



## Introduction

WATER is a very precious and critical resource for human survival and other livings. Tamil Nadu constitutes 4 percent of India's land area and has only 3 percent of India's water resources. Around 80 percent of the ground water has already been put into use. The demand for water in Tamil Nadu has been increasing at a fast rate both due to increasing population. Agriculture is the largest consumer of water in the State using 75% of the State's water resources. The State is heavily dependent on monsoon rains, 47% during the north east monsoon, 35% during the south west monsoon, 14 % in the summer and 4 % in the winter period. But the actual rainfall varies from year to year. Since the state is entirely dependent on rains for recharging its water resources, monsoon failures lead to acute water scarcity and severe droughts.

This is the most essential input for agriculture. The performance of agriculture is also attributed to the differences in the fertility of soil, climate, monsoons etc. A very large part of India suffers from insufficient supply of water for irrigation. That may be one of the reasons, for a large percentage of the population is still officially estimated to be living below the poverty line. What is strange about India is that year after year some parts of the country experience floods and destruction and water flows unharnessed in to the sea. Hence large parts of the country experience drought, and even drinking water is scarce. Tamil Nadu belongs to the latter category. With many parts of India facing irregular irrigation water supply, land utilizations is far below the capacity with most land unutilized and large scale deforestation goes on in an unplanned manner, endangering the environment and ecological imbalance of the country. In this process, soil erosion and soil degradation takes place at a fast pace. With this degraded environment, and denuded

forest lands, rainfall in many parts of India is below the normal level for a number of years continuously and consequently there is a shortage of water supply for irrigation.

Due to the introduction of modern farm technology in agriculture in recent years, there has been a shift in the pattern of the agriculture. The use of modern chemical manures, pesticides and mechanization has given high hopes for abundant agricultural yields and large profits. But there is a need to ensure regular irrigation supply. On the other hand, irrigation supply has been shrinking during the last few years due to inadequate rains, and large-scale depletion of underground water supply. This indeed Tamil Nadu as well as Indian agriculture scenario.

## The State

Tamil Nadu with a geographical area of 1,30,058 sq.km, the state has mostly red loam, black and alluvial soils. There are many small rivers flowing from west to east. The most important rivers used for irrigation are Cauvery, Vaigai and Tambiraparani. Though the state benefits both from the North-East monsoon and South – West monsoons, the former is the most important supplier of rain, accounting for 450.4 mm. per year on an average of the total of 946 mm of rainfall. This is insufficient to meet the agricultural needs of the state. According to 2011Census, Tamil Nadu returned a total population of 7.21 crores. Of this the rural population stands 3.71 crores and the urban population 3.49 crores. Tamil Nadu stands 7<sup>th</sup> place in India.

Even this deficient amount of rainfall is not regular as it fluctuates from year to year. Added to it, the density of population at 429 per sq.km is high and therefore availability of water for a large population, along with supply for irrigation and industrial use is highly inadequate. The fast-depleting ground-water supply gives a bleak picture of the future.

Thus, resources like lands are limited and water is inadequate. In this context proper planning and efficient management of land and water usage are required.

In Tamil Nadu 20% of net irrigation through Tank irrigation, there are no perennial rivers. Kudimaramathu and Neerkatti systems have been practiced and channeling this water to individual fields and to retain the incoming water based on the requirement of the village and the excess was allowed to flow into the next tank in the series. About 27 % of its net irrigated area is under canal irrigation in Tamil Nadu. The most important canal system lies in the Cauvery delta where 6,400 km long canals irrigating about 4 lakh hectares in Thanjavur and Tiruchchirapalli Districts. The Mettur Canal system of the Mettur dam and the Cauvery River irrigates about 1.2 lakh hectares in Salem and other Districts. The Lower Bhavani Project Canal system irrigates about 79 thousand hectares in Coimbatore District. Parambikulam Aliyar and Manimuthar are other sources for irrigation.

Cauvery River originates at ThalaKavery in Koorg Hills of Karnataka. In Tamil Nadu the river travels 416 km as it enters Tamil Nadu impounds 95.6 TMC of water for use in the Cauvery basin and Mettur dam. The only storage structure across the river is Cauvery in Tamil Nadu. The Grand Anaicut was built by Karikalla Chola stands to this date as testimony and Engineering marvel that about 2000 years back. The Anicut has been built to divert flood, for irrigation and regulate water in Grand Anicut Canal.

Irrigation in Tamil Nadu through canals, dams and rivers is highly dependent on rains. After independence, the government started building dams across the rivers with good intentions of planned irrigation and regulated water supply. Storing up flash flood

waters and torrential rain waters was also a system that had been carried out for a long time. This system had its repercussions on tank irrigation which was the traditional system of irrigation. Tanks served as percolation points for wells and irrigation wells in the surrounding area. But the government neglected tank maintenance and administration. The result was that those farms near the irrigation tank were able to cultivate the crops while tail-ender suffered. However, the tanks got silted often, due to cultivation in the tank bed. Further, neglected tanks stored water for just two or three months, whereas, for the rest of the months they remained dry.

Modernization of irrigation was actually not a blessing to Tamil Nadu agriculture, but on the other hand it is a slow destruction of the agricultural irrigation system. What is needed is the rehabilitation of the tank irrigation system, whose administration should be in the hands of state authorities, and not on local administration. Actually, the total area irrigated by the tank system was in 8,07,069 acres 1983-84, or 30.62 percent of the total area cultivated in Tamil Nadu. This came down to 22.14 percent in 1991-92. Thus, the output out of tank irrigation has been slowly coming down from the advent of the first five-year plan. Constructions of dams have dried up the river beds. So, cultivation carried out near the river beds has not been prosperous except those carried out with the aid of dams. Therefore, those river beds depend naturally on tank irrigation or some other source. Planned administration should see that the tanks get water from those dams and thus ensure enough supply of water for at least one crop a year which lies fallow today. Water storage in tanks ensures good level of water in irrigation wells.

In the last 10years, cultivable land has shrunk by five-lakh hectares in this state owing to urbanization and industrialization,

resulting in agriculture and allied sectors registering 0.69% growth in the first four years of the 11th Plan (2007-12) against the targeted 4%. Because of monsoon failure it may not be possible to achieve the required food grain production target. Hence, the food security of the state is under threat. In 2014-2016 the food grain production was 127.95 lakh tone, in future this is not sufficient to the projected increasing population, food grain production must be increased with proper environmental safeguard measures and proper water management practices.

### **Well Irrigation**

Another important source of irrigation in Tamil Nadu is the wells. With intensive agricultural activity since 1960s irrigation wells have multiplied all over Tamil Nadu. In 1983-84, it was estimated that in Tamil Nadu there were 63,107 tube wells, 16,42,143 wells for irrigation and 5,09,032 well for domestic purposes. But in 1991-92 the number of tube wells increased to 99,004. Besides 16,82,453 ordinary wells for irrigation and 5,83,010 wells for domestic purposes. All these wells irrigated nearly 9.4 lakh hectares. Of the total numbers of wells in 1992, over 14 lakhs used pump sets using electricity and 2.6 lakhs were using oil engines. Further, the Statistical Hand Book of Tamil Nadu 2015 reveals that the availability of water sources in Tamil Nadu is 377571 tanks, 463467 Tube wells and others, 1178873 open wells and 6024 from other sources. Gross area sown in Tamil Nadu during the year 2013-14 was 5897472 hectare (42%). The sown area depends upon the rainfall.

The problem with the well system of irrigation is that Tamil Nadu, with a low average rainfall, year after year, has been over exploiting ground water resources. With low rainfall, water percolation underground is limited and thus replenishment of

underground water resources is less, and many wells get dried up. To meet the irrigation needs, the farmers start deepening their wells. This is becoming an acute problem in Tamil Nadu. Official agencies do not seem to be aware of this problem. There is a need to control ground water exploitation. A coordinated approach is required. Afforestation on a large scale for strengthening the ecological situation is the need of the hour. Only 23.5% of the forest covers in Tamil Nadu, therefore it is required to increase 33% based on environmental policy. Secondly, impounding of river water and the river-beds running dry all through the year should be stopped. Irrigation tanks need to be deepened and silts should be removed periodically, so that more water is stored up. With tanks supplied with water, the wells will not become dry. Government should take steps to regulate the digging up of wells. There should be a limit to a certain number of wells being permitted per square kilometer. In this way water resources can be measured and conserved, to sustain the irrigation system in Tamil Nadu.

### **Suggestions**

The ways to solve water scarcity in Tamil Nadu are

- To improve efficiency of using water and reduce losses and waste.
- To improve land management practices to conserve water.
- To envelope suitable cropping pattern for achieving higher economic returns in relation to water use efficiency.
- Optimization of water use in wetland or tank fed rice cultivation.
- Tanks, ponds and community forests should be properly maintained.
- Stop deforestation and step up afforestation and waste land development programmes.

- Proper implementation of MGNREGS/IRDP/NREP, and JRY, the soil and water conservation measures.
- A greater participation of social & environmental scientists in water management projects or measures.
- Every summer, unemployed labour force be utilized for desilting of tanks and ponds and construction of check dams, percolation ponds, contour trenches at appropriate places. This will conserve fresh water resources of the state.
- Flood and rainwater harvesting and Wastewater management measures
- Saving water in agriculture-encourage drip-irrigation system & Enhancing irrigation efficiency, Rejuvenation of water bodies and Water sharing.

Proper water source rules (for both surface and ground water) to be implemented by the respective Authorities. Further, implementation of Interlinking of Rivers programme in India under National Perspective Plan to be implemented without any delay by the Central Authorities.

To sum up, the above points of strategy should be or may be adopted either to minimize or avoid water scarcity in Tamil Nadu.

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