

## EXECUTIVE SUMMARY

Long distance inter-basin transfer of water from surplus basins to water deficit basins has been mooted in our country in order to reduce the imbalance in the water availability between various regions. A National Perspective Plan (NPP) was formulated in the year 1980 by the Union Ministry of Irrigation (now Ministry of Water Resources) and the Central Water Commission identifying a number of inter-basin water transfer links in respect of both Peninsular Rivers and Himalayan Rivers of the country. The Peninsular Rivers Development and the Himalayan Rivers Development Components put together were expected to create an additional irrigation potential of 35 million hectares besides hydropower potential and other benefits.

The inter-linking system of Mahanadi – Godavari – Krishna – Pennar – Cauvery – Vaigai – Gundar is one of the four parts of the Peninsular Rivers Development Component of the NPP. Amongst the Peninsular Rivers, as per NWDA studies, the Mahanadi and the Godavari have sizeable quantum of water surplus after meeting the existing and projected requirements within the basins. It is, therefore, proposed to divert the surplus waters of the Mahanadi and the Godavari rivers to the water-short Krishna, the Pennar, the Cauvery and the Vaigai basins. Diversion has been proposed from Mahanadi to Godavari through Mahanadi (Manibhadra) – Godavari (Dowlaiswaram) link. Three links have been proposed connecting Godavari and Krishna. They are: (i) Godavari (Inchampalli) Krishna (Nagarjunasagar), (ii) Godavari (Inchampalli) – Krishna (Pulichintala) and (iii) Godavari (Polavaram) Krishna (Vijayawada). Three links connecting Krishna and Pennar have been proposed for effecting further diversion. They are (i) Krishna (Almatti) – Pennar, (ii) Krishna (Srisaïlam) - Pennar and (iii) Krishna (Nagarjunasagar) – Pennar (Somasila). This report deals with the feasibility of Krishna (Almatti) – Pennar link for diversion of a part of Krishna waters from Almatti reservoir to the Pennar river in partial exchange to the surplus water of Mahanadi and Godavari rivers proposed to be brought to the Krishna basin.

The Krishna (Almatti) – Pennar link envisages diversion of 1980 Mm<sup>3</sup> of waters from Krishna for enroute utilisation in Krishna and Pennar basins. A 587.175 km long link canal off takes from the right bank of Almatti dam runs through the Bagalkot, Bijapur Koppala, Beïlary, Raichur districts of Karnataka and Anantapur district of Andhra Pradesh and finally outfalls into Maddileru river, a tributary of Pennar river. The annual irrigation proposed through the link is 258334 ha which comprises 16334 ha in Middle Krishna sub-basin, 46224 ha in Tungabhadra sub-basin, 83741 ha in Vedavathi sub-basin and 112035 ha in Upper Pennar sub-basin. The annual utilization in Middle Krishna, Tungabhadra and Vedavathi sub-basins will be 85 Mm<sup>3</sup>, 253 Mm<sup>3</sup> and 505 Mm<sup>3</sup> respectively while the same in Upper Pennar sub-basin will be 871 Mm<sup>3</sup> as per the suggested cropping pattern. Apart from irrigation, it is also proposed to provide for future domestic and industrial water requirements in the command area. Additional domestic and industrial requirements, projected to 2050 AD, are estimated to be 22 Mm<sup>3</sup> and 34 Mm<sup>3</sup> respectively. Transmission loss in the link canal is estimated to be 210 Mm<sup>3</sup>. A Power house is proposed at the canal off

take with an installed capacity of 13.5 MW and annual power generation of about 42.5 MU.

The canal is designed for carrying peak demands of the month of August. The canal is designed as a cement concrete lined canal with trapezoidal section. The size of the canal at the off take is 32.00 x 5.25 m with a bed slope of 1 in 20000. Out of the total length of 587.175 km, five tunnels constituting to a total length of 35.660 km are proposed to cross the ridges to avoid heavy cutting. The maximum diameter of the tunnel is 13.60 m with a bed slope of 1 in 10000.

The total cost of the link project has been estimated under three units, viz., i) Head works, ii) Canal system and iii) Power house. The cost of Unit-I, Head-works, works out to Rs.52.43 crores. The cost of Unit-II, the Canal System, works out to Rs.6519.51 crores. The cost of Unit-III, Power house, works out to Rs.27.86 crores. Thus, the total cost of the link project is estimated to be Rs.6599.80 crores at 2003-04 price level. The cost per Mm<sup>3</sup> of water diverted works out to Rs.3.33 crores.

The schedule of construction of the link is planned for a period of 10 years. The link project will benefit Raichur and Bellary districts of Karnataka and give relief to the drought prone areas of Anantapur district of Andhra Pradesh by providing assured water for irrigation. The benefit-cost ratio of the whole project has been worked out considering the annual cost of the project and the annual benefits from the project and is found to be 1.20. The internal rate of return of the project with and without distributional and employment impacts works out to 14.26% and 9.51% respectively.

The objective of preparation of the feasibility report is mainly to facilitate firming up of the proposals and for discussions among the concerned States to arrive at broad agreements on the quantum of diversion and utilization of water, sharing of cost and benefits, etc.

Detailed topographical survey of the proposed canal alignment was carried out by NWDA. Special surveys/Investigations such as Geophysical Investigation, Geotechnical Investigation, Borrow area survey, Construction material survey, Environmental, ecological and socio-economic survey, etc., were got carried out through Geological Survey of India [GSI], Central Water Commission [CWC], Central Soil and Materials Research Station [CSMRS], Pune University, a private consultancy firm, etc. Details of various surveys, investigations, hydrology, design and layout of structures, estimates, etc., are covered in this report.