CHAPTER II

HARNESSING OF THE SURFACE WATER

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2.1 Planning for effective harnessing of surface water

The efficiency of the irrigation systems depends on the utilisation of the gross capacity of the irrigation infrastructures through periodical maintenance plans to arrest seepages, siltation issues and sediment deposition which reduces the gross capacity of the reservoirs and canals.

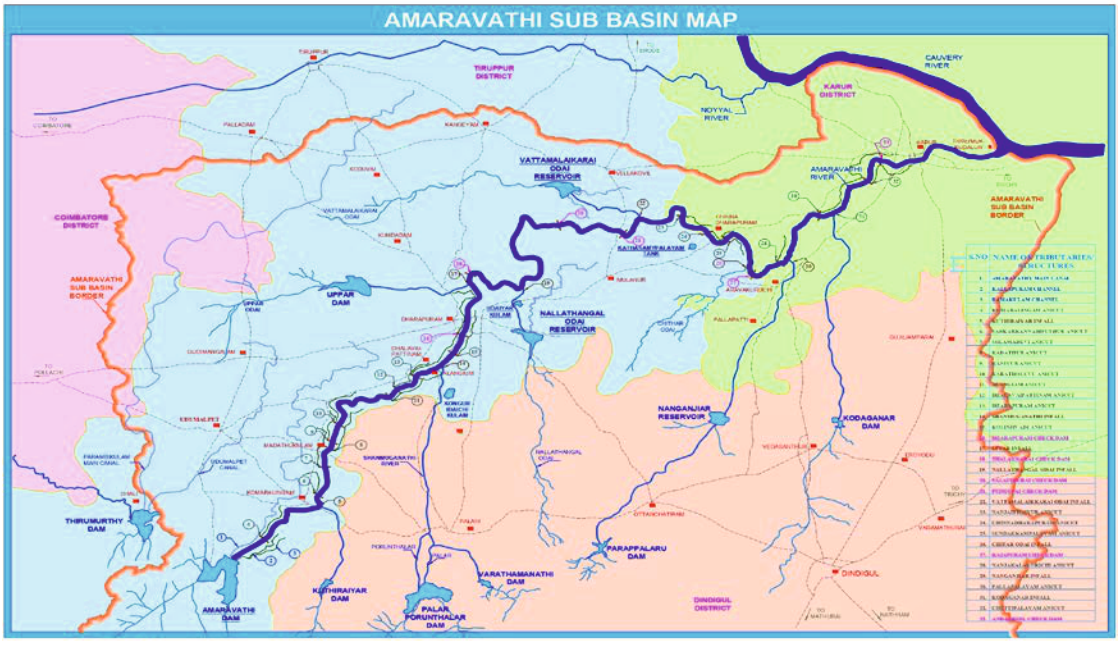
Based on the recommendations of the Reservoir Sedimentation Committee, Government of India advised (1980) the State Government to carry out capacity surveys for all major reservoirs once in five years to ensure adequate silt storage and retardation of sedimentation in the reservoirs.

Guidelines for Preparation of Detailed Project Reports (DPR) of Irrigation and Multipurpose Projects of Government of India (2010) stipulated that the studies carried about the depletion of reservoir's useful capacity due to sedimentation should also be discussed in the DPR.

Audit noted that the original capacity of the three selected projects *viz.*, Amaravathi Reservoir in Amaravathi sub-basin, Radhapuram Channel in Hanumanadhi sub-basin and Kelavarapalli Reservoir in Pennaiyar upto Krishnagiri sub-basin was reduced due to sediment deposition. PWD did not consider the guidelines of GOI on utilisation of optimum capacity of the reservoirs and addressing the issues of sedimentation during the preparation of DPR for the TN-IAMWARM project. This led to non-harnessing of the available surface water for irrigating the registered ayacuts through the channels from the dam during the period of audit, as discussed in the subsequent paragraphs:

2.2 Amaravathi Reservoir in Amaravathi sub-basin

AMARAVATHI SUB-BASIN



(Source: Details furnished by the Department)

The department, prior to preparation of DPR for TN-IAMWARM project for Amaravathi Reservoir, conducted capacity survey during the years 2004 and 2009. The capacity survey (2009) of the Amaravathi Reservoir revealed that the current storage capacity as 94.54 Mcum as against 109.476 Mcum which was the original live storage capacity of the reservoir. The survey report highlighted that there was gross capacity loss of 13.64 *per cent* and annual loss of 0.27 *per cent* due to sediment deposition.

Based on the data on water utilisation for the period from 1996-97 to 2007-08 (till preparation of DPR of the project), it was noticed that the Department failed to store the water to the full original capacity of the reservoir for irrigation needs. DPR highlighted that there was surplus water in the range of 1.168 TMC to 10.434 TMC which was not harnessed for irrigation purpose in eight years[9] between 1996-97 to 2007-08. WRD failed to consider the guidelines of GOI in addressing the issues of sedimentation during the preparation of DPR. Audit noted that there was discharge of surplus water of 4.345 TMC for 31 days in 2015-16 and 8.852 TMC for 63 days in 2018-19 which was also not harnessed.

It is pertinent to note that GoTN sanctioned (September 2014) ₹ 1.50 crore for preparation of DPR for removal of sedimentation in the reservoir. DPR was prepared (September 2016) by a consultant[10] and the detailed estimate was submitted (January 2017) to Government. Based on the directions (August 2018) of the Government to examine execution of the work under Revenue model, the estimates were revised (April 2019) and forwarded to Government for administrative sanction. However, Government returned (December 2019) the proposal with an instruction to submit a revised proposal at an appropriate time. Revision of estimates was pending finalisation by the Department. Thus, due to delay in finalisation of estimates by Department and according to sanction by Government for removal of sedimentation, the full capacity of the reservoir could not be utilised despite incurring ₹ 0.63 crore for preparation of DPR.

Audit also noted from the Environmental and Social Monitoring and Impact Assessment Report (2014) of WRD that many parts of the Amaravathi sub-basin were drought prone, face over-exploitation of ground water resources and decline in agriculture due to limitations in water resources. Due to non-harnessing of surplus water of 4.345 TMC for 31 days in 2015-16 and 8.852 TMC for 63 days in 2018-19, Department failed to provide sufficient irrigation facilities to the drought prone areas of the sub-basin.

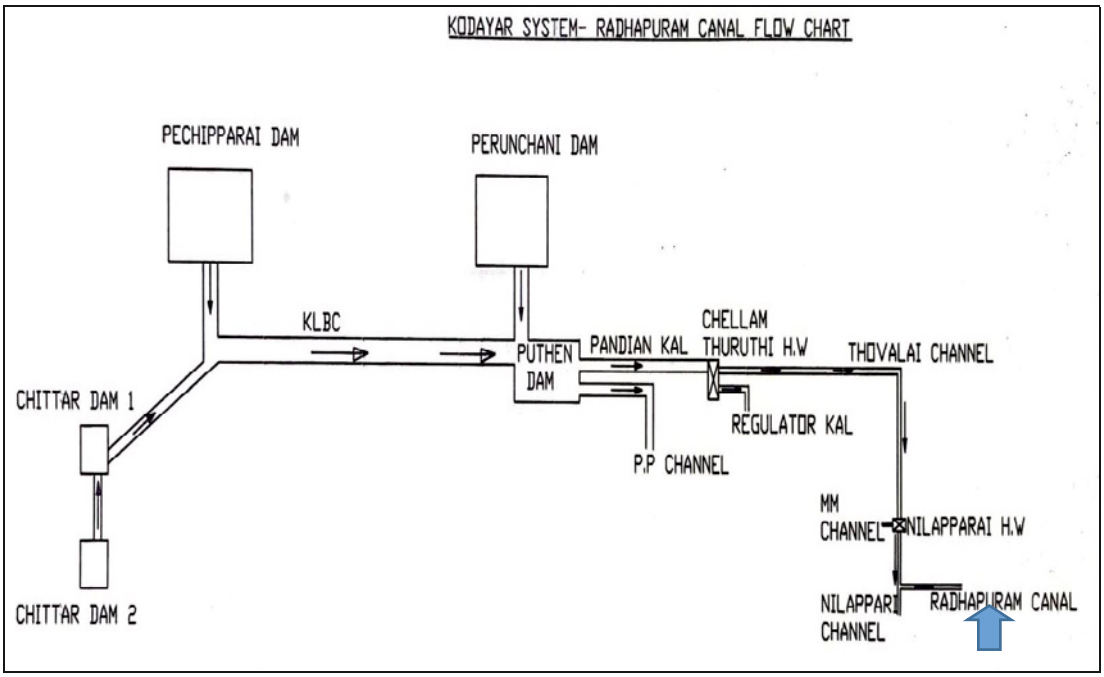
Government replied (October 2021) that a revised proposal at an estimated cost of ₹ 10.30 crore which estimated revenue generation of ₹ 290.00 crore had been sent in June 2021 for obtaining administrative sanction of the Government.

[9] 1996-97 to 2000-01; 2004-05, 2005-06 and 2007-08.

[10] M/s. Water and Power Consultancy Services (WAPCOS) Limited - A Government of India Undertaking, Ministry of Water Resources, River Development and Ganga Rejuvenation.

2.3 Radhapuram channel in Hanumanadhi sub-basin

RADHAPURAM CHANNEL



(Source: Details furnished by the Department)

The department conducted capacity survey during the years 2009 and 2013 in Pechiparai Reservoir which is the water source for Radhapuram channel in Hanumanadhi sub-basin. As per the capacity survey (2013) of Pechiparai Reservoir, the original capacity of 150.27 Mcum was reduced to 106.775 Mcum, (28.95 *per cent*) due to sedimentation. The survey report stipulates that the annual capacity loss at 0.69 *per cent,* which is graded as serious[11] as per the provisions of IS 12182 – 1987 and requires special care in estimating the sediment yields from the catchment.

Government sanctioned (September 2014) ₹ 1.45 crore for preparation of DPR to address the issues relating to sedimentation in the reservoir. After three years, DPR was prepared (August 2017) incurring an expenditure of ₹ 0.63 crore. Based on the DPR, PWD sought (April 2018) sanction for the work of desilting the Pechiparai Reservoir with an expenditure of ₹ 132.60 crore and the desilting work would also generate a revenue of ₹ 63.19 crore towards sale of desilted earth. Government returned (June 2018) the proposal with instructions to revise the proposal in revenue model without any expense to the State exchequer. Accordingly, WRD submitted (April 2019) revised proposal for ₹ 5.12 crore with a revenue generation of ₹ 95.60 crore. The clarifications sought for by the Government (June 2019) on statutory clearances, payment of compensation to Forest Department, etc., were yet to be furnished by WRD. Thus, despite sanction of funds for preparation of DPR, no decision had been taken in this regard, even after a lapse of seven years from sanction.

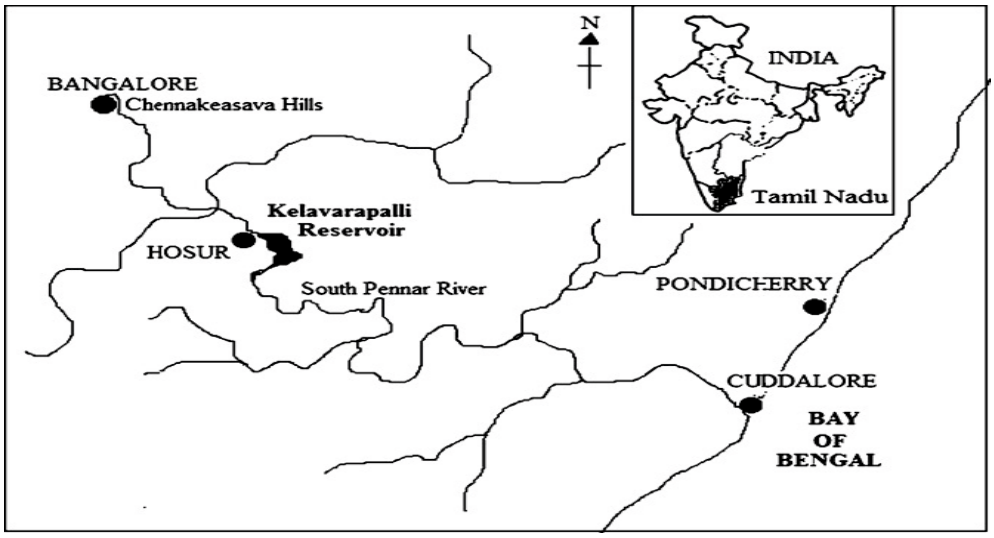
[11] Indian Standard IS: 12182-1987 – Guidelines for determination of effects of sedimentation in planning and performance of reservoirs.

Despite the Survey Report highlighting accumulation of sedimentation which resulted in reduction of the original capacity of reservoir by 29 *per cent* till 2013 and an additional 0.69 *per cent* every year, no fruitful initiative had been taken to fully harness the available surface water in the Pechiparai reservoir. Failure to consider the guidelines of GOI in addressing the issues of sedimentation during the preparation of DPR resulted in non-harnessing of surplus water of 9.336 TMC[12] for irrigation needs in three out of the five year period of 2015-20 and the surplus water was let into sea.

Thus, inadequate planning in preparation of DPR for the two projects *viz*., Amaravathi Reservoir in Amaravathi sub-basin and Radhapuram channel in Hanumanadhi sub-basin led to non-harnessing of the surface water for the benefits of the ayacuts despite incurring the expenditure of ₹ 1.26 crore towards preparation of DPR for desilting works.

2.4 Kelavarapalli Reservoir in Pennaiyar upto Krishnagiri sub-basin

KELAVARAPALLI RESERVOIR



The Kelavarapalli Reservoir was constructed between 1993 and 1995. The Department did not conduct any capacity survey to assess the quantum of sedimentation in the Reservoir prior to the preparation of DPR for TN-IAMWARM project. DPR for the project prepared in 2008 stipulated that Kelavarapalli Reservoir was the only major reservoir located in Pennaiyar upto Krishnagiri sub-basin and there was huge sediment deposition in the reservoir due to which capacity of water flow had been considerably reduced. Despite the same, the first Capacity Survey Report was prepared in 2019 by the Institute of Hydraulic and Hydrology of WRD after a delay of 10 years from the preparation of DPR (2008). The Capacity Survey Report stated that the original capacity of 13.61 Mcum was reduced to 10.75 Mcum with a capacity loss of 21 *per cent* (2.86 Mcum) in the reservoir and an average annual capacity loss of one *per cent.* Scrutiny of departmental records also

[12] 2015-16 – 3,208 TMC; 2018-19 – 5,869 TMC and 2019-20 – 259 TMC. Total 9.336 TMC.

revealed that the surplus water was not harnessed for all the five years (2015-20) and the quantum of water which was not harnessed was 43.26 TMC[13].

Thus, absence of periodical capacity surveys to assess and to address the sediment deposition issues in the reservoir and non-restoration of original capacity of the reservoir led to non-harnessing of surplus water and deprival of benefits to the extended ayacuts.

Conclusion:

Absence of periodical capacity surveys by the Department led to non-ensuring adequate silt storage and retardation of sedimentation in the Reservoirs. Delay in sanction of desiltation works for removal of sedimentation resulted in non-harnessing of the realised surface water to an extent of 65.793 TMC in three reservoirs which affected the irrigation needs of the crop area of the sub-basins.

Recommendations:

The Government may:

- Conduct periodical capacity surveys to assess the extent of sedimentation in the reservoirs to ensure adequate silt storage.
- Prioritise sanction of desiltation works for removal of sedimentation to retain the original capacity of the reservoir and to utilise the available water without wastage.

[13] 2015-16 - 8.817 TMC; 2016-17 – 0.979 TMC; 2017-18 – 13.204 TMC; 2018-19 – 10.119 TMC; and 2019-20 – 10.141 TMC. Total 43.26 TMC.