

**COST BENEFIT ANALYSIS FOR DIVERSION OF FOREST LAND**

**Name of Proposal-**“ Up-gradation & 4-laning of Bhaniyawala - Rishikesh Road (Spur) of NH-7 from km 0.000 to km 20.600 in the State of Uttarakhand.”

**Nature of Proposal:** Diversion of 19.8345 Ha. of Reserve Forest Land of Shivalik Forest Division under FCA, 1980 for Up-gradation & 4-laning of Bhaniyawala - Rishikesh Road (Spur) of NH-7 from km 0.000 to km 20.600 Section.

**Total Length of the Project road in/along forest area** = 9.170 km

**Total No. of District through which proposed project road alignment traverse** – 01, Dehradun

**Total forest area (RF) proposed for diversion** = 19.8345 Ha.

**Purpose:** The Cost Benefit Analysis is being undertaken for proposed diversion of Forest Land for development of 4-lane Greenfield road for above said project.

**Cost Benefit Analysis as per MoEF&CC Guideline for Forest Land Diversion – August 2017**

**Table -A: Cases under Which a Cost- benefit analysis for forest diversion are required**

Sl.No.	Nature of Proposal	Applicable / not applicable	Remarks
1	All categories of proposal involving forest land upto 20 hectares in plains and upto 5 hectare in hills	Not applicable	These proposals may be considered on a case to case basis and value judgement.
2	Proposal for defence installation purpose and oil prospecting (prospecting only)	Not applicable	In view of national priority accorded to these sectors, the proposals would be critically assessed to help ascertain that the utmost minimum forest land is diverted for non-forest 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 proposals would be rarely entertained.



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4	All other proposal involving forestland more than 20 hectare in plains and more than 5 hectares in hills including roads, transmission lines, minor, medium and major irrigation projects, hydro projects, mining activity, railway line, location specific installations like micro-wave stations, auto repeater centres, TV towers etc.	Applicable	These are cases where a cost benefit analysis is necessary to determine when diverting the forest land to non-forest use in the overall public interest.
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Since the proposal is for diversion of forest area measuring more than 20 hectare in plains area and more than 5 hectare in hills for road project, cost benefit analysis report is applicable.


**Table -B : Estimation of cost of forest diversion**


SL	Parameters	Given Guideline	Evaluation
1	Ecosystem services losses due to proposed forest diversion	<p>Economic value of loss of eco-system services due to diversion of forests shall be the net present value (NPV) of the forest land being diverted as prescribed by Central Government (MoEF&amp; CC).</p> <p><b>Note:</b> 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.</p> <p><b>Note-1:</b> 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 environmental cost and other losses caused</p>	<p>Forest land Proposed for diversion is falls under the Eco-Class I (Dense Forest). Since the reserve forest land is of Eco class-III (Tropical Dry Deciduous) Forests having density 0.8 (Dense Forest), therefore Per hectare NPV Rate as per MoEF&amp; CC circular No. 5-3/2011-FC (Vol-I) dated 6<sup>th</sup> January 2022 is considered Rs. 15, 95, 790/- Per ha.</p> <p>So NPV for 19.8345 hectare forest land will be = Rs. 15,95,790 x 19.8345 hectare = <b>Rs. 3,16,51,697 or Rs. 316.52 lakhs.</b></p>



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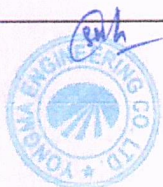
SL	Parameters	Given Guideline	Evaluation
		due to diversion of forest land for non-forestry purposes. The NPV represents the net value of various ecosystem services and other environmental services in monetary terms which the forest would have provided if the forest would not have been diverted.	
2	Loss of animal husbandry productivity, including loss of fodder.	To be quantified and expressed in monetary terms or 10% of NPV applicable whichever is maximum.	Loss of animal husbandry due to proposed diversion is very moderate and calculated below; Gross loss @ 5 ton/Ha./year, @ Rs. 100/- per ton. Therefore, loss of fodder as estimated for 19.8345 hectare will be $19.8345 \times 5 \times 100 = \text{Rs. } 9917.25/\text{yr.} \times 50 \text{ years} = \text{Rs. } 4,95,863/-$ or Rs.4.96 lakhs. Further considering 10% of NPV it will be = Rs. 316.52 lakh (NPV) $\times 0.1 = \text{Rs. } 31.65$ lakh So considered amount (maximum one) is <b>Rs. 31.65 lakh.</b>
3	Cost of human resettlement	To be quantified and expressed in monetary terms on actual terms as per approved R&R plan.	Nil. as no human resettlement is required.
4	Loss of public facilities and administrative infrastructure (Roads, building, schools, dispensaries, electric lines, railway, etc.) on forest land, 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 at the time of diversion	No loss of public infrastructure like Roads, hospital etc. are investigated. However, there will be some utility shifting like, electricity pole, telephone line, OFC cable etc. from proposed ROW located in forest land.  The likely cost of these utility shifting is estimated <b>Rs. 50 lakhs</b>
5	Possession value of forest land diverted 	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	Possession Value of forest land will be (considering 30% of NPV) = $0.3 \times \text{Rs. } 316.52 = \text{Rs. } 94.95$ lakh. Average per hectare land rate along the project highway in district Dehradun is <b>Rs. 600 lakh</b> per hectare of non-commercial area (as per Circle rate 2020). It is to be noted that along the project road section there is agricultural land.

SL	Parameters	Given Guideline	Evaluation
		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 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.	So, possession value of forest land (as per average circle rate) = 19.8345 hectare x 600 lakh = 111900.70 lakh So considered amount (maximum one) is <b>Rs. 11900.70 lakh.</b>
6	Cost of suffering to oustees	The social cost of rehabilitation of oustees (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 oustees should have earned in two years had he not been shifted.	Nil, no resettlement & Rehabilitation is identified or required in forest land which is proposed to be diverted. Also, the community residing along the project road is not dependent on forest or forest produce. There will not be any losses on this account as diversion of the forest land to this project will not affect any house or structure in protected/reserved forest area.
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. 316.52 x 0.5 = <b>Rs. 158.26 lakh.</b>
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	CA cost per hectare is considered Rs. 4.07 lakh per hectare for estimation purpose. It may be updated as per actual CA estimate prepared and provided by Forest Department. So, CA cost = 19.8345 hectare x 2 x Rs. 4.07 lakh = <b>Rs. 161.45 lakh.</b>




**Table – C- Existing guideline for estimating benefit of forest diversion in CBA**

SL	Parameter	Given Guideline	Evaluation
1	Increase in productively attribute to the specific project	To be quantified & expressed in monetary terms avoiding double counting	<p>The proposed project for which diversion of forest land is sought is for widening of Existing Road. The project road will improve accessibility to the region. This will help in both economic&amp; social development in the region.</p> <p>The project will enable smooth accessibility in the region by which people of the region will be directly benefited. This will accelerate industrialization/commercialization in region and the same will directly generate maximum employment opportunities in these areas and boosting up the economy of the region and state.</p> <p>Again, directly the project will have the potential for temporary employment generation for 200 local people for 2 years generating 124800 mandays during construction period. (26 Man-days in month x 24 month x 200 worker = <b>124800 Mandays</b>.)</p> <p>Due to up-gradation of the existing highway, there will be overall development of the project area including capital city Dehradun in terms of transportation of agriculture produces, easy access to education, health, market etc.</p> <p>Project road is to be developed as 4-lane road to provide smooth, reduced time, connectivity to State capital and other adjoining places.</p>
2	Benefits to economy due to specific project	The incremental economic benefits in monetary terms due to the activities attributed to the specific project	<p>Economic benefit in terms of increase in trade, tourism, saving in vehicular operation and maintenance cost, better connectivity, safer journey to commuter and saving of travel time.</p> <p>Improved road connectivity helps in better implementation and management of government schemes. It will provide fast and economical transport of goods.</p>



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SL	Parameter	Given Guideline	Evaluation
			<p>After completion, the local people and industries situated in the area will be greatly benefited. The widening of project road will provide safe, fast, economical and environment friendly transportation to the State which in term will accelerate the rate of growth in this area.</p> <p>After completion of the Bhaniyawala - Rishikesh Section, User agency will impose the Toll on the said stretch and benefits to economy due to specific project has been quantified as follows.</p> <p>Road length (Km) = 17.20  Structure (Km) = 3.4 x 10 times  = 34.00 km  Total Project length = 51.20 Km  Toll Collection according to existing Toll Plaza at Lachhiwala = 103 Lakhs per year  Road has been designed for 15 years therefore total toll collection will be :  15x103x51.20 = <b>79104 Lakhs</b></p> <p>In addition to that there are several other benefits that may accrue due to saving in fuel, reduction in carbon emission and man animal conflict.</p>
3	No of population benefited due to specific project	As per the Detailed project report	<p>The proposed road section in Uttarakhand for Up-gradation &amp; 4-laning of Bhaniyawala - Rishikesh Road (Spur) of NH-7 from km 0.000 to km 20.600 in Section in the State of Uttarakhand district Dehradun.</p> <p>While overall the populations of Uttarakhand State (100.86 Lakhs) will benefit from the project. Specifically, the projected population of district, Dehradun (16.98 Lakhs) through which the alignment passes will benefit largely in addition to lakhs of neighbour district commuters as well as long distance travellers and fright. (Source: Census 2011).</p>
4	Economic benefits due to of direct and indirect employment due to the project.	<p>As per the detailed project report.</p> 	<p>Direct employment to 200 people for 2-year during construction period (accordingly 26 Man-days in month x 24-month x 200 worker = 124800 Mandays) and substantial indirect employment as a result of development of infrastructure, and tourism industries will also provide</p>



SL	Parameter	Given Guideline	Evaluation
			direct benefit to small scale industrial units in the area.
5	Economic benefit due to Compensatory afforestation	<p>Benefit from such compensatory afforestation accruing over next 50 years monetised and discounted to the present value should be included as benefits of Compensatory afforestation.</p> <p>*for benefit of CA the guideline of the Ministry for NPV estimation may be consulted.</p>	<p>In lieu of total trees to be removed from Proposed PROW in Reserve/protected forest land along the project road, it is proposed to undertake at compensatory plantation of least twice of the affected/diverted forest area as per Forest (Conservation) Act. So, the net productivity will increase.</p> <p>The compensatory afforestation will be taken up in about <math>19.8345 \times 2 = 39.6690</math> hectare of Degraded Forest land which is at least two times of the area proposed to be diverted.</p> <p>The compensatory afforestation will be done on 39.6690 hectare of degraded forest land, which is down the line would be having a density of minimum 0.7. The ecological value for a 50 years period for the density of 1.0 is INR 126.74 lakhs per hectare (As per Forest Conservation Act 1980). By considering minimum 0.7 density the ecological gain for this project would be <b>Rs. 3519.35 lakh.</b></p>

#### Summary of Cost Benefit Analysis for the Project.

Sl. No.	Total cost / Loss (in Lakhs)	Benefit (in Lakhs)
1	Ecosystem services losses Rs. <b>316.52 Lakhs</b>	Ecological gain from compensatory afforestation on 39.6690 (at least) hectare on degraded land would be <b>Rs. 3519.35 lakh</b>
2	Loss of animal husbandry productivity, including loss of fodder = <b>Rs. 31.65 Lakhs</b>	<p>Approx. 124800 Man days will be generated for unskilled/semi skilled worker in terms of Salary and wages @ Rs. 500/day (average) = <b>Rs. 624.00 lakh</b></p> <p>(# Minimum wages in Uttarakhand is Rs. 10520/month (or Rs. 350/day, but for considering actual practical wages including lodging the average cost per day for semiskilled/labourer is approx. Rs. 500 per day.)</p> <p>Basic living amenities including alternative fuel (LPG, Solar Cooker etc) will be supplied to labours/workers.</p> <p>Construction period – 2 years</p>

		Number of labours at peak time – 200 Approx. 20 % labour assume to be local Per head cost of fuel - Rs. 20/ per day for rest 160 labours Total cost = Rs. 20x160 labours x 730 days = Rs. 23,36,000/- or Rs. <b>23.36 lakhs</b>
3	Loss of public facilities = <b>50 lakhs</b>	After completion of the Bhaniyawala - Rishikesh Road Project User agency will impose the Toll on the Said stretch and benefits to economy due to specific project has been quantified as follows. Road length (Km) = 17.20 Structure (Km) = 3.4 x 10 times = 34.00 km Total Project length = 51.20 Km Toll Collection according to existing Toll Plaza at Lachhiwala = 103 Lakhs per year Road has been designed for 15 years therefore total toll collection will be : 15x103x51.20 = <b>79104 Lakhs</b>
4	Possession Value of Forest land diverted = <b>11900.70 lakh</b>	
5	Habitat fragmentation cost = <b>158.25 lakh</b>	
6	Compensatory afforestation and soil & moisture conservation cost = <b>161.45 lakhs</b>	
	<b>Total Cost/Loss = Rs. 316.52 Lakhs + Rs. 31.65 Lakhs + Rs. 50 Lakhs + Rs. 11900.70 Lakhs + Rs. 158.25 Lakhs + 161.45 Lakhs = 12618.57 Lakhs</b>	<b>Total gain/benefit from project = Rs. 3519.35 Lakhs + Rs. 624.00 Lakhs + Rs. 23.36 Lakhs + 79104 = 83270.71 Lakhs.</b>

**Cost Benefit Ratio** = Total Benefit/Total Cost = 83270.71 / 12618.57 = 6.59

**The Benefit Cost ratio is >1 therefore the project is found viable based on given/above described criteria.**

**Date:** 01.04.2024

**Place:** Dehradun



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