

Chapter – 13

Benefit-Cost ratio

13.1 General

The transferred Godavari waters will not only benefit the Krishna basin, but also accrue benefits to further south i.e., in Pennar, Cauvery, Vaigai basins. As such, it will be more appropriate to assess the overall benefits of the whole integrated net work, after the entire component of interlinking proposals under Peninsular rivers development of NPP i.e., Mahanadi – Godavari – Krishna – Pennar – Cauvery – Vaigai link is completed. The assessment of benefit – cost ratio for the singular link may not reflect the overall economics of the proposal.

However, since the water diverted through Polavaram – Vijayawada link will not directly go beyond Krishna 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 singular link has been estimated on the basis of benefits that accrue due to en route irrigation contemplated under the link.

13.2 Benefits

13.2.1 Direct Benefits

The expected value of produce with and without introduction of irrigation are worked out comprising the direct benefits from the project. The gross values of the benefits for the pre-project and post-project conditions are computed adopting the yields and prices of commodities collected from the Agricultural and Marketing Departments of the Government of Andhra Pradesh by the Polavaram project authorities and are incorporated in their project report. The net annual benefits by en route irrigation for the CCA of 139740 ha through Polavaram – Vijayawada link works out to Rs.20110 lakh. The net value of the benefits is computed after allowing for the loss in the area due to excavation of canal and distributaries, and land going out of cultivation in the project area etc.

13.2.2 Indirect Benefits

The Polavaram – Vijayawada link canal project when implemented will have a positive impact on the socio-economic conditions of the en route area, which can be partly quantified and partly visualised 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 infrastructural 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 aqua culture, bird sanctuaries etc.
9. Increased civic amenities in the planned colonies for the resettled people.

13.3 Cost

While working out the cost of the scheme, the cost of the link canal and the cost of command area development are considered as cost of this link. The total cost accordingly is estimated as Rs.148391 lakh based on 1994-95 schedule of rates. The annual cost is computed at 10% of interest and 1% depreciation on the total estimated cost.

13.4 B . C . Ratio

Working details of the benefit-cost ratio are given below:

Rs. in lakh

I. Estimated cost of project	
Cost of link canal, canal structures including command area development	148391
II. Annual benefits	
a) Post-project	
i) Gross value of produce	57170
ii) Cost of expenditure	18782
iii) Net value of produce	38388
b) Pre-project	
i) Gross value of produce	28086
ii) Cost of expenditure	12617
iii) Net value of produce	(-) 15469
Loss in agricultural production in land going out of cultivation due to distributary system @10% of gross value of produce before irrigation (based on the figures adopted by the A.P. State in the Polavaram project report)	(-) 2809
Net Value	20110
III. Annual cost	
a) Interest @ 10% of project cost	14839
b) Depreciation @ 1% of capital cost	1484
c) Annual O&M charges @ Rs.100 per ha for 139740 ha	139.74
Total	16462.74
IV. Benefit-cost ratio	20110/16462.74 = 1.22*

*The above B.C. ratio is derived considering the annual benefits exclusively from the en route irrigation through the link canal. The benefits to be accrued from the proposed diversion of 2265 Mm³ to the Krishna delta as proposed in the GWDT Award plus the additional diversion of 1236 Mm³ proposed by NWDA have not been considered. But the cost of the canal for transportation of the entire waters (including 2265 + 1236) has been considered. The benefits from the diverted quantities to Krishna delta through the link canal could be estimated and included only after the finalisation of economic analysis of Peninsular links component which is being separately attempted by NWDA.

13.5 Internal Rate of Return

The Internal Rate of Return for the whole project has been computed considering distributional and employment effect which works out to 8.63%. The details are given in Table 13.1.

Details of Project:

1. Life of the project after completion : 100 years
2. Construction period : 12 years
3. Cost of project : Rs.1484 crore
4. Annual benefits : Rs. 201 crore
5. Maintenance cost @ 1% of the cost of I - works : Rs. 13 crore

Table 13.1
Internal Rate of Return (IRR)
Cost /Benefit: Rs. in crore

Year(s)	Cost	Benefit	Net Benefit	Discounting factor		Present worth of the net benefits	
				(8%)	(10%)	(8%)	(10%)
0	34	-	- 34	1.000	1.000	- 34	- 34
1	66	-	- 66	0.926	0.909	- 61	- 60
2	125	-	-125	0.857	0.826	-107	-103
3	182	-	-182	0.794	0.751	-145	-137
4	173	-	-173	0.735	0.683	-127	-118
5	165	-	-165	0.681	0.621	-112	-102
6	147	-	-147	0.630	0.564	- 93	- 83
7	136	-	-136	0.583	0.513	- 79	- 70
8	130	-	-130	0.540	0.467	- 70	- 61
9	156	-	-156	0.500	0.424	- 78	- 66
10	113	39	- 74	0.463	0.386	- 34	- 29
11	57	101	44	0.429	0.350	19	15
12	13	201	188	5.355	3.505	1007	659
13	13	201	188				
14	13	201	188				
-				
-				
-				
(Continued up to 111 th year)							
111	13	201	188				

Total			86	- 189
Internal Rate of Return	$8 + \{ 2 \times (86/275) \} = 8.63\%$			