CHAPTER V

KELAVARAPALLI RESERVOIR

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MEASURABLE OUTCOMES OF KELAVARAPALLI RESERVOIR

5.1 Introduction of Kelavarapalli Reservoir

The Pennaiyar River has its origin in the South Eastern slopes of Chennakesava hills in Nandhidurg in Karnataka state. After traversing about 112 km in Karnataka state, it enters in Tamil Nadu in Hosur Taluk. The river flows through five[28] districts in Tamil Nadu for a total length of 320 km and finally flows into the Bay of Bengal near Cuddalore.

Kelavarapalli Reservoir was constructed between 1993 and 1995. It has two lined channels *viz*., (i) Right Main Channel (RMC) with the length of 22.99 km to cater 1,041.24 ha; (ii) Left Main Channel (LMC) with five branch / distributaries channel to a length of 49.58 km to cater 2,197.95 ha.

The details of fully irrigated, partially irrigated and gap areas before implementation of the project and the irrigated area anticipated after implementation of the project in the ayacuts of Kelavarapalli Reservoir system, as specified in the DPR (2007-08), are given in **Table 13**.

Table 13: Ayacuts of the channels under Kelavarapalli Reservoir system

(in ha)

Sl. No.	System	Ayacut area before implementation of the project			Irrigated area anticipated after implementation of the project in DPR
		Fully irrigated	Partially irrigated	Gap area	
1	RMC	264.18	205.54	571.92	1,041.24
2	LMC	569.20	431.65	1,197.10	2,197.95
TOTAL		**833.38**	**637.19**	**1,768.62**	**3,239.19**

(Source: Details furnished by WRD)

5.2 Outcomes envisaged

The DPR of TN-IAMWARM (2007-08) stipulated that total water potential of the sub-basin as 121.12[29] Mcum. It was also elaborated that the conveyor system of the channel was sub-standard due to the damaged condition of the anicuts, diversion head works, supply channels, etc. Hence, it was proposed to improve and modernise the irrigation infrastructures through TN-IAMWARM project thereby increasing the irrigation water demand under WRD sources from 23.36 Mcum to 45.23 Mcum.

DPR envisaged the following measurable outcomes:

- Increase in conveyance efficiency from 53 to 56 *per cent.*
- Conversion of 1,769 ha of gap area as fully irrigated area.

[28] Krishnagiri, Dharmapuri, Thiruvannamalai, Villupuram, Cuddalore.

[29] Surface water – 58.88 Mcum and Ground water – 62.24 Mcum.

5.3 Inadequate documentation on conveyance efficiency

The DPR of the project contemplated that the improvement and modernisation of irrigation infrastructures would improve the conveyance efficiency from 53 to 56 *per cent*. DPR did not include the basis for calculation of the existing conveyance efficiency of 53 *per cent* with details of water flow from the head works to tail end, etc.

WRD did not furnish either the details of calculation of conveyance efficiency or the records relating to the calculation of conveyance efficiency after the completion of the project. However, WRD replied (January 2021) that conveyance efficiency was actually increased upto 58 *per cent*. It was further stated that records pertaining to channel-wise conveyance efficiencies at different reaches and irrigated areas including water distribution in tail end command areas were not maintained.

It is also pertinent to note that the conveyance efficiency in a similar lined channel of Amaravathi Reservoir ranged between 96.36 and 98.18 *per cent* during the period 2015-16 to 2018-19 after implementation of the project. However, the conveyance efficiency of the lined Kelavarapalli reservoir was stated to be 58 *per cent* only.

Hence, Audit could not assess the achievement of the outcome of the project due to failure of the Department to maintain adequate documentation in this regard.

Government replied (October 2021) that the conveyance efficiency of channel was ascertained by conventional methods. It was assured that the proposal would be initiated for installation of the devices at the appropriative location for calculating the discharge.

5.4 Non-conversion of the gap area as fully irrigated area

As per Government instructions[30] (April 1985), Section Officer of WRD should maintain an ayacut register of the irrigation system in their jurisdiction. The Section Officers are required to ascertain and record the details of fields which have not been irrigated in a particular crop period. The officer is also authorised to cross verify the cultivation records with the village records and to bring the discrepancies to the notice of the Revenue authorities for rectification.

The DPR envisaged that structural and operational deficiencies of the existing channel resulted in partial irrigation and gaps in irrigation area. Hence, it was proposed to rehabilitate the channel with the objective to convert the entire ayacut area of 3,239.19 ha of Kelavarapalli Reservoir as fully irrigated area, as detailed in **Table 14**.

[30] G.O.Ms.No. 593, Revenue Department, dated 16.4.1985.

Table 14: Details of area irrigated with and without project

(in ha)

Total Registered Ayacut	Ayacut area before implementation of the project				Irrigated area after implementation of the project (A+B+C)
	Fully irrigated (A)	Partially irrigated (B)	Total (A+B)	Gap area (C)	
3,239.19	833.38	637.19	1,470.57	1,768.62	3,239.19

(Source: Details furnished by WRD)

The actual irrigated area through the Kelavarapalli Reservoir after the implementation of the project (2015-16 to 2019-20) was very meagre (three *per cent*) and the envisaged outcome of conversion of gap area and partially irrigated area into fully irrigated area remained unachieved, as detailed in **Table 15**.

Table 15: Actual irrigated area

Registered Ayacut	Actual irrigated area (in ha)				
	2015-16	2016-17	2017-18	2018-19	2019-20
3,081.59 Ha[31]	106.70	106.70	106.70	106.70	102.40
Percentage to the registered Ayacut	3	3	3	3	3

(Source: Details furnished by WRD and from the G Returns)

It may also be seen that:

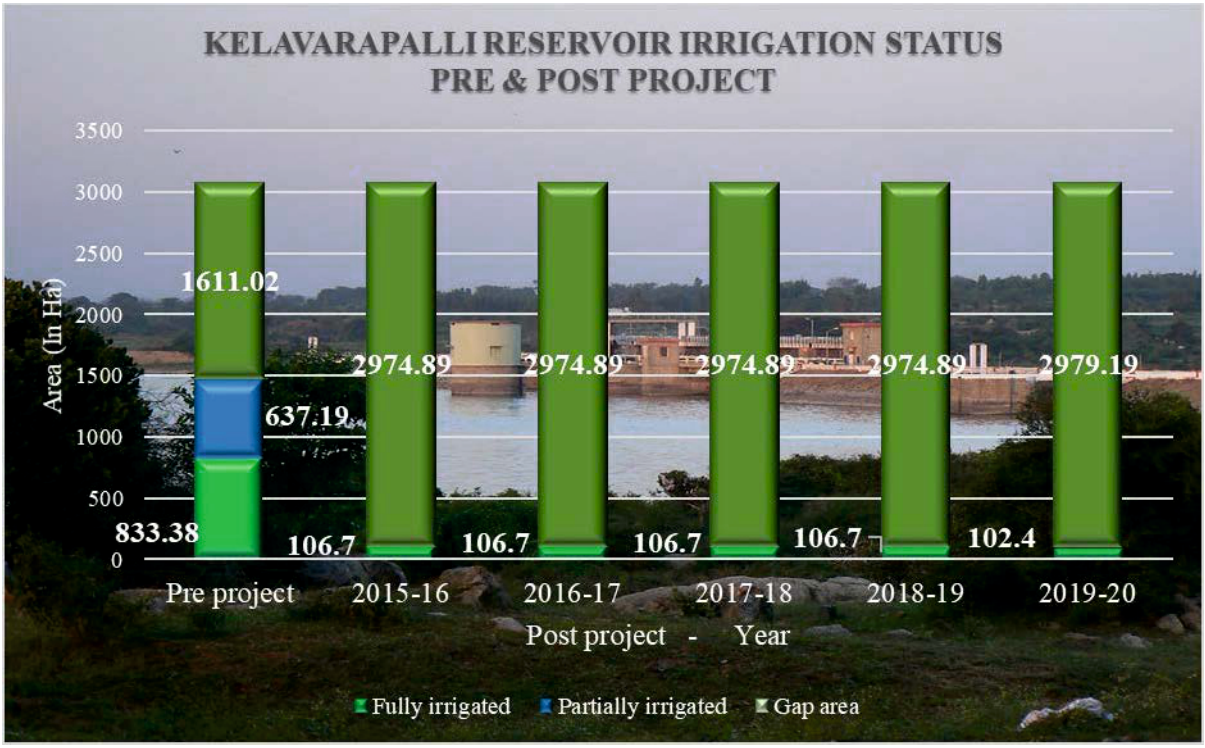
- Despite the release of 67 to 98 *per cent* of crop water requirement, as discussed in **Paragraph 5.4.2**, to cover registered ayacut, there was shortfall to an extent of 88 *per cent* after the implementation of the project, for which Department incurred an expenditure of ₹ 6.60 crore. Besides, the envisaged outcome of conversion of partially irrigated area and gap area as fully irrigated area was not achieved in any of the five years.
- Field officials of WRD, however, did not adhere to the instructions of the Government with regard to irrigation of fields in a particular crop period. The field officials failed to share the status on water availability with the farmers to encourage raising of crops. This had resulted in underutilisation of the released water to the benefit of farmers besides the intended objective of conversion of gap area into irrigated area remained unachieved. Failure of the Department had resulted in underutilisation of water potential by the farmers, despite release of water as discussed **in Paragraph 5.4.2.**

[31] Of the total registered ayacuts of 3,239.19 ha in Kelavarapalli channel, details pertaining to six villages having a total ayacut of 157.60 ha were not made available by the Department of Economics and Statistics and hence the comparison was restricted to 3,081.59 ha.

Thus, not only the intended outcome of the project on conversion of gap area into fully irrigated area remained unachieved but also there was substantial reduction in the fully irrigated area after the implementation of the project.

The irrigation status in Kelavarapalli Reservoir during the pre and post project implementation (2015-16 to 2019-20) is shown in **Chart 8**.

Chart 8: Pre and Post project implementation status



(Source: Details furnished by WRD)

The gaps in regulation of water by the Department from the Kelavarapalli Reservoir are discussed in the subsequent paragraph:

5.4.1 Absence of Rules of water regulation

The WRD brought out (October 1984) the Compendium of Rules of water regulations for the reservoirs which were constructed upto 1983, for better water management in the systems. Rules for water regulations for the Kelavarapalli Reservoir were not incorporated in the compendium as the reservoir works were completed in 1995.

However, WRD reported (September 2016) to Government that compendium of Rules for Water Regulation would be updated covering all the reservoirs in the State within a period of six months and sent to Government. However, the same was not released even after a lapse of about five years (April 2021). Though WRD forwarded the draft Rules to the Government, the same was pending approval (May 2021).

Thus, failure of the department in framing the Rules of water regulations for the reservoir even after 25 years of its completion resulted in release of water without assessing the irrigation requirements, as discussed in the subsequent paragraph:

Government replied (October 2021) that Rules for water regulation for Kelavarapalli Reservoir is under formation.

5.4.2 Short release of water

Scrutiny of records revealed that WUA was not functioning in the sub-basin area of Kelavarapalli Reservoir during the Audit period. As the WUA were not formed, its activities *viz*., preparation of water budget for release of water based on the cropping pattern, etc. as envisaged in the section 22 of TNFMIS Act, 2000 were not undertaken.

The orders issued by the Government for release of water in these channels, actual release of water and crop water requirement after completion of the project as envisaged in the DPR were as detailed below:

Table 16: Actual release of water against the crop water requirement

Year	Water to be released as per GO (Mcft)	Crop water required with project as per DPR[32] (Mcft)	Actual release of water (Mcft)	Short release (percentage)
2015-16	Not Available	1,149.89	766.800 (67)	383.09 (33)
2016-17	4,421.34*	1,149.89	950.918 (83)	198.972 (17)
2017-18		1,149.89	909.705 (79)	240.185 (21)
2018-19		1,149.89	1,123.372 (98)	26.518 (2)
2019-20		1,149.89	948.672 (83)	201.218 (17)

***GO for release of water for the year 2015-16 was not made available to Audit. Further, in respect of the remaining period the orders were issued spreading over two financial years. Hence, total for four years was included in the table.**
(Source: Details furnished by WRD)

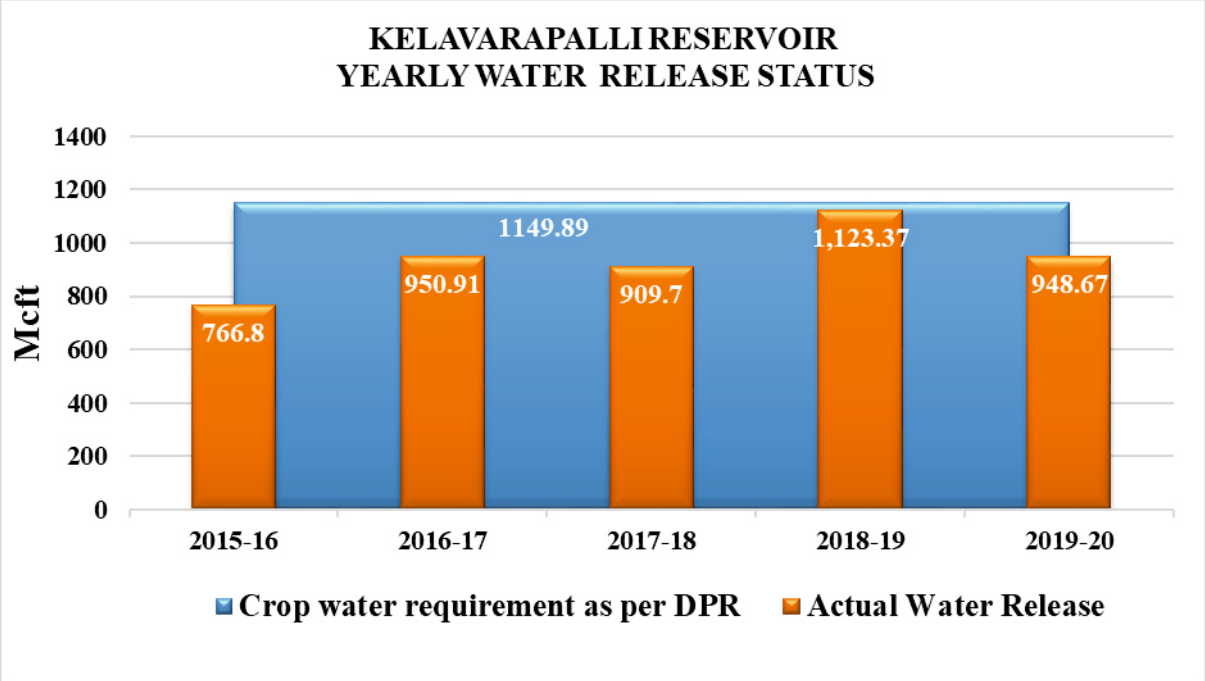
It is seen from the above that:

- As against the orders of the Government for release of 4,421.31 Mcft during the period from 2016-17 to 2019-20, WRD released 3,932.667 Mcft (89 *per cent*) only.
- Despite the release of water from 67 to 98 *per cent* of water required for crops, the actual irrigation was only about 110 ha (04 *per cent*), as against the targeted area of about 3,000 ha. Such a large scale reduction in actual irrigated area indicated inadequate co-ordination of the field officials of WRD with the Revenue authorities and farmers as already discussed in the **Paragraph 5.4.**

The quantum of water released as against the crop water requirement in respect of Kelavarapalli Reservoir for the period from 2015-16 to 2019-20 is exhibited in **Chart 9.**

[32] The crop water requirement of sub-basin is 1,597.07 Mcft. Since, percentage of the ayacuts covered under Kelavarapalli Reservoir to the total ayacuts in the sub-basin works out 72 *per cent*, the same percentage was adopted to arrive the water requirement for the ayacuts covered under the reservoir.

Chart 9: Water release against crop water requirement



(Source: Details furnished by WRD)

Thus, absence of adequate water management, as discussed in previous paragraphs, resulted in non-achievement of the envisaged outcomes of conversion of gap area into fully irrigated area as envisaged in the DPR of the project even after incurring of ₹ 6.60 crore and maintenance cost of ₹ 1.50 crore.

5.5 Formation of extension supply channel in Kelavarapalli Reservoir

Based on the proposal (September 2015) of WRD, GoTN sanctioned (February 2016) ₹ 2.50 crore with the NABARD loan assistance, for excavation of a new supply channel to divert the flood surplus of Kelavarapalli Reservoir through its Left Main Channel to feed Marudandapalli Eri and Durai Eri in Hosur taluk. The scheme would have direct benefit for 222 acre from the water from these two tanks and indirect benefit for 50 acre for irrigation by recharge of wells aligned adjacent to diversion channel.

The work was commenced in March 2016 and completed in August 2016 with the expenditure of ₹ 2.50 crore. It is evident from the **Table 16 of Paragraph 5.4.2**, that even after completion of four years of formation of new channel work, WRD did not take efforts to regulate the water in the new channel due to objection raised by other farmers. However, WRD failed to convince the benefit to farmers about the availability of surplus water in the reservoir so as to fulfil the objectives of the project.

Thus, despite having surplus water in the Kelavarapalli Reservoir continuously for the period of four years since excavation of supply channel, surface water was not harnessed to the benefit of the 222 acre and the expenditure of ₹ 2.50 crore incurred remained unfruitful.

Conclusion:

The intended outcome of Kelavarapalli Reservoir viz., conversion of gap area into fully irrigated area remained unachieved besides there was substantial reduction in the fully irrigated area after the implementation of the project. Failure of the department in framing the Rules of water regulations for the Kelavarapalli Reservoir even after 25 years of its completion resulted in release of water without assessing the irrigation requirements. Supply channel of Kelavarapalli Reservoir excavated to harness surface water to benefit 222 acres of agriculture land was not utilised for four years and the expenditure of ₹ 2.50 crore incurred remained unfruitful.

Recommendations:

The Government may:

- Frame Rules for regulation of water for irrigation systems in Kelavarapalli Reservoir to ensure release of water based on irrigation requirements.
- Take efforts to utilise the supply channel to benefit the agriculture lands by harnessing surface water.