Chapter - 14
Benefit – cost ratio and financial return

14.1 General

Krishna (Almatti) – Pennar link is envisaged to transfer surplus waters from the Krishna basin by way of successive replacement principles for use in Pennar basin down stream of Upper Pennar project in Anantapur district of Andhra Pradesh apart from irrigating areas enroute in the lower reaches of Middle Krishna, Tungabhadra and Vedavathi sub-basins.

This link canal will benefit Raichur and Bellary districts of Karnataka and give relief to drought prone areas of Anantapur district of Andhra Pradesh. In this region, the irrigation is presently dependent on rainfall.

However, since the water diverted through Krishna (Almatti) – Pennar link will not directly go beyond Pennar basin and as the basic criteria for the analysis of proposal is to be worked out to reflect a broad general idea of the economic viability of the scheme, the B.C ratio of this single link has been estimated on the basis of benefits that accrue due to en-route irrigation contemplated under the link.

14.2 Benefits

14.2.1 Direct Benefits

(a) Irrigation

A total quantity of 1980 Mm^3 of water is proposed to be diverted through the link canal to bring a net culturable command area of 294795 ha under assured irrigation. The gross annual irrigation will be 258334 ha under the link project. The area under each crop is computed by considering actual water requirement as proposed in the relevant sub-basins. At present the area which is proposed to be irrigated under this scheme is fully dependent only on rainfall, with the erratic rainfall and prevailing drought conditions, only crops like paddy, ground nut, bajra, jowar, ragi, pulses and chillies are grown from which the yield is very limited. There is shortage of water at present for irrigation in the entire area now proposed to be brought under this link command. By implementing this scheme it is proposed to bring the maximum command area under irrigation.

(b) Revenue from Domestic and Industrial Water Supply

The water requirements in the command area for domestic and industrial uses are estimated as 56 Mm^3. The annual net revenue from the water supplies for domestic and industrial uses adopting the rates in vague, Bangalore is estimated as Rs.5670 lakhs.

(c) Power

Benefits from power **(**42.5 MU**)** at Rs.3.00 per unit works out to Rs.1275 lakh.

14.2.2 Indirect Benefits

The Krishna (Almatti) – Pennar link canal project when implemented will have a positive impact on the socio-economic conditions of the enroute area, which can be partly quantified and partly visualized in a broad perspective only. These could be listed as below:

1. The assured irrigation in the command area will create direct additional employment opportunity in agriculture sector, besides job opportunities during construction of the project.
2. Increased opportunities for agro based industries and other related cottage and small-scale industries.
3. General prosperity and upliftment of economic level of the people of the region.
4. Augmented supply of drinking water due to ground water recharge from the regeneration of irrigated water.
5. Communication system will improve because of canal roads and CD works raising marketing opportunities.
6. Industrial growth due to increase in infrastructure facilities.
7. Afforestation programme could be implemented on canal banks resulting in environmental improvement.
8. The formation of the reservoir will help tourism development, fish and aquaculture, bird sanctuaries, etc.
9. Increased civic amenities in the planned colonies for the resettled people.
10. The ecological condition of the area will improve.

14.3 Cost

While working out the cost of the scheme, cost of head work at Kalvapalli, the cost of canal power house, the cost of the link canal and the cost of command area development are considered as cost of this link. Accordingly, the total cost of the link is estimated as Rs.659980 lakh. The annual cost is computed at 10% of interest and 1% depreciation on the total estimated cost.

14.4 Benefit – Cost Ratio of the Project

Details for working out the benefit cost ratio are given below.

					Rs. in lakh.
I.	Estimated cost of project, cost of link canal and canal structures including command area development				659980
II.	Annual benefits				
1)	Irrigation Benefits				
	a) Post project				
	i) Gross value of produce		130710		
	ii) Cost of expenditure	(-)	42512		
	iii) Net value of produce		88198		88198
	b) Pre-project				
	i) Gross value of produce		11495		
	ii) Cost of expenditure	(-)	7312	(-)	
	iii) Net value of produce		4183		4183
	c) Loss in agricultural production in area coming under submergence and going out of cultivation in project area, distributory system etc. at the rate of 2% of gross value of produce after irrigation on Rs. 130710 lakh.			(-)	2614
	Net value of benefits				81401
2)	Revenue from domestic and industrial water supply				5670
2)	Benefit from power				1275
	Total (1 and 2)				88346
III.	Annual cost				

a)	Interest @ 10% of the project cost (including cost of land development)	65998
b)	Depreciation @ 1% of capital cost (excluding cost of land development)	6600
c)	Annual O&M charges @ 200/- per ha for 258334 ha	517
d)	Maintenance of head works @ 1% of its cost of Rs. 5243 lakhs	52
e)	Depreciation @ 8.33 % of capital cost of canal power house	232
	Total annual cost	73399

Benefit – Cost ratio = Net value of benefits / Annual cost
= 88346 / 73399
= 1.20

14.5 Internal Rate of Return (IRR)

Internal Rate of Return for the whole project has been computed considering distributional and employment effect which works out 14.26% and without considering distributional and employment effects, the internal rate of return works out to 9.51%.

14.6 Value of water

The total cost of the scheme works out to Rs.659980 lakh for a total diversion of 1980 Mm^3 of water. The cost per Mm^3 of water works out to Rs.333 lakh.