CHAPTER IV

RADHAPURAM CHANNEL

PECHIPARAI DAM

PERUNCHANI DAM

CHAPTER IV
MEASURABLE OUTCOMES OF RADHAPURAM CHANNEL

4.1 Introduction

The Chittar Pattanamkal scheme was devised[24] to harness surplus water in the Kodayar system to irrigate the ayacuts and to cover 6,882.6 ha in the Radhapuram area of Tirunelveli district. For this purpose, the reservoir levels of Pechiparai and Perunchani reservoirs were raised to increase their storage capacity. The existing channels were strengthened and lined to lead to a new channel (Radhapuram Channel) into the drought prone Radhapuram area.

Radhapuram channel of 28/800 Km length, excavated during 1970 in Tirunelveli district is an extension of old Thovalai channel under Kodayar system in Kanyakumari district. The Radhapuram channel starts from Pechiparai reservoir (Kodayar left bank channel) in Kanyakumari district. Thovalai channel from Perunchani dam joins the Kodayar left bank channel in Tirunelveli district, is called Radhapuram Channel. Thus, the source for the Radhapuram channel is both from Pechiparai and Perunchani dams.

4.2 Outcome envisaged in Radhapuram channel

Detailed Project Report (DPR) was prepared during 2008-09. DPR envisaged that the total water potential of the sub-basin covered by Radhapuram channel as 96.58[25] Mcum. It was also stated 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 53.93 Mcum to 69.56 Mcum.

DPR envisaged the following measurable outcomes:

- To increase conveyance efficiency from 42 to 53 *per cent*
- Conversion of the partially irrigated/gap area as fully irrigated area

4.3 Non-achievement of expected conveyance efficiency

The DPR of the project contemplated that the improvement and modernisation of irrigation infrastructures would improve the conveyance efficiency from 42 to 53 *per cent*. The DPR was incomplete since, it did not include the basis for calculation of the existing conveyance efficiency of 42 *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. WRD stated (March 2021) that conveyance efficiency had increased from 42 to 48 *per cent* during 2020 and no data relating to the period from 2015-16 to 2018-19 was furnished to audit.

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[24] During third five year plan period 1961-62 to 1965-66.

[25] Surface water – 58.81 Mcum and ground water – 37.77 Mcum.

As against the envisaged outcome on the targeted increase in conveyance efficiency by 11 *per cent,* the achievement was 06 *per cent* during 2020. The achievement for the period 2015-16 to 2018-19 could not be ascertained due to absence of documentation on conveyance efficiency. Thus, the intended outcome of the project remained partially achieved during 2020 and for the balance years 2015-16 to 2018-19 it was not susceptible for verification, despite incurring an expenditure of ₹ three crore towards improvement and modernization of irrigation infrastructures besides maintenance cost of ₹ 0.40 crore during 2015-16 to 2019-20.

A joint inspection conducted (March 2021) in entire length of Radhapuram channel by the Audit along with the officials of the WRD also revealed water seepages, unauthorised stacking of sand bags, accumulation of plastic waste in the channels which affected the free flow of water thereby reducing the conveyance efficiency of the channel and reduced irrigation water to the ayacuts in the tail end as discussed in **Paragraph 6.2.2**.

Government replied (October 2021) that the conveyance efficiency of 53 per cent was achieved during 2021-22. The fact however, remained that the envisaged outcome was not achieved during 2020 and no data was furnished for the period from 2015-16 to 2018-19.

4.4 Non-conversion of gap area as fully irrigated area

As per the DPR (2008-09) of TN-IAMWARM, for rehabilitation of the project, the details regarding fully irrigated, partially irrigated and gap areas for the total ayacuts of Radhapuram channel was 4,596.54 ha as detailed below:

Table 8: Ayacuts in Radhapuram channel system

(in ha)

System	Registered Ayacut as per DPR (2008-09)	Status of irrigated area as per DPR		
		Fully irrigated	Partially irrigated	Gap area
Radhapuram channel	4,596.54	1,705.93	707.50	2,183.11*

***After adjusting the permanent gap area of 2,288.15 ha due to erection of windmill.**
(Source: Details furnished by WRD)

A cross verification of data furnished by the Department of Economics and Statistics revealed that the actual area irrigated through channel during the period 2015-16 to 2019-20 is as follows:

Table 9: Actual irrigated area

Registered Ayacut	Actual irrigated area (in Ha)				
	2015-16	2016-17	2017-18	2018-19	2019-20
4,596.54	489	290	529	362	375
Percentage to the registered Ayacut	11	6	11	8	8

(Source: Details furnished by WRD)

From the above **tables**, it is evident that

- Department was not in a position to retain the fully irrigated area prior to the commencement of the rehabilitation works to the channel, as the actual irrigated area was reduced from 11 *per cent* to 8 *per cent* during the period from 2015-16 to 2019-20 which was lesser than the fully irrigated area as stipulated in the DPR.
- There was significant reduction of more than 70 *per cent* in fully irrigated area during the five year period (2015-16 to 2019-20) after completion of the project when compared with the extent of fully irrigated area prior to the implementation of the project (2008-09).

Thus, the intended outcome of the project of conversion of gap area of 2,183 ha into fully irrigated area remained unachieved. Therefore, the expenditure of ₹ three crore on the project became unfruitful due to non-provision of irrigation to entire area of 4,596.54 ha as envisaged in the project.

Audit noted that there were shortcomings in regulation of water by the field offices of the Department. Ineffective regulation of water also contributed to the non-achievement of the outcome of conversion of gap area as discussed in the subsequent paragraphs:

4.4.1 Absence of Rules for regulation of water

Water Resources Department (WRD) is responsible for regulation of water to the ayacuts of Reservoir. Though, Radhapuram channel was excavated in 1970 to cater additional area of cultivation from the water released from the Pechiparai and Perunchani Dams after raising level of these dams, the Rule of regulation of water from these reservoirs (1968) was not amended. However, GoTN issued instructions (1970) to release the water in the Radhapuram Channel for irrigation, when the combined storage water of dams is more than 1,300 Mcft. Water Resources Department 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. Despite the same, the regulation of water in Radhapuram Channel was not considered in the said Compendium.

Audit noted that WUA was not functioning in the sub-basin area of Radhapuram channel during the audit period. As the WUA was 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.

4.4.2 Non-release of water proportionate to the area of cultivation

The water requirement to achieve the targeted irrigated area, as per DPR, was 69.56 Mcum (2,456.16 Mcft or 2.5 TMC). Based on the Rules for regulation (1968), the water requirement for irrigation for the two channels (Pandian kal and Padmanabhapuram puthan) flowing from these two Dams was 16.4 TMC. Considering the water requirement for irrigating the target area of Radhapuram channel in the DPR (2.5 TMC), the total water release requirement from these two Dams for irrigation worked out to 18.9 TMC.

As against the total requirement of 18.9 TMC for irrigating the area covered by the three channels, the actual water released from Pechiparai and

Perunchani dams, the proportionate[26] release of water in Radhapuram channel (13.23 *per cent*) as per water requirement and actuals thereon for the period 2015-16 and 2019-20 are shown in **Table 10**.

Table 10: Water release from Pechiparai and Perunchani Dams

(in Mcuft)

Year	Pechipari dam	Perunchani dam	Total water released	Proportionate share for Radhapuram Channel (col 4 x 13.23 *per cent*)	Actual water release in Radhapuram channel	Short release
2015-16	10,264.65	5,821.44	16,086.09	2,128.19	884.41 (42)	1,243.78 (58)
2016-17	7,020.14	4,400.62	11,420.76	1,510.97	126.09 (8)	1,384.88 (92)
2017-18	10,185.73	4,467.74	14,653.47	1,938.65	674.23 (35)	1,264.42 (65)
2018-19	13,903.91	8,469.67	22,373.58	2,960.02	383.43 (13)	2,576.59 (87)
2019-20	9,557.54	6,755.15	16,312.69	2,158.17	400.13 (19)	1,758.04 (81)

(Source: Details furnished by WRD)
(Figures in brackets indicate the percentage)

It may be seen from the above that:

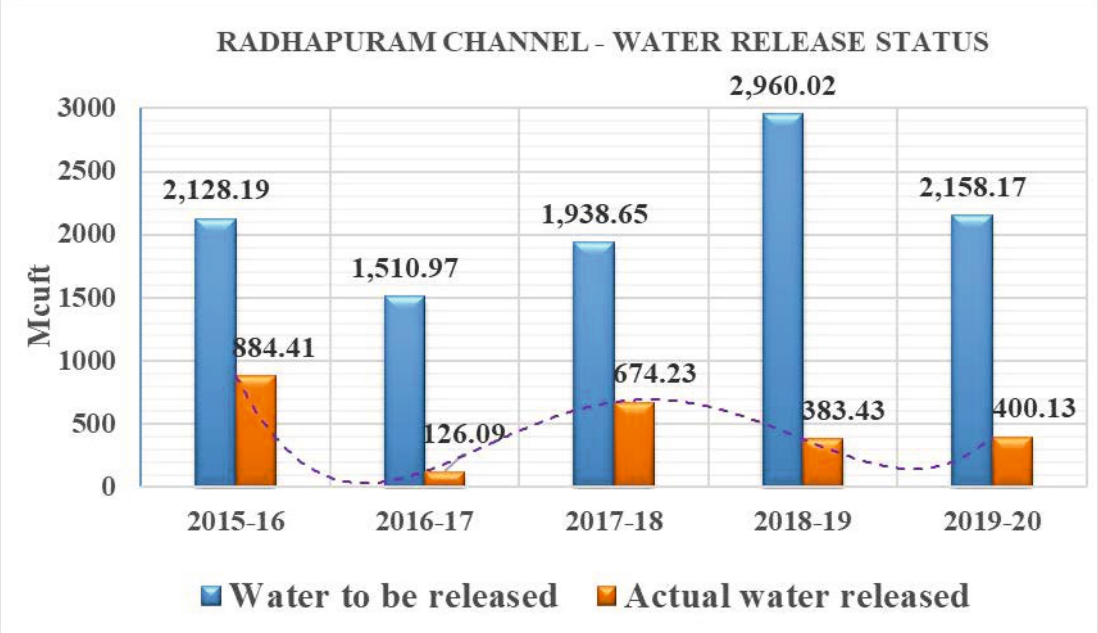
- WRD released only 08 to 42 *per cent* of the required water for irrigating the target area in the Radhapuram channel during 2015-16 to 2019-20. The short release of water in Radhapuram channel ranged between 58 and 92 *per cent*. Audit noted that the initial proposal for release of water in the Radhapuram channel submitted by the field officials of the Department to Government ranged between 130 Mcft and 194 Mcft as against the water requirement of 2.5 TMC (as envisaged in the DPR) during the years 2016-17 to 2019-20.
- During 2018-19 the water released from the two dams for the three channels was 22.4 TMC. Of this, the water requirement for the two channels[27] was 16.4 TMC and there was an excess water release of 5.9 TMC. But, WRD released only 0.38 TMC as against the requirement of 2.5 TMC for Radhapuram channel and the balance water was diverted to the other two channels.

The short release of water in Radhapuram channel during the period 2015-16 to 2019-20 is exhibited in **Chart 6.**

[26] Total requirement 18.9 TMC. Requirement for Radhapuram area 2.5 TMC; Proportionate requirement 2.5/18.9 *per cent* = 13.23 *per cent*.

[27] Pandian kal and Padmanabhapuram puthan channels

Chart 6: Short release of water



(Source: Data furnished by WRD)

Thus, the field officials of WRD failed to propose to release 2.5 TMC of water as envisaged in the DPR required for conversion of gap area. This led to short release of water to the drought prone Radhapuram area and non-achievement of envisaged outcome on conversion of gap area as discussed in **Paragraph 4.4.**

Government accepted (October 2021) the short release of water and stated that the actual release of water has been increased to 926 Mcuft during 2020-21. The fact, however, remains that there was short release of water during 2015-16 to 2019-20.

4.4.3 Delay in release of water despite availability

GoTN instructed (1970) to release water in the Radhapuram channel on 16 June of every year for irrigation when the combined storage of water in dams is more than 1,300 Mcft. An analysis of the combined water storage in dams and actual release of water are detailed in **Table 11**.

Table 11: Release of water

Year	Date	Combined water level in the dams (Mcft)	GO No. / date and quantum of release	Remarks
2015-16	16.06.2015	6,669.21	The date and quantum of water released was not furnished to audit.	--
2016-17	16.06.2016	6,165.91	415/20.09.2016 - from 21.09.2016 for 20 days @ 75 cusec Maximum 130 Mcft	Despite availability of water on 16 June itself, WRD initiated the proposal only in August 2016 i.e., after a delay of two months and the order was issued only in September 2016
	22.08.2016	4,024.70		
	02.09.2016	3,265.46		
2017-18	28.06.2017	1,426.81	562/03.11.2017 – from 06.11.2017 to 25.11.2017 for 20 days @ 75 cusec Maximum 129.60 Mcft	Scrutiny of WRD records revealed that the proposal was initiated in October 2017 and issued orders for release of water after the delay of about four months. Actual release of water was made in November 2017.
	29.06.2017	1,487.99		
	30.06.2017	1,520.48		
	11.10.2017	2,264.58		
	20.10.2017	2,343.69		
2018-19	16.06.2018	4,039.29	312/07.07.2018 - from 03.07.2018 for 30 days @ 75 cusec Maximum 194.4 Mcft	Delay less than a month.
2019-20	16.06.2019	1,392.16	449/25.09.2019 - 27.09.2019 to 26.10.2019 for 30 days @ 75 cusec Maximum 194.4 Mcft	Delay more than three months.
	07.09.2019	3,817.13		

(Source: Details furnished by WRD)

It may be seen from the above that:

- WRD failed to initiate proposals for release the water as soon as the combined storage position of the dam reached the mandated levels of 1,300 Mcft. Non-submission of proposal in time led to delay in issue of Government instructions for release of water in Radhapuram channel despite availability of water. The delay in release of water ranged between 25 days and four months.

Thus, failure of the WRD to assess availability of water in the source dams and propose for release of water requirement in time led to non-achievement of the outcome of conversion of gap area into fully irrigated area as discussed in **Paragraph 4.4**.

4.5 Non-achievement of the targeted productivity

DPR of Agriculture Department (2008-09) aimed at increasing income of the farmers by increasing the productivity in four major crops *viz.,* paddy, groundnut, pulses and cotton.

The details regarding the targeted increase and actual achievement of productivity of the four major crops during the period 2015-16 to 2019-20 are shown in **Table 12.**

Table 12 Achievement of productivity

(in MT/ha)

Crop	Actuals before implementation of project	Target after implementation of project	Actuals after implementation of the project				
			2015-16	2016-17	2017-18	2018-19	2019-20
Paddy	4.000	4.500	5.980 (33)	3.875 (-14)	5.960 (32)	6.023 (34)	5.945 (32)
Groundnut	2.000	2.500	1.340 (-46)	1.314 (-47)	1.355 (-46)	1.452 (-42)	1.430 (-43)
Pulses	0.500	0.700	0.590 (-16)	0.540 (-23)	0.673 (-4)	0.731 (4)	0.740 (6)
Cotton	1.200	1.400	0.430 (-69)	0.420 (-70)	0.470 (-66)	0.428 (-69)	0.470 (-66)

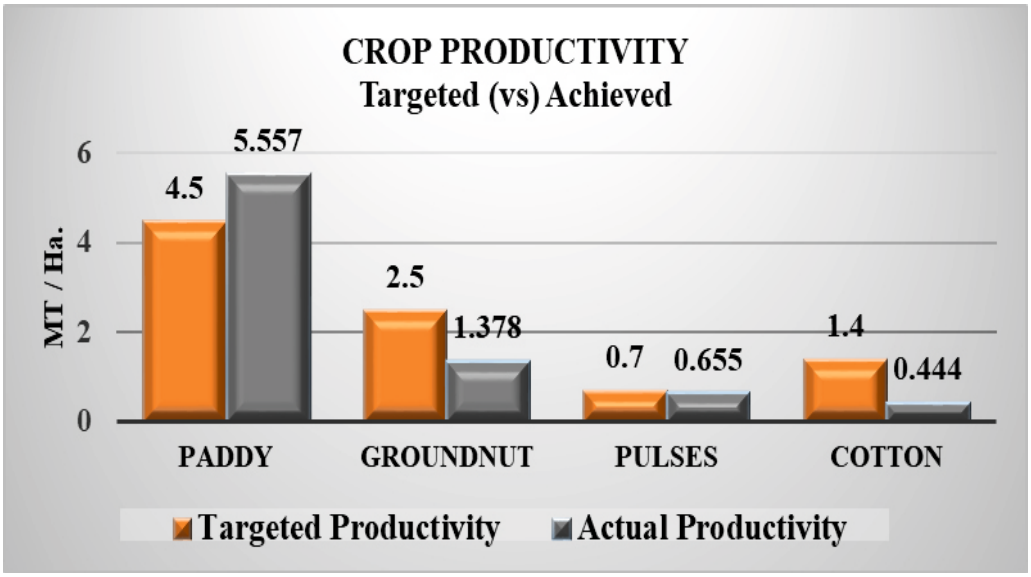
(Figures in bracket indicate the percentage of achievement)
(Source: Details furnished by WRD and Agriculture Department)

It could be seen from the table that:

- After the implementation of the project, the productivity was achieved in two crops *viz*., paddy and pulses, however, was not achieved in case of groundnut and cotton crops during the period from 2015-16 to 2019-20.
- The productivity in crops *viz*., groundnut and cotton after the implementation of the project was less than that of the actuals prior to implementation of project.

The average of achievement of productivity as against the targets of four major crops during the period from 2015-16 to 2019-20 is shown in **Chart 7.**

Chart 7: Achievement in Crop Productivity



(Source: Details furnished by WRD)

Thus, absence of adequate water management, as discussed in previous paragraphs, resulted in non-achievement of the envisaged outcome of increase in the agriculture productivity thereby increasing the income of farmers as envisaged in the DPR of the project.

Government replied (October 2021) that the ayacut area of Radhapuram channel has been converted to seasonal crops as farmers were interested in cultivating the short-term crops. The reply is not tenable as the targeted productivity of the short-term crops *viz.*, groundnut and cotton remained unachieved after the implementation of the project.

Conclusion:

The outcomes envisaged for Radhapuram Channel viz., increased conveyance efficiency remained partially achieved during 2020 and for the balance years 2015-16 to 2018-19 it was not susceptible for verification due to absence of adequate documentation; and the outcome of conversion of gap area of 2,183 ha into fully irrigated area remained unachieved. Inadequate assessment of availability of water in the source dams and delayed release of water from Radhapuram Channel due to non-receipt of Government orders also hindered the achievement of envisaged outcomes.

Recommendations:

The Government may:

- Maintain adequate documentation for recording the actual conveyance efficiency of Radhapuram Channel to ensure supply of adequate water to all the farmers.
- Take efforts to assess the requirement of water based on the availability in the source dams and avoid delayed issue of Government orders for release of water for irrigation from Radhapuram channel.