settlements has also increased tremendously due to piped water supply and is contaminating rivers, lakes, tanks, and ground water[2].

3.11.3 Ground Water Pollution

With greater utilisation of water for industrial and domestic use and also due to the increased use of agricultural chemicals, ground water quality is deteriorating rapidly in the State. Diminished water quality also means that the quantum of fresh water available for particular uses is reduced, or that the water can be used only after treatment. Problems of water quality can be due to natural causes like geological formations or due to sea water intrusion[2].

- In the black cotton soil areas of the State, dissolved salts are high.
- In the coastal areas such as backwaters, estuaries etc. salinity levels are high.

Table:3.2 Ground water pollution due to various industries[4].

Sl.No.	District	Study Area	Type of Industry	Intensity of Pollution
1.	Kancheepuram	Kancheepuram to Irumbulicheri	Tannery and Dyeing	Moderately polluted
2.	Vellore	Ranipet Pernampet Ambut	Tanneries	Highly polluted
3.	Cuddalore	Nellikuppam Moongilthuraipattu Periasevalai	Distillery, Sugar mill	Slightly polluted
4.	Trichy	Senthanneerpuram Thiruvalarchipatti	Distillery Tanneries	Moderately polluted highly polluted
5.	Karur	Punjaipugalur	Distillary	Moderately polluted
6.	Salem	Mettur	Chemicals	Slightly polluted
7.	Coimbatore	Sirumugai	Viscose factory	Slightly polluted
8.	Erode	Appakudal	Sugar mill	Highly polluted
9.	Dharmapuri	Palacode Marikkampalli Moornampalli Belathur	Sugarmill Chemicals Chemicals Cotton mills	Moderately Polluted Highly Polluted
10.	Madurai	Pettai Irumbadi Avaniapuram	Chemicals Chemicals Sewage	Not affected Not affected Slightly affected
11.	Tirunelveli	Ariyanayagipuram Vikramasingapuram	Paper mill Cotton mill	Moderately Polluted

Source: Ground Water Resource of Tamil Nadu-Present Status of Development-July 2002

- Effluents from the leather industry have contaminated the groundwater in the Palar basin.
- Effluents from the textile industry have affected the groundwater in the Noyyal basin.
- Seawater intrusion has taken place in some coastal areas due to over extraction of groundwater.
- Excess application of fertilisers and pesticides has affected groundwater quality in certain pockets; high levels of nitrates are observed in the Western districts.
- Naturally occurring fluoride is a serious problem particularly in the Western districts of the State.

3.11.4 Catchment Degradation

In a catchment without trees, 80 to 95% of the rainwater flows as run off and erodes surface soil. In the catchment area of most of river basin intensive farming activities are taking place. Such farming operations and deforestation have exposed the topsoil, and resulted change in runoff pattern and soil erosion affecting the reservoirs with heavy siltation[1].

Uncontrolled grazing and movement of thousands of cattle is the most damaging activity in the catchment area, which disturbs the stability of the topsoil and leads to accelerated soil erosion[1].

3.11.5 Siltation in Rivers and Reservoirs

The problem of siltation in reservoirs has become alarming, since the silt deposited in the reservoirs or tanks decreases the capacity of the reservoirs thereby reduces the utility of them for various purposes. The studies on the sedimentation problems carried out in 33 reservoirs in Tamil Nadu reveal that there is a loss in capacity of more than 50% in two reservoirs viz., Kundha and Glenmorgan, more than 30% capacity loss in 8 reservoirs. Further, the rates of sedimentation per annum in 33 reservoirs in terms of percentage of the capacity of reservoir and are as follows[1]:

<0.5% of the capacity per annum in 22 reservoirs

0.5 to 1% of the capacity per annum in 4 reservoirs

1.0 to 2% of the capacity per annum in 4 reservoirs

> 2.0% of the capacity per annum in 3 reservoirs

3.11.6 Excessive surface and ground water abstraction

Excess abstraction of water for domestic and industrial supply and agricultural uses without proper planning and priorities will adversely affect the surface water. The ground water table is being depleted year after year due to the failure of monsoon, inadequate recharge of the aquifers and excessive pumping of water from the wells over and above the annual recharge into the aquifers. In coastal aquifers the excessive pumping also causes saline water intrusion towards fresh water aquifer, and mixing of saline water with fresh water. This process of saline water intrusion is irreversible and causes the degradation of the quality of ground water with high concentration of TDS and mineral like chlorides and renders the ground water unsuitable for the purposes for which they were serving[1].

3.11.7 Eutrophication and aquatic weeds

Eutrophication is the ecological degradation of the surface waters with plant nutrients. Eutrophication results from the excessive levels of nutrients like phosphorous and nitrogen compounds. Agriculture is a major factor in eutrophication of surface waters. Although both nitrogen and phosphorus contribute to eutrophication in majority of cases phosphorous is the limiting nutrient. Reservoirs, rivers, irrigation canals and drainage channels are infested with aquatic weeds, which may be submerged or floating. The Water hyacinth is a free-floating aquatic weed proliferating in polluted water bodies. It has a spongy bulbous base with feather like roots, short stem with green thick leaves and lilac colour flowers. It spreads very fast in eutrophic lakes and rivers[1].

The key environmental issues of concern are discussed above. The magnitude of these problems in the different river basins are furnished in Table 3.3.

Table 3.3 Key environmental issues in different river basins[1]

Name of river basin	Catchment degrada-tion	Siltation in river	Excessive surface water extraction	Sea water intrusion due to excess extraction	Municipal sewage pollution	Industrial effluent Pollution	Weed Growth	Water logging & salinity
Chennai								
Palar		+		+				
Varahanadhi	0	**O**	**O**	**O**		**0**		**0**
Ponnaiyar				**0**		**O**	+	+
Vellar				**O**		**O**		**0**
Cauvery			**0**					**0**
Agniyar	0	**O**	**O**	**O**		**O**	**0**	**0**
PAP		+	+	**0**			+	+
Pambar	**0**	**O**	**O**	**O**		**O**	**0**	**0**
Kottakaraiyar	**0**	**O**	**O**	**O**		**O**	+	**0**
Vaigai				+				+
Gundar	**0**	**O**	**O**	**O**		**O**	+	**0**
Vaippar	**0**	**O**	**O**	**O**		**O**	+	**0**
Kallar	**0**	**O**	**O**	**O**	+	**O**	+	**0**
Tambiraparani				**0**		**O**		+
Nambiyar	**0**	**O**	**O**	**O**	+	**O**	+	**0**
Valliar	**0**	**O**	**O**	**O**	+	**O**	+	**0**

Severe + Moderate **O** Insignificant

3.12 Response

3.12. 1 National water policy

The National Water Policy lays down general guidelines in preparing basin-wise master plan, priorities for water use, inter-basin transfer, etc. The National Water Policy enunciated by the Government of India in 1987, which was further updated and adopted by National Water Resources Council in April 2002, has recognized that water is a prime natural resource, a basic human need and a precious national asset. It has recommended that resource planning in the case of water has to be done for a hydrological unit such as a drainage basin as a whole or for a sub-basin. It has further emphasised that special multi-disciplinary units should be set-up in each state to prepare comprehensive plans taking into account the needs of not only irrigation, but also various other water uses so that the available water can be put to optimum use. The National Water Policy has recommended establishing a standardized National Information System with a network of data banks and databases, integrating and strengthening the existing Central and State level agencies for improving the quality of data and the processing capabilities for better planning[1].

3.12.2 State Water Policy

Tamil Nadu adopted a State Water Policy in 1994 along the lines of the National Water Policy of 1987. Subsequently, the National Water Policy was revised in 2002. The Tamil Nadu Government is in the process of revising the State Policy to include various current concerns. Some of the major aspects of the policy are the following[2]:

- Importance of water resources in the development of the State.
- Need for considering socio-economic aspects of water resource projects.
- Need for basin wide planning for equitable water use.
- Priorities for water use in the State.
- Management and development of ground water resources.
- Watershed management in rainfed areas.
- Increase in demand for non-agricultural uses.
- Management of water quality and environmental aspects.
- Need for a hydrological database for planning and management.
- Stakeholder participation in management e.g. water user associations.
- Need for proper pricing of water in different sectors.

Thus the policy framework for water resources management is largely in place. The apex institution in the State at the policy level is the Water Resources Control and Review Council chaired by the Chief Minister. The primary agency charged with implementation of the policy is the Water Resources Organisation. The Institute of Water Studies is the nodal agency responsible for water planning while the Irrigation Management Training Institute imparts training to farmers and officials. Domestic water supply (urban and rural) schemes are executed by the Tamil Nadu Water Supply and Drainage Board (TWAD) for the entire State except Chennai Metropolitan Area where Metrowater is the implementing agency. TWAD executes capital projects which are handed over to the concerned local bodies for operation and maintenance. Industrial water pollution is regulated by the Tamil Nadu Pollution Control Board. Management of water quality and environmental aspects of rivers and water bodies is being monitored and coordinated by the Department of Environment.

3.12.3 Management of Industrial Effluent

The Government of India and the Government of Tamil Nadu have enacted acts for water pollution prevention and control. The system rely almost exclusively on the downstream control by fixing effluent standards for the discharge of effluents into water bodies. Regulations were framed to monitor and control the discharge of effluents into water bodies. Regulations were framed to monitor and control the discharge of effluent from each industry and specifications were laid down for the quality of effluencts to be discharged on land or into water bodies after treatments.

The Government has taken several measures to prevent and control pollution of waterways. The Government has passed orders banning the operation of highly polluting industries within 1 km from the embankment of rivers and reservoirs. The Government has also passed orders imposing total ban of setting up of any of highly polluting new industries within 5 km from the rivers of Cauvery and its tributaties, Pennaiyar, Palar, Vaigai and Tambirabarani[2].

3.12.4 Water Cess

The Water (Prevention and Control of Pollution) Cess Act of 1977 empowers the State Pollution Control Boards to levy a cess on industries based on their water

consumption. If they comply with the provisions of the Water Pollution Act of 1974 and the Environment Protection Act 1986, the cess is correspondingly reduced. In Tamil Nadu, the cess is levied by the Tamil Nadu Pollution Control Board on water consuming industries[2].

The water cess rates were revised in 2003 because they were considered to be too low to act as a disincentive for industries to conserve the use of water and hence reduce the volume of pollution. However, even the revised rates remain quite low compared to the cost of fresh water[2].

3.12.5 Water Resources Consolidation Project

The Government of Tamil Nadu has obtained assistance from the World Bank (Rs. 840.84 crore) to implement the Water Resources Consolidation Project. The WRCP provides for rehabilitation and modernisation of 16 irrigation systems and 25 minor irrigation schemes, and completion of nine on-going irrigation projects[2].

3.12.6 Water sector reforms project

Two of the major rural water supply schemes being implemented are the Minimum Needs Programme and the Accelerated Rural Water Supply Programme. The Government of India has sponsored a "Sector Reforms" project based on demand driven, cost recovery, and user participation principles. The Sector Reforms project was launched on a pilot basis in four districts viz. Coimbatore, Vellore, Cuddalore and Perambalur. During 2002-03 two more districts Kancheepuram and Virudhunagar were brought under the project[2].

The Government issued an Ordinance making it mandatory to provide rain water harvesting structures by a stipulated date in all buildings both in the rural and urban areas. To conserve and augment the storage of ground water, to reduce water table depletion, to improve the quality of ground water and to arrest sea water intrusion in coastal areas, rain water harvesting structures were installed in almost all buildings in rural and urban areas in Tamil Nadu. This measure is now being extended to cover all open areas, fields, road margins, thoroughfares, streets, reserve forest areas, revenue forest areas, all tanks, all *Ooranis,* National and State Highways, rural roads, by-passes, bridges, culverts, all temple tanks etc., which have potential for harvesting run-off water[2].

3.12.7 River Basin Boards

The National and State Water policies recommend the management of water resources at the river basin level. As part of the Water Resources Consolidation Project, the Government of Tamil Nadu has approved the creation of river basin boards for the Palar and the Tamiraparani basins. River basin management committees have been set up to monitor the water related activities of different agencies and users[2].

3.12.8 Ground Water Regulation

The Tamil Nadu legislature passed the Ground Water (Development and Management) Act and the Act came into force after receiving the assent of the President in March 2003. The Act is applicable to the whole State of Tamil Nadu except the Chennai Metropolitan Area which is governed by a separate Act[2].

A Tamil Nadu Ground Water Authority has been set up to direct and regulate the development and management of the ground water resources of the State. The Authority has the power to notify areas for regulation. Every use in the notified area will have to obtain the permission of the Authority to extract ground water. Wells cannot be sunk and transport of groundwater by lorries, tankers, etc. cannot be done in a notified area without obtaining a permit. Electricity cannot be provided for energising wells which are in contravention of the Act. All new wells sunk in the State

even in non-notified areas have to be registered. The Authority may lay down or adopt standards for water quality depending on the kinds of water use[2].

The Tamil Nadu Ground Water Act is in consonance with the rules under the Environment Protection Act, 1986 by which a Central Ground Water Authority was constituted. The Central Ground Water Board functions in conjunction with the CGWA[2].

3.12.9 Interlinking of Rivers

Government of India formulated in 1980 the National Perspective Plan for the water resources development in the country. The plan consists of (a) Himalayan River Development Component, and (b) Peninsular River Development Component. The second one envisages diversion of surplus water of Mahanathi to Godavari and further transfer from Godavari to water short Krishna, Pennar, Palar, Cauvery and Vaigai rivers. It also envisages diversion of surplus waters of the West flowing rivers for the benefit of the drought prone areas[2].

In order to study and examine the feasibility of diverting the surplus waters, the Government of India constituted the National Water Development Agency (NWDA) in 1982. The NWDA has proposed interlinking of the Peninsular Rivers including rivers in Tamil Nadu. Three of the projects will have a bearing on the water resources of Tamil Nadu[2].

In the long term, Tamil Nadu may have to rely less on sharing water with other States unless the interlinking of rivers project becomes a reality. The focus will, therefore, have to be on managing the available water resources efficiently. Pricing could be an important instrument in resource allocation both with regard to the use of water as well with regard to pollution. If water user associations are active in all the major irrigation systems, they will be able to manage the locally available water resources. River basin boards may have to be set up in all the river basins of the State to coordinate the various uses and users of water. It is increasingly recognised that water has become a very scarce resource in Tamil Nadu due to increasing demand and deterioration in quality, and that the utilisable water resources will have to be managed carefully in the years ahead[2].

3.13. References

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