

## 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 interlinking of Mahanadi-Godavari-Krishna-Pennar-Cauvery is one of the four parts of the Peninsular Rivers Development Component of the NPP. Amongst the Peninsular Rivers, the Mahanadi and the Godavari have sizeable surpluses 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 to the water short river basins viz., the Krishna, the Pennar and the Cauvery. Three water transfer links have been proposed connecting Godavari to Krishna: (i) Inchampalli -Nagarjunasagar, (ii) Inchampalli-Pulichintala and (iii) Polavaram- Vijayawada. This report deals with the feasibility of the First link, i.e., diversion of a part of the surplus waters of Godavari from the proposed Inchampalli reservoir to the Existing Nagarjunasagar dam on river Krishna through the Godavari (Inchampalli) – Krishna (Nagarjunasagar) link canal project.

The objective of preparation of the Feasibility Report is to facilitate firming up of the proposals and for discussions among the riparian states to arrive at broad agreements on the quantum of water diversions and sharing of costs etc.

The Godavari (Inchampalli) - Krishna (Nagarjunasagar) link canal project envisages diversion of 16426 Mm<sup>3</sup> of water from the proposed Inchampalli project on river Godavari to the existing Nagarjunasagar project on river Krishna. Out of this, a quantum of 1664 Mm<sup>3</sup> is to be utilised for irrigation, domestic and industrial uses in the command area enroute and 562 Mm<sup>3</sup> will be lost in transmission and the balance 14200 Mm<sup>3</sup> will reach Krishna at the existing Nagarjunasagar reservoir. After meeting the deficit in Krishna basin the balance quantity will be further diverted to Pennar, Cauvery, Vaigai and Gundar basins.

Total length of the link canal is 299.25 kms (including a tunnel of 9.15 km). This link canal falls entirely in Andhra Pradesh traversing through Karimnagar, Warangal and Nalgonda Districts before outfalling into the Nagarjunasagar reservoir. The proposed Inchampalli Joint Project at the off-take point and the existing Nagarjunasagar Project at the tail end have been planned to be utilized for the intending diversion without any change in their storage capacities. The monthly simulation studies of the Inchampalli reservoir carried out and incorporated in this report show that a quantum of 16426 Mm<sup>3</sup> of water could be diverted annually, at a success rate of 76%.

The command area of 178055 ha proposed under Kakatiya Canal Stage – II of Sri Ram Sagar Project by the Govt. of Andhra Pradesh will be taken over by the link canal from the water short existing Sri Ram Sagar Project and a quantity of 684 Mm<sup>3</sup> will be utilized from the link canal. Also an area of 109250 ha of ongoing Srisailem Left Bank Canal taking off from Nagarjunasagar foreshore will be commanded utilising 743 Mm<sup>3</sup> of water through the link canal, thereby reducing the pumping costs (at Alimineti Madhav Reddy Lift Irrigation Scheme) as planned by the Govt. of Andhra Pradesh.

Apart from irrigation, it is also proposed to provide water for future domestic and industrial requirements in the command area as well as all the townships along the link canal on either side within a distance of 20 kms. The quantity to meet the above domestic and industrial requirements projected to 2050 AD is estimated to be around 104 Mm<sup>3</sup> and 133 Mm<sup>3</sup> respectively.

Power House with an installed capacity of 975 MW at the toe of the dam, planned under the Inchampalli Joint Project is proposed to be modified as a pumped storage scheme with reversible turbines for generation of peaking power. Since the water cannot be diverted to Nagarjunasagar reservoir by gravity owing to the topography, a series of pumping stations in four stages have been proposed along the canal in its head reaches for lifting the water to a static head of about 107 m in order to transfer the water to endemically needy areas.

The existing Musi reservoir at RD 199.150 km is proposed to be utilized as a balancing reservoir en route the link canal. Since, a head of about 10. m is available at the off take point of this reservoir, a canal power house of 70 MW is also proposed.

The link canal is designed as a lined canal of trapezoidal section with bottom rounded corners. The maximum carrying capacity of the canal is 1090 cumec with corresponding cross section of 109.60 m bed width and 6.75 m full supply depth. The canal passes mostly through agricultural fields except in the initial reaches of about 35 kms where it is running through dense reserved forests.

About 30170 ha of forest land is coming under submergence for which compensatory afforestation is proposed. About 1 lakh people will be affected due to submergence by Inchampalli reservoir for which suitable provision for Rehabilitation & Resettlement is made in the estimate. Due to construction of the project large-scale opportunities for employment are expected.

Direct benefits from the link project due to irrigation, domestic and industrial water supplies enroute the canal are estimated to be Rs. 1217 crore per annum. The capital cost of this project is Rs. 26289 crore at 2003-04 price level. Based on the quantum of water consumed en route the canal, apportioned cost is worked out to be Rs.2754 crore and the annual cost to be Rs. 541 crore. The Benefit Cost Ratio works out to 2.25 and the Internal Rate of Return with and without distributional and employment effect are assessed as 17.86% and 14.81% respectively. The B.C. ratio may undergo a change if the cost of transferring surplus waters from the upstream link canal is also considered.