

Form- 29

Cost Benefit Analysis For Diversion of Protected Forest (PF) Land

Name of Project: Song Dam Drinking Water Project

Nature of Proposal: Diversion of 127.6712 ha. of Forest Land.

Number of District through which project Situated-02 No. i.e. Dehradun and Tehri Gadwaal

Total Forest Area Proposed For Diversion

Dehradun Forest Division – 62.6245 ha.

Mussoorie Forest Division - 65.0467 ha.

Purpose: The Cost Benefit Analysis is being undertaken as the proposed diversion of forest land being affected due to Dam and Allied Facilities Construction for above said project is >20 Ha.

Cost Benefit Analysis as per Guidelines for Forest Land Diversion-2017

Sr. No	Nature of Project	Applicable/Not Applicable	Remarks
1	All categories of proposal involving forest land upto 20 ha. In plains and upto 5 Ha. In hills	Not Applicable	These proposals may be considered on a case to case basis and value judgements.
2	Proposal for defense installation purpose and oil prospecting (prospecting only)	Not Applicable	In view of national priority accorded to these sector, the proposals would be critically assessed to help ascertain that the utmost minimum forest land is diverted for nonforest use.
3	Habitation, establishment of industrial units, tourist lodge complex and other building construction.	Not Applicable	These activities being detrimental to protection and conservation of proposal would be rarely entertained
4	All other proposals involving forest land more than 20 Ha. In plains and more than 5 Ha. In hills including roads, Transmission line, minor, medium and major irrigation projects, hydro projects, mining activity, railway line, location specific installations like	Applicable	These are cases where a costbenefit analysis is necessary to determine when diverting the forest land to non-forest use in the overall public interest
5	microwave stations, auto repair centres, TV towers etc.	Not Applicable	-

Since the proposal is for diversion of forest land measuring more than 20 Ha. In the Hilly area for Dam project, cost benefit analysis report is applicable.

Table-B: Estimate of Cost of Forest Diversion

Sr. No.	Parameters	Given Guideline	Evaluation
1	Ecosystem Services losses due to Proposed forest diversion	<p>Economic value of loss of ecosystem service due to diversion of forests shall be the net present value (NPV) of the forest land being diverted as prescribed by Central Government (MoEF&CC)</p> <p>Note: - in case of National Parks the NPV shall be ten (10) times the normal NPV and in case Wildlife Sanctuary the NPV shall be five (5) times the normal NPV or otherwise prescribed by the ministry or any other competent authority. Note:-1: Net Present Value(NPV) of environment and ecosystem service loss:- The concept of Net Present Value (NPV) of environment and ecosystem services loss:- The Concept of Net Present Value of the forest land diverted is a scientific method of calculating the environment cost and other losses caused due to diversion of forest land for non-forestry purposes, the NPV represents the net value of various ecosystem services and other environmental services in monetary terms which the forest would have provided if the forest would not have been diverted.</p>	<p>NPV value (as per of forest Conservation act 1980 is in between Rs. 5.8 and 9.2 lac per hectare. Accordingly, NPV value for proposed diverted land is calculated by DFO Offices = 654.70 Lac.</p>
2	Loss of animal husbandry, productivity including loss of fodder	<p>To be quantified and expressed in monetary terms of 10% of NPV applicable whichever is maximum.</p>	<p>Loss of Animal husbandry due to proposed diversion is very moderate and calculated as 10% of N.P.V. i.e 65.47</p> <p>Gross Loss @ 5 ton/Ha/year @ Rs. 100/- per tonne. Therefore, loss of fodder as estimated for about 127.6712 Ha. Will be 127.6712</p> <p>$127.6712 \times 100 = 12767.12$</p>

			years=Rs. 3191780/- (31.92 Lac) So considered amount (maximum one) is Rs. 65.47 Lac
3	Cost of human resettlement	To be quantified and expressed in monetary terms on actual terms as per approved R&R plan.	10000 Lac. Approx. (R&R Policy drafting in progress so approx, cost is considered)
4	Loss of public facilities and administrative infrastructure(roads, buildings, schools, dispensaries, electric lines, railways etc) on forest land or which would require forest land if these facilities were diverted due to: the Project	To be quantified and expressed in monetary terms on actual cost basis of the time of diversion.	Utility Shifting and Relocation Cost as per details of R&R. 32200 Lac.
5	Possession value of forest land	30% of environmental cost (NPV) due to loss of forest or circle rate of adjoining area in the district should be added as a cost component as possession value of forestland whichever is maximum. Note 2: Possession value of forest land diverted:- The forest land diverted for the project such as irrigation, hydropower, railways, roads, wind and transmission lines and mining etc are unlikely to be returned and remains in the possession of the user agencies, Therefore 30% of the net present value (NPV) of forest land diverted or market rate of adjoining area in the district should be added as a cost component as "possession value of forest land" in addition to the environmental cost due to loss of forests	Possession value of forest land will be (considering 30% of NPV) = $0.3 \times 65470116 = 196.42$ Lac. Approx.rate in Dehradun and Tehri Gadwaal Dist. 36.6 lac/Ha. So possession value of forest land (as per average circle rate) = $127.6712 \text{ Ha.} \times 34.5 \text{ Lac} = 4678.38$ Lac. So considered amount (Maximum one) is Rs. 4678.38 Lac.
6	Cost of Suffering to ousters	The social cost of rehabilitation of oustes (in addition to the cost likely to be incurred in providing residence, occupation and social services as per R&R plan) be worked out as 1.5 times of what oustes should have earned in two years had	275 Families is estimated to be shifted considering 10,000 income of each family for a month so losses for 2 year will be as. $275 \times 12 \times 2 \times 1.5 \times 10,000 = 990$ Lac.

		he not shifted.	
7	Habitat Fragmentation Cost	While the relationship between fragmentation and forest goods and services is complex, for the sake of simplicity the cost due to fragmentation has been pegged at 50% of NPV applicable as a thumb rule.	Habitat fragmentation cost is 50% of NPV that is Rs. $65470116 \times 50\% = 327.35$ Lac.
8	Compensatory afforestation and soil & moisture conservation cost	The actual cost of compensatory afforestation and soil & moisture conservation and its maintenance in future at present discounted value.	As per DFO Office, CA cost estimated Rs. 665.13 Lac./- for 127.6712 Ha. Forest land to be diverted.

Table-C:- Existing guideline for estimating benefit of forest diversion in Cost Benefit Analysis (CBA)

Sr. No.	Parameters	Given Guideline	Evaluation
1	Increase in productivity attributable to the specific project	To be quantified & expressed in monetary terms avoiding double counting.	1- Availability of Drinking Water 2- Connectivity of Surrounding Villages 3- Development of Tourist Place 4- Improvement in Basic Infrastructure
2	Benefits to economy due to specific project	The Incremental economic benefit in monetary terms due to the activities attributed to the specific project.	Market development – taking 20 shops are established after construction of Dam taking minimum benefit per shop per day Rs. 250.00/- For 20 shops per year :- $=250 \times 30 \times 20 \times 12 = \text{Rs. } 1800000.00$ or 18.00 lac. Benefit for 50 year :- $=18.00 \times 50 = \text{900.00 lac.}$
3	No. of population benefited due to specific project	As per detailed project report.	1900000
4	Economic benefit due to direct and indirect Employment Potential	As per detailed project report.	Employment generation due to other activities like take 20 people get per month @ Rs. 8500 per month Benefit of 50 year: $20 \times 8500 \times 12 \times 50 = \text{Rs. } 102000000.00$ or 1020.00 lac.
5	Economic benefit due to compensatory afforestation	Benefit from such compensatory afforestation accruing over next 50 years monetised and discounted to the present value should be included as benefit of CA the guideline of the Ministry for NPV estimation may be consulted.	Ecological Gain from Song Dam (For Subtropical Pine/Broadleaved Hill Forests Total Economic Value for VDF – Rs. 191515/Ha/Yr So Economic Value for 50 Yr – $50 \times 191515 = 9575750$ Say 95.76 Lakh/Ha) So Total Economic Value for 50 Yr $256 \times 95.76 = \text{24514.56 Lac.}$ for 50 year. (Note- Economic Value taken from Revision of rates of NPV applicable for different class/category of forests centre for ecological services management (CESM), Indian Institute of Forest Management (IIFM), Bhopal In Collaboration with Forest survey of India (FSI), Dehradun)
		Total	26434.56 lacs.

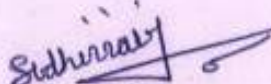
Summary of Cost-Benefit Analysis for the project.

Sr. No	Loss in Lac	Benefit in Lac
1	Ecosystem Services losses = Rs. 654.70 Lac.	Ecological Gain = 24514.56 Lac.
2	Loss of animal husbandry, productivity including loss of fodder = Rs. 65.40 Lac.	Benefits to economy due to specific project = 900.00 Lac.
3	Loss of Human Resettlement = 10000 Lac.	Economy benefit due to direct and indirect employment = 1020.00 Lac.
3	Loss of public facility = Rs. 322 Lac.	-
4	Possession value of forest land diverted = Rs. 4678.38 Lac.	-
5	Habitat Fragmentation Cost = Rs. 327.35 Lac.	-
6	Compensatory afforestation and soil & moisture conservation cost= Rs. 665.13 Lac.	-
	Total Cost/Loss = 654.70 Lac + 65.40 + 10000 Lac + 322 Lac + 4678.38 Lac + 990 Lac + 327.35 Lac + 665.13 Lac = 17702.96 Lac	Total gain/benefit from project = Rs. 24514.56 Lac. + 900 Lac + 1020 Lac = 26434.56 Lac.

Benefit Cost Ratio = Total Benefit/Total Cost = 26434.56/17702.96= 1.49 which is >1, so project is found valuable based on given/above described criteria.



अपर सहायक अभियन्ता
अवस्थापना पुनर्वास खण्ड,
ऋषिकेश



सहायक अभियन्ता
अवस्थापना पुनर्वास खण्ड,
ऋषिकेश



अधिसारी अभियन्ता
अवस्थापना पुनर्वास खण्ड,
(वस्थापना पुनर्वास) खण्ड
ऋषिकेश



रूप प्रभागीय वनाधिकारी
ऋषिकेश
देहरादून वन प्रभाग, देहरादून



प्रभागीय वनाधिकारी
देहरादून वन प्रभाग,
देहरादून