

Chapter 8

Water And Irrigation Planning

8.1 General

The proposed Cauvery – Vaigai - Gundar link canal off takes from the Kattalai barrage with full supply level of 100.750 m, diverts a total quantity of 2252 Mm³ of water annually.

The link canal is aligned to run adjacent to the existing New Kattalai high level canal which is on its left upto RD 36 km. The Cauvery – Vaigai – Gundar link runs for a length of 255.60 km up to Gundar River.

8.2 Water planning

The total diverted water of 2252 Mm³ from the Kattalai barrage through the link is proposed to be utilised as follows.

| | | Unit: Mm ³ |
|--------------|---|-----------------------|
| 1. | Irrigation requirement of the proposed command area en-route the link in the basin area between Cauvery and Gundar rivers | 1952.30 |
| 2. | Domestic & industrial requirement in the proposed command area & towns located 20 km right side of canal alignment | 185.00 |
| 3. | Enroute transmission losses | 114.70 |
| Total | | 2252.00 |

The details of working of the above demands are discussed in the following sections.

8.3 Existing Irrigation in the Proposed Command Area

The link canal in its course from Kattalai barrage to Gundar passes through the areas lying between the Cauvery and Gundar rivers, where the existing irrigation facilities are minimal and hence it is proposed to provide these areas falling in Karur, Tiruchchirappalli, Pudukkottai, Sivaganga, Ramanathapuram, Virudhunagar and Thoothukudi districts of Tamil Nadu with irrigation from the water diverted through the link canal.

The gross command area under the link canal has been identified to be 605123 ha excluding land covered by water.

8.3.1 Existing Irrigation Facilities in the Command Area

The existing irrigation in the proposed command is about 50% of the gross cropped area and rest is rain fed. The existing sources of irrigation are mainly tanks and wells. There are about 29068 dug wells, 2051 tube wells and 5288 tanks in the proposed command area. Out of the total area presently being irrigated, 82.4% is by tanks and 17.6% by wells.

The source-wise irrigation in the proposed command area during the year 1996-97 as assessed from taluk-wise statistics are presented in Table 8.1.

Table 8.1
Source-wise Irrigation in the Proposed Command Area During
the Year 1996-97

Unit: ha

| SI No | District | Area irrigated by | | | | Total |
|-------|-------------------|-------------------|-------|-------|---------------|--------|
| | | Canals | Tanks | Wells | Other sources | |
| 1. | Karur | --- | --- | 219 | 13 | 232 |
| 2. | Tiruchchirappalli | --- | 31 | 313 | --- | 344 |
| 3. | Pudukkottai | --- | 15645 | 8463 | --- | 24108 |
| 4. | Sivaganga | --- | 42706 | 4545 | --- | 47251 |
| 5. | Ramanathapuram | --- | 28388 | 3478 | --- | 31866 |
| 6. | Virudhunagar | --- | 3910 | 2263 | --- | 6173 |
| 7. | Thoothukudi | --- | 56 | 133 | 4 | 193 |
| | Total | --- | 90736 | 19414 | 17 | 110167 |

8.3.2 Current Agriculture Scenario and Existing Cropping Pattern

The total area available for cultivation in the proposed command area calculated based on the taluka wise statistics is 451606 ha and the net culturable command area available is 337717 ha. The gross sown area is 292951 ha, which is cultivated mostly during North - East monsoon only.

The principal crops grown in the area are jowar, maize, pulses, cotton, vegetables and chillies during the Kharif season and paddy, ragi and oilseeds during the Rabi season. Paddy, oil seeds and cotton are the main crops each being cultivated in about 70% of the net sown area in the proposed command.

8.4 Proposed Irrigation in the Command Area

8.4.1 Soil and Land Irrigability Classification

Since no detailed thematic maps are readily available, the land irrigability classification of the proposed command area could not be ascertained. Soil Survey & Landuse Organisation, Department of Agriculture, Govt. of Tamil Nadu prepared soil survey report for land irrigability classification. The land irrigability details of the proposed command area, worked out based on this report are furnished below:

| | | |
|----|---|----------------------|
| 1. | Area of land with moderate limitation for sustained use under irrigation | 3.23 lakh ha. |
| 2. | Area of land with moderate to severe limitation for sustained use under irrigation | 0.52 lakh ha. |
| 3. | Area of land with severe to very severe limitation for sustained use under irrigation | 2.59 lakh ha. |
| | Total | 6.34 lakh ha. |

Out of the above 6.34 lakh ha, an area of 3.38 lakh ha has been considered as command area, which could be provided with irrigation.

8.4.2 Lay out of District Sluices, Branch Canals/ Distributaries and their Commands

The 1: 50000 scale toposheets with contours at 20 m interval of the command area prepared and supplied by the Survey of India were used for the purpose. In the initial reach as the New Kattalai High Level Canal is running closer to the proposed link canal no branch canals are proposed in this reach. However the water is let out by providing direct sluices. A total of 25 direct sluices are provided from RD 0.000 km to RD 65.700 km. Considering the information on ground elevation available in these maps, a network of branch canals was drawn with the branch canals/distributaries aligned mostly along the ridges between the local streams, with their commands on both the sides extending upto the streams, which in turn form the exterior boundaries of the command under each of the branches. The layout of the branch canals/distributaries so finalised was then transposed on to the land irrigability maps of the same area in 1:50000 scale. The CCA under each of the branch canals was planimetered and then worked out proportionately based on the land use statistics. The areas under each of

the branches so measured were adjusted to match with the gross irrigable area of 605123 ha in the entire command area, so as to finally arrive at the branch-wise irrigable areas. After deducting the forest, scrub and barren land, the net irrigable area is determined to be 337717 ha.

In all, the total command area is divided into area under 25 direct sluices and 12 branch canals and branch-wise net irrigable areas are given in Table 8.2.

Table 8.2
Direct Sluices/ Branch Canals with their Irrigable Areas in the Command

| Sl. No. | Name of the direct sluice/ branch canal | Irrigable area (ha) (CCA) |
|---------|---|---------------------------|
| 1 | Direct sluices | 7457 |
| 2 | Tiruppur | 17827 |
| 3 | Narangiyampatti | 36913 |
| 4 | Pillaipatti | 8772 |
| 5 | Pallattur | 9650 |
| 6 | Kottaiyur | 10950 |
| 7 | Managiri | 6076 |
| 8 | Kil Vellanjpatti | 21565 |
| 9 | Uttikulam | 18317 |
| 10 | Ottakulam | 63847 |
| 11 | Kolavalliyur | 79608 |
| 12 | Isali | 5271 |
| 13 | Krishnapuram | 51464 |
| | Total | 337717 |

8.4.3 Suggested Cropping Pattern

The cropping pattern suggested for future major projects in the preliminary water balance study reports of the basin lying between Cauvery and Gundar rivers prepared by NWDA has been adopted for the proposed command area under the link canal. This cropping pattern has been suggested taking into account the soils available in the basin area and prevailing agricultural/irrigation practices. The intensity of irrigation is considered as 100%. The proposed cropping pattern for irrigation of the command area enroute the link canal is given in Table 8.3.

Table 8.3
Proposed Cropping Pattern for Irrigation under
the link canal

| Crops | % of CCA |
|--------------|-----------------|
| Paddy | 15 |
| Jowar | 5 |
| Maize | 5 |
| Ragi | 5 |
| Pulses | 10 |
| Oilseeds | 20 |
| Cotton | 20 |
| Vegetables | 10 |
| Chillies | 10 |
| Total | 100 |

8.4.4 Crop Water Requirement

The proposed command area is falling in the basin of streams between Cauvery and Gundar. The crop water requirement has been computed using climatological approach. There are two IMD observatories located at Tiruchchirappalli and Madurai which are adjacent to the proposed command area. Normal monthly values of potential evapotranspiration and rainfall data of both the observatories are available in the IMD publication. These have been used in computing the net irrigation requirements of different crops as per the suggested cropping pattern. The gross irrigation requirements of the crops have been worked out considering an irrigation efficiency of 55% for the crops under major schemes except paddy for which 65% is considered. Considering the extent of irrigable areas under each of the direct sluices and branch canals and delta of each crop, the month-wise and branch-wise water requirements are computed. The annual water requirement for enroute irrigation is estimated to be 1952.30 Mm³.

8.5 Domestic and Industrial Requirements of the Proposed Command Area

The requirement of water for domestic consumption in the rural and urban areas and for livestock has been computed by projecting the rural and urban human population and livestock population of the proposed command area to 2050 AD. It is also proposed to meet the domestic requirement of the towns situated to the right side of the link canal alignment, within a distance of 20 km and involving lifts not more than

100 m from link, by considering the per capita daily requirement of 70, 200 and 50 litres for the rural, urban and livestock population respectively.

The rural and urban population of the command area for the year 2001 has been estimated on proportionate area basis from the taluk wise census data of 2001. The total population of the command area in 2001 was 18.95 lakhs and has been projected to 2050 AD using compound growth rates as suggested by UNO in their publication, "World Population Prospects- 1994" (Revised). Out of the total projected population, urban population is 45.4% and rural population is 54.6%.

The existing urban population is deducted from the projected urban population presuming that its domestic requirement is already being met by existing sources and only the remaining urban population is considered for working out the urban domestic requirement to be provided through the link canal.

The total livestock in the command area as estimated on proportionate area basis from census data of 1994 is 10.88 lakhs and it was projected to 2050 AD assuming an annual compound growth rate of 1%.

The water requirement for the entire urban and 50% of the rural population is proposed to be met from the surface water resources, which works out to 62 Mm³.

In the absence of relevant data to estimate the industrial water needs, the industrial requirement has been assumed to be the same as the domestic water requirement, i.e. total of urban, rural and livestock requirements, which is 123 Mm³. During the period from February to May, the canal would be operated for an hour per day only for releasing water for domestic and industrial needs. Thus the total domestic and industrial water requirement of the enroute area to be supplied from the Cauvery – Vaigai - Gundar link canal is estimated to be 185 Mm³.

8.6 Transmission losses

The transmission or conveyance losses i.e. the amount of water lost through evaporation and seepage in the link canal during its course from the Kattalai barrage to Gundar, have been estimated month-wise considering 0.60 cumecs per million square metre of wetted area of the canal as per Bureau of Indian Standard Code. The annual transmission losses work out to 114.70 Mm³.

8.7 Month-wise Distribution Pattern of Water for various demands from the Link

The month-wise water requirement for various demands to be met from the Cauvery – Vaigai - Gundar link is shown in Table 8.4.

Table 8.4
Month-wise Distribution Pattern of Water for Various Demands
From the Link

Unit: Mm³

| Month | Proposed command | | Transmission loss | Total |
|--------------|------------------|------------------------------|-------------------|---------------|
| | Irrigation use | Domestic and Industrial uses | | |
| Jun. | 53.8 | 15.2 | 11.0 | 80.0 |
| Jul. | 219.8 | 15.7 | 14.0 | 249.5 |
| Aug. | 195.8 | 15.7 | 13.0 | 224.5 |
| Sep. | 276.8 | 15.2 | 14.0 | 306.0 |
| Oct. | 255.2 | 15.7 | 14.0 | 284.9 |
| Nov. | 243.2 | 15.2 | 14.0 | 272.4 |
| Dec. | 407.4 | 15.7 | 15.9 | 439.0 |
| Jan. | 300.3 | 15.7 | 14.8 | 330.8 |
| Feb. | 0.0 | 14.2 | 1.0 | 15.2 |
| Mar. | 0.0 | 15.7 | 1.0 | 16.7 |
| Apr. | 0.0 | 15.2 | 1.0 | 16.2 |
| May | 0.0 | 15.7 | 1.0 | 16.7 |
| Total | 1952.3 | 185.0 | 114.7 | 2252.0 |