COST BENEFIT ANALYSIS FOR DIVERSION OF FOREST LAND

Name of Proposal-"UP-gradation and 4-lanning of Paonta Saheb-Ballupur (Dehradun) Section of NH-72 (Km 104.000 to Km 149.000) in the State of Uttarakhand."

Nature of Proposal: Diversion of 24.1884 Ha. of Reserve Forest Land of Shivalik Forest Division under FCA, 1980 for UP-gradation and 4-lanning of Paonta Saheb-Ballupur (Dehradun) Section.

Total Length of the Project road in/along forest area = 9.568 km

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

Total forest area (RF) proposed for diversion = 24.1884 Ha.

Purpose: The Cost Benefit Analysis is being undertaken for proposed diversion of Forest Land for widening (4-laning) of existing 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.

Sl.No.	Nature of Proposal	Applicable / not applicable	Remarks
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 costbenefit analysis is necessary to determine when diverting the forest land to non-forest use in the overall public interest.

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	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& CC). **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 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 due to diversion of forest land for non-forestry	Forest land Proposed for diversion is falls under the Eco-Class III (Dense Forest). Since the reserve forest land is of Eco class-III (Tropical Dry Deciduous) Forests having density 0.6 (Dense Forest), therefore Per hectare NPV Rate as per MoEF& CC circular No. 5-3/2011-FC (Vol-I) dated 6th January 2022 is considered Rs. 12, 28, 590/- Per ha. So NPV for 24.1884 hectare forest land will be = Rs. 12,28,590 x 24.1884 hectare = **Rs. 2,97,17,626 or Rs. 297.18 lakhs.**

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SL	Parameters	Given Guideline	Evaluation
		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 24.1884 hectarewill be 24.1884 x 5 x 100 = Rs.12094.2/yr. x 50 years = Rs. 6,04,710/- or Rs.6.04lakhs. Further considering 10% of NPV it will be = Rs. 297.18 lakh (NPV) x0.1 = Rs.29.72 lakh So considered amount (maximum one) is **Rs. 29.72 lakh.**
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 **Rs. 232.22 lakhs**
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	Possession Value of forest land will be (considering 30% of NPV) = 0.3 x Rs. 297.18 = **Rs.89.15 lakh.** Average per hectare land rate along the project highway in district Dehradun is **Rs. 180 lakh** per hectare of non-commercial area (as per Circle rate 2020).It is to be noted that along the project road

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SL	Parameters	Given Guideline	Evaluation
		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 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 additiion to the environmental cost due to loss of forests.	section there is agricultural land. So, possession value of forest land (as per average circle rate) = 24.1884 hectare x 180lakh = 4353.91 lakh So considered amount (maximum one) is **Rs. 4353.91lakh.**
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. 297.18 x 0.5 = **Rs.148.59 lakh.**
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. 3.71 lakh per hectare for estimation purpose. It may be updated as per actual CA estimate prepared and provided by Forest Department. So, CA cost = 24.1884 hectare x 2 x Rs. 3.71 lakh =**Rs.179.48 lakh.**

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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	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& social development in the region. 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. Again, directly the project will have the potential for temporary employment generation for 300 local people for 2 years generating 187200 mandays during construction period. (26 Man-days in month x 24 month x 300 worker = **187200 Mandays**.) 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. Project road is to be developed as 4-lane road to provide smooth, reduced time, connectivity to State capital and other adjoining places.
2	Benefits to economy due to specific project	The incremental economic benefits in monetary terms due to the activities attributed to the specific project	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. Improved road connectivity helps in better implementation and management of government schemes. It will provide fast and economical transport of goods. After completion, the local people and industries situated in the area will be

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SL	Parameter	Given Guideline	Evaluation
			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. 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. However, they have not been quantified, as it will be a function of various govt. policy variables. Exact quantification of the value is not possible as it is time and policy dependent.
3	No of population benefited due to specific project	As per the Detailed project report	The proposed road section in Uttarakhand which is part of NH-72, traverses in district Dehradun. 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)
4	Economic benefits due to of direct and indirect employment due to the project.	As per the detailed project report.	Direct employment to 300 people for 2-year during construction period (accordingly 26 Man-days in month x 24-month x 300 worker = 187200 Mandays) and substantial indirect employment as a result of development of infrastructure, and tourism industries will also provide direct benefit to small scale industrial units in the area.

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SL	Parameter	Given Guideline	Evaluation
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 benefits of Compensatory afforestation. *for benefit of CA the guideline of the Ministry for NPV estimation may be consulted.	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. The compensatory afforestation will be taken up in about 24.1884 x 2 = 48.3768 hectare of Degraded Forest land which is at least two times of the area proposed to be diverted. The compensatory afforestation will be done on 48.3768 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 **Rs.4291.89 lakh.**

Summary of Cost Benefit Analysis for the Project.

Sl. No.	Total cost / Loss (in Lakhs)	Benefit (in Lakhs)
1	Ecosystem services losses Rs. **297.18 Lakhs**	Ecological gain from compensatory afforestation on 48.3768 (atleast) hectare on degaraded land would be **Rs. 4291.89 lakh**
2	Loss of animal husbandry productivity, including loss of fodder = **Rs. 29.72 Lakhs**	Approx. 187200 Man days will be generated for unskilled/semi skilled worker in terms of Salary and wages @ Rs. 500/day (average) = Rs. **936.00 lakh** (# 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.) Basic living amenities including alternative fuel (LPG, Solar Cooker etc) will be supplied to labours/workers. Construction period – 2 years Number of labours at peak time – 300 Approx. 20 % labour assume to be local Per head cost of fuel - Rs. 20/ per day for

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		rest 240 labours Total cost = Rs. 20x240 labours x 730 days = Rs. 35,04,000/- or Rs. **35.04** lakhs
3	Loss of public facilities **= 232.22 lakhs**	
4	Possession Value of Forest land diverted = **4353.91**Lakhs	
5	Habitat fragmentation cost = **148.59 laksh**	
6	Compensatory afforestation and soil & moisture conservation cost = **179.48 lakhs**	
	Total Cost/Loss = Rs. 297.18 Lakhs + Rs. 29.72 Lakhs + Rs. 232.22 Lakhs + Rs. 4353.91 Lakhs + Rs. 148.59 Lakhs + 179.48 Lakhs = 5241.10 Lakhs	**Total gain/benefit from project = Rs. 4291.89Lakhs + Rs. 936.00Lakhs + Rs. 35.04Lakhs = 5262.93 Lakhs.**

Cost Benefit Ratio = Total benefit /Total cost = 5262.93/5241.10 = 1.0042 which is >1, so project is found viable based on given/above described criteria.

Date: 25.02.2022

Place: Dehradun

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