

## CHAPTER VII

### MONITORING THE QUALITY OF IRRIGATION WATER



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#### 7.1 Absence of action plan for improving the water quality

Guidelines for Preparation of DPRs of Irrigation and Multipurpose Projects of GOI stipulated that, while preparing DPR, assessment of water quality parameters<sup>35</sup> in locations *viz.*, upstream, reservoir and downstream areas should be made and measures for improving the water quality be described.

IS: 11624-1986 – Indian Standard Guidelines for the quality of irrigation water and Food Agriculture Organisation Guidelines for interpretations of water quality for irrigation stipulated that water with total salt concentration in terms of electrical conductivity exceeding three deciSiemens per metre (3,000 milliSiemens (mS)/cm) or total dissolved solids<sup>36</sup> exceeding 2,000 mg/l caused hazardous effects on soil properties and crop growth.

Scrutiny of records revealed that the DPR prepared for Amaravathi sub basin of TN-IAMWARM project did not assess the water quality parameters as envisaged. Audit noticed from the scrutiny of a study report of the Department prepared in March 2012, that untreated domestic sewage was being discharged into the Amaravathi river system which affected the water quality. In addition, there were instances of discharge of semi treated industrial effluent directly into the river which increased the total dissolved solids in the water body.

Despite the above instances, Department did not assess the water quality of the river at the time of preparation of DPR or during the execution of the project so as to suggest measures for improving the water quality.

#### 7.2 Water quality in Amaravathi Reservoir

##### 7.2.1 Status of Pollution in Amaravathi river

Audit obtained the data relating to the pollution monitoring tests conducted by the Tamil Nadu Pollution Control Board (TNPCB) during July 2019 to March 2020 from two<sup>37</sup> locations *viz.*, Sellandipalayam and N Colony on the banks of Amaravathi river. It was seen that the water quality was not within the permissible limits which had hazardous effects on soil properties and crop growth as detailed below:

- The Electrical Conductivity at Sellandipalayam ranged from 3,170 to 3,590 and at N Colony it was between 7,690 and 8,390 as against the permissible limits of 3,000 mS/cm.

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<sup>35</sup> Salinity, pH value, presence of anions like boron, phosphate, fluoride which pose toxic risk and environmental problems.

<sup>36</sup> Total dissolved solids is a measure of the dissolved combined content of inorganic and organic substances present in water.

<sup>37</sup> (i) Southern bank of River Amaravathi and downstream side of Karur Dyeing Cluster in Sellandipalayam near Kalaingar Tea Stall and (ii) Adjacent to Karur Municipal Solid Waste (MSW) dumpsite and on the northern bank of River Amaravathi and downstream side of Karur Dyeing Cluster in Vangal Road near Narikuravar Colony.

- The total dissolved solids at Sellandipalayam ranged from 2,032 to 2,168 and at N Colony it was between 4,928 and 6,344 as against the permissible limits of 2,000 mg/l.

However, the Department had not carried out any corrective measures to improve water quality.

### **7.2.2 Discharge of untreated sewage**

Implementation Completion Report of the project (June 2015) noted that sewage was not being treated by the Municipalities or Town Panchayats and that the effluents generated by the major industries *viz.*, textile dyeing and bleaching units were let out directly into the nearby drains which ultimately reached the Amaravathi River or its supply channels.

Scrutiny of records and Joint inspection with the field officials of the Department revealed the following:

Karur Municipality established (April 2007) a Sewage Treatment Plant (STP) with a processing capacity of 15 Million Litres per Day (MLD) for treatment of sewage generated from the municipal areas of 32 out of 48 wards. Despite having a treatment plant, it was observed by TNPCB (July 2016) that the Municipality discharged sewage without treatment into nearby channels of Amaravathy river. It is pertinent to mention that Hon'ble Madurai Bench of Madras High Court directed (September 2016) Karur Municipality to stop draining the untreated sewage water into Amaravathi River before October 2016. However, no fruitful action was initiated by the Municipality. TNPCB, based on the complaint of farmers that the water discharged from STP affected the crop growth, inspected (July 2019) the STP and confirmed that discharged sewage water was not clean and had traces of colour. TNPCB directed (July 2019) the Karur Municipal Commissioner to ensure that treated sewage should comply with the prescribed standards for irrigation. However, during joint inspection (March 2021), audit noticed that the sewage directly flowed into Left and Right Bank Irrigation Channel of Amaravathi river. The field officials had also admitted in the joint inspection that the irrigation in these reaches was undertaken with the contaminated water. It was also ascertained from TNPCB (March 2020) that water samples were not tested and monitored regularly.

It was also observed from the scrutiny of G returns that this polluted water was used in six villages for irrigation purpose for an area of 61 ha (channel irrigated) to 307 ha (channel irrigated) during 2015-16 to 2019-20.

To an audit query, TNPCB replied (March 2020) that Karur Municipal authority was directed to formulate a proposal to cover entire municipal area through underground drainage system. The Commissioner, Karur Municipality, to an audit query, replied (January 2021) that DPR to cover entire municipal area was under preparation.

The Additional Chief Secretary, in the Exit Conference (July 2021), accepting the audit observation instructed the departmental officials to ensure that the irrigation water is free from pollution by co-ordinating with other Government agencies.

Government accepted and replied (October 2021) that a Joint Committee had been constituted by the National Green Tribunal (South Zone) to suggest measures for controlling direct letting of drainage/ sewage into irrigation channels in Karur municipality areas.

### **7.3 Water quality in Kelavarapalli Reservoir**

#### **7.3.1 Absence of water quality testing**

During the preparation of DPR (2007-08), Department identified that there was flow of drainage water from Bangaluru city into the Kelavarapalli reservoir throughout the year. DPR also highlighted about the existence of industrial pollution in this sub-basin caused by 34 Major and Medium industries due to discharge of effluents from these industries through drains and into the river or supply channels of tanks. Scrutiny of records revealed that WRD did not conduct periodical test for assessing the quality of irrigation water. During joint inspection (March 2021), the field officials of the Department confirmed that no action had been initiated for testing the quality of irrigation water and assured that necessary action would be initiated in this regard.

Thus, environmental issues in the irrigation areas of Kelavarapalli reservoir was not addressed by the Department for more than 12 years, despite being highlighted in the DPR of the project.

### **7.4 Participatory Irrigation Management**

Operations and Maintenance (O&M) of the tanks and irrigation systems rehabilitated under the project was the main responsibility of the WRD. State budgets contain an allocation for maintenance of water structures being managed by WRD and will be used for the O&M of project irrigation assets. In addition, as per section 25 of the Tamil Nadu Farmers Management of Irrigation System (TNFMIS) Act 2000 and Rule 25 of TNFIMS Rules 2002, WUAs may levy a fee for management of irrigation systems and regulation of water. GoTN in the Project Appraisal Document of World Bank committed to sustain the participatory irrigation management (PIM) programme in the State and to provide continued support to the WUAs through the permanent institutionalisation of the PIM cell in the office of the Engineer-in-Chief.

Rule 23 of TNFMIS Rules, 2002 envisaged that a Managing Committee with the assistance of Competent Authority<sup>38</sup>, shall prepare water budget one month before the onset of the irrigation season after considering the anticipated inflows and existing water availability in the reservoir. Further, for the second crop season, the Project Committee would determine the quantum of area to be irrigated based on the availability of water at the beginning of the second season.

Rule 24 of TNFMIS Rules, 2002 stipulated that after the preparation of water budget, the Farmers' Organisation shall draw up a plan of water regulation

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<sup>38</sup> As per section 26 (1) of the Tamil Nadu Farmers' Management of Irrigation Systems Act 2000 the Government may, by notification, appoint such officer of the Water Resources Organisation, as they consider necessary, to be the competent authority to every farmers organisation, for the purposes of this Act.

viz., the dates of release and closure based on the principle of equitable distribution of water amongst all users.

Scrutiny of records in the three selected sub-basins revealed the following:

- PIM cell of WRD failed to adhere to the statutory requirements on the participatory Irrigation management by ensuring the existence of WUAs.
- The term of WUAs had expired in June and December 2014 in respect of Pennaiyar upto Krishnagiri and Hanumanadhi sub-basins respectively and they were not formed thereafter.
- In Amaravathi sub-basin, elections were conducted between July 2014 and February 2015 and WUA was functional upto February 2020. Thereafter, no election was conducted and WUA was not formed.
- Even when WUA was functional till February 2020 in Amaravathi sub-basin, Department failed to consider the water budget prepared by WUA in the proposal forwarded to Government for release of water for irrigation purposes.
- Similarly, the second crop season was also not determined by WUA based upon the actual availability of water during the second season.

Thus, non-adherence to the provisions of the TNFMIS Rules by the Department led to non-release of water based on crop water requirement despite availability of water as discussed in **Paragraphs No. 3.4.1.**

## **7.5 Monitoring**

### **7.5.1. Non-maintenance of ayacut register**

GoTN instructed (April 1985) that the field officials of WRD should have an approved ayacut register of the irrigation system in their jurisdiction with the data on fields which have not been irrigated in a particular crop period. This should be compared with the records of Revenue Department for every month. The instructions also stipulated that the section officer should attend the monthly meetings along with the Revenue, statistical and agricultural staff and variations and discrepancies noticed, if any, should be rectified then and there before recording in the Revenue records. The section officer is also authorised to check the cultivation details in the records of Village Administrative Officer and any shortcoming should be rectified through joint inspection with Revenue officials.

As against the above, the officials of the three<sup>39</sup> WRD divisions did not maintain ayacut register of their jurisdiction with the irrigation details for the respective crop periods. The higher officials of the Department had also failed to monitor the lapses on the part of field officials. Hence, WRD was not in a position to ascertain water requirement for the actual irrigated area within their jurisdiction.

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<sup>39</sup> Amaravathi Basin Division/Dharapuram; Kodayar Basin Division/Nagercoil and Upper Pennaiyar Basin Division/Dharmapuri.

Thus, WRD failed to adhere to the Government instruction in assessing the actual irrigated area which led to non-release of water based on the crop water requirement as discussed in the **Paragraphs 3.4.1 and 5.4.2.**

The department furnished ayacut register for Amaravathi basin. It was replied (October 2021) that ayacut register was not maintained for Kodayar basin (Radhapuram channel) and records of Upper Pennaiyar basin (Kelavarapalli reservoir) were damaged due to seepage of water and necessary action initiated to maintain the register in future. The fact however remains that the Department failed to maintain new register immediately after the damage of old register.

### 7.5.2. Absence of monitoring the quantum of water discharged from non-system tanks

The irrigation infrastructure in respect of the following three selected projects depended mainly on system tanks and non-system tanks as detailed in the **Table 17.**

**Table 17: Tank irrigation infrastructure in three sub-basins**

Sl. No.	Sub-basin	Total ayacuts (ha)	Total ayacuts depending on tanks (ha)	System tanks		Non-system tanks		Percentage of non-system ayacut to total ayacuts
				No.	Ayacuts (ha)	No.	Ayacuts (ha)	
1	Agniyar	12,016.90	12,016.90	0	0.00	190	12,016.90	100
2	Kosasthalaiyar	35,256.26	34,918.17*	91	10,449.97	203	24,468.20	69
3	Girdhumal	17,057.81	17,057.81	31	6,886.56	85	10,171.25	60

**\*Balance 338.09 ha covered under Anicuts**

**(Source: Details furnished by the Department)**

Audit noted that the non-system tanks maintained by the PWD in the ayacut area of these three projects did not possess measuring devices to check and document the quantum of water received through rainfall, water utilisation through discharge, storage position, etc. In the absence of these devices, the quantum of water received through rainfall, its utilisation etc., were not measured and the field officials of WRD could not monitor the release of water for irrigation of ayacuts from these non-system tanks.

### **Conclusion:**

Department failed to monitor the quality of irrigation water and there were instances of discharge of untreated sewage water into the water courses. There were gaps in undertaking Participatory Irrigation Management activities viz., formation of Water Users Association, preparation of water budget and raising of crop for second season based on the water availability which hindered the achievement of envisaged outcomes of the project.

**Recommendations:**

The Government may:

- Strengthen monitoring mechanism to retain the quality of irrigation water by arresting the discharge of untreated water into the irrigation channels.
- Ensure effective functioning of Water Users Association and preparation of water budget to strengthen the Participatory Irrigation Management activities.