

COST BENEFIT ANALYSIS FOR DIVERSION OF FOREST LAND

Name of Proposal: - "Development of Economic Corridors, Inter-corridors, feeder routes and Coastal Road to improve the efficiency of freight movement in India (Lot-3/Odisha & Jharkhand/Package-2) Raipur-Vishakhapatnam (Ch. 0.000 - Ch. 124.661 km) (Length 124.661 km) in the State of Chhattisgarh under Bharatmala Pariyojana. (Forest Proposal is for between km 42+844 to Km 124.661)."

Nature of Proposal: Diversion of 228.0425 hectare of Reserve Forest Area under FCA, 1980 for the purpose of Construction of greenfield alignment.

Total Length of Project road- = 124.661km

Total No. of District through which proposed project road alignment traverse – 3 (Raipur, Dhamtari, Kanker, Kondagaon)

Total Forest area proposed for diversion

(a) Under Dhamtari forest division (RF land) – 147.6694 Ha.

(b) Under kanker forest division (OA/RF land)- 39.0869 Ha.

(c) Under Keshkal forest division (OA/RF land- 41.2862 Ha.

(d) Under Raipur Forest Division- NIL

(OA= Orange Area; RF= Reserve Forest)

Total Required Forest Land = 228.0425 Ha.

Purpose: The Cost of Benefit Analysis is being undertaken for proposed Diversion of Forest land for construction (six laning) greenfield alignment, elevated road, and tunnel for above said project.

Cost Benefit Analysis as per Guideline for Forest Land Diversion- August 2017

Table -A: Cases Under Which a Cost- benefit analysis for forest diversion is required

SL	Nature of Proposal	Applicable / not applicable	Remarks
1	All categories of proposal involving forest land up to 20 hectares in plains and up to 5 hectares in hills	<u>Applicable</u>	These proposals may be considered on a case-to-case basis and value judgement.
2	Proposal for defense 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.
4	All other proposal involving forestland more than 20 hectare in plains and more than 5 hectares in hills including	<u>Applicable</u>	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.

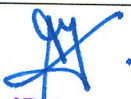

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roads, transmission lines, minor, medium and major irrigation projects, hydro projects, mining activity, railway line, location specific installations like micro-wave stations, auto repeater centers, TV towers etc.		
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Since the proposal is for diversion of forest land measuring more than 20 hectare in partly plane and partly in hilly area 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 ecosystem 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).</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.</p> <p>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 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 Handbook/Guideline dated 18/03/2019) of Forest land is in between Rs 6,99,000 to Rs 10,43,000 per hectare.</p> <p>Most part of project road project road pass through Reserve Forest Area (Eco class-II (Tropical Dry Deciduous Forest, Dense Forest) and per hectare NPV rate is considered Rs 9,39,000 (as per Forest Handbook Guideline 18/03/2019)</p> <p>So NPV for 228.0425 hectare will be</p> <p>228.0425 Hect. X Rs 9,39,000 = Rs 214131907.5</p> <p>Total NPV= 2141.31 lakh</p>
2	Loss of animal husbandry productivity, including loss of	To be quantified and expressed in monetary terms or 10% of NPV applicable whichever is maximum.	<p>Loss of animal husbandry due to proposed diversion is moderate and calculated below;</p> <p>Gross loss @ 5 ton/Ha. / year. @</p>


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	fodder.		<p>Rs. 100/- per ton. Therefore, loss of fodder as estimated for about 228.0425 hect. will be $228.0425 \times 5 \times 100 = \text{Rs } 1,14,021.25\text{yr.} \times 50 \text{ years} = \text{Rs. } 57,01,062.5/- \text{ or } 57.01 \text{ lakh}$</p> <p>Further considering 10% of NPV it will be = Rs 2141.31 lakh (NPV) $\times 0.1 = 214.13 \text{ lakh}$</p> <p>So considered amount (maximum one) is Rs 214.13 lakh.</p>
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 in forest land.
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	<p>No loss of public infrastructure like Roads, hospital etc are investigated. However, at few locations there will be some utility shifting like, electricity pole, telephone line, OFC cable etc, from Proposed RoW located in forest land.</p> <p>The likely cost of these utility shifting is estimated Rs 500 lakhs. (5.0 crore)</p>
5	Possession value of forest land diverted	<p>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.</p> <p>Note2:- 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 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</p>	<p>Possession Value of forest land will be (considering 30% of NPV) $= 0.3 \times 2141.31 \text{ lakh} = 642.39 \text{ lakh}$</p> <p>For the purpose of estimation average per hectare average of the rate of all these three districts has been taken which are follows</p> <p>In district Dhamtari per hectare rate of nearby area (project road) non-forest land is Rs 870800 to Rs 825300, Average rate = Rs 848050</p> <p>In district Kanker per hectare of nearby area (project road) is Rs 126608 to 642856, Average rate = Rs 384732.</p> <p>In district Kondagaon per hectare average rate of nearby area (project road) is Rs 113500 to Rs 683500, average rate = Rs 398500.</p>


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		to the environmental cost due to loss of forests.	<p>Average of the average rate of non-forest land in nearby area (project road) = $\frac{848050+384732+398500}{3}$</p> <p>= Rs 5,43,760.66 or Rs 5.43 Lakh /per hectare</p> <p>So, possession value of forest land (as per average circle rate) = $228.0425 \times 5.43 \text{ lakh} = 1238.27 \text{ lakh}$</p> <p>So considered amount (maximum one) is Rs 1238.27 lakh.</p>
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.	<p>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.</p> <p>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/reserve forest area.</p>
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 2141.31 lakh x 0.5= 1070.65 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.	<p>Keeping in view of similar calculation in neighboring district (i.e Bilaspur) of Chhattisgarh, the CA cost per hectare is considered Rs 726270.00 per hectare for estimation purpose. It will be further updated once concerned DFO office will provide actual CA estimate.</p> <p>So, CA cost $228.0425 \text{ hect.} \times 2 \times \text{Rs } 726270.00 = \text{Rs } 33,12,40,852.95 \text{ OR Rs } 3312.40 \text{ Lakh}$</p>

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

SL	Parameter	Given Guideline	Evaluation
1	Increase in productively	To be quantified & expressed in	The proposed project for which diversion of forest land is sought is for widening of Existing Road. The


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	attribute to the specific project	monetary avoiding counting	terms double	<p>project road will improve accessibility to the region. This will help in both economic & 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. Again, directly the project will have the potential for temporary employment generation for local people approx. 1500 for 2 years generating 9,36,000 mandays during construction period.</p> <p>Also there will be Toll and other road maintenance staff during operation and atleast 100 permanent staff for toll period (approx. 25 years) will be engaged.</p> <p>Due to construction of this highway, there will be overall development of the project area in terms of transportation of agriculture produces, easy access to education, health marked etc.</p> <p>Project road is to be developed as 6 lane road to provide smooth and reduced time connectivity between Visakhapatnam and Raipur.</p>
2	Benefits to economy due to specific project	The incremental economic benefit 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. 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>"In addition to that there are several other benefits that may accrue due to saving in fuel, reduction in time to commute, vehicle maintenance, reduction in carbon emission and man animal conflict and animal kill in road accident etc. 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.</p>


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3	No. of population benefited due to specific project	As per Detailed project report	<p>The proposed road section which is a Greenfield alignment, traverses through four districts Raipur, Dhamtari, Kanker and Kondagaon.</p> <p>The population of these districts are; Raipur- 40.6 lakhs, Dhamtari – 8.0 lakh , Kanker- 7.48 lakh and Kondagaon – 5.78 lakh persons which are directly benefited in addition to lakhs of neighbour district commuters as well as long distance travellers and fright.</p>
4	Economic benefits due to of direct and indirect employment due to the project.	As per detailed project report.	<p>Direct employment to approx. 1500 for 2-year during construction period (accordingly 26 days x 24-month x 1500 labors= 9,36,000 Man days) people and substantial indirect employment as a result of development of infrastructure and will also provide direct benefit to small scale industrial units in the area.</p>
5	Economic benefit due to Compensatory afforestation	<p>Benefit from such compensatory forestation 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 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 228.0425 Hect. x 2= 456.085 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 456.085 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 lacs per hectare (As per Forest Conservation Act 1980). By considering minimum 0.7 density the ecological gain for this project would be INR 40462.94 lakh.</p>

Summary of Cost-Benefit Analysis for the Project.

Sl. No	Loss (in Lakhs)	Benefit (in Lakhs)
1	Ecosystem services losses Rs 2141.31 Lakh.	Ecological gain from compensatory afforestation on 456.085 (atleast) hectare on degraded land would be Rs 40462.94 lakh
2	Loss of animal husbandry productivity, including loss of fodder= Rs 214.13 lakh	<p>9,36,000 Man days will be generated for unskilled/semi-skilled worker in terms of Salary and Wages @ Rs 500/day[#] (average) = Rs 4680.00 lakh</p> <p>{# Minimum wages in Chhattisgarh is Rs 344.62 (in Zone C) to 364.62 (in Zone A) for unskilled labour, but for considering actual practical wages including lodging the average cost per day for semiskilled / labourer is approx. Rs 500 per day.}</p>


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Sl. No	Loss (in Lakhs)	Benefit (in Lakhs)
		<p>Also there will be Toll / patrol and other road maintenance staff during operation and atleast 100 permanent staff for toll period (approx. 25 years) will be engaged.</p> <p>Considering average salary Rs 25000 per month, total benefit will be Rs 25000 x 100x 300 Month= 7500.00 lakh</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> <p>Number of labours at peak time – 1500</p> <p>Approx. 20% labour assume to be local</p> <p>Per head cost of fuel –Rs.20/ per day for rest 1200 labours</p> <p>Total cost= Rs 20x1200 labours x 730 days= Rs 1,75,20,000 /- or Rs 175.2 lakhs</p>
3	Loss of public facilities = 500 lakh	--
4	Possession Value of Forest land diverted=1238.27 lakh.	--
5	Habitat fragmentation cost = 1070.65 lakh.	--
6	Compensatory afforestation and soil & moisture conservation cost= 3312.40 lakh	--
	Total cost/Loss = Rs 2141.31 + 214.13 lakh +Rs 500 lakh+ 1238.27 lakh+ Rs 1070.65 lakh + 3312.40 lakh = lakh	Total gain/ benefit from project= Rs 40462.94 lakh + Rs 4680.00 lakh +7500.00 lakh+ Rs 175.2 lakhs. = 52818.14 lakh

Cost Benefit Ratio = Total Benefit/ Total Loss = 52818.14 : 8476.76 = 6.23 which is > 1, so project is found viable based on given/above-described criteria.

Date: - 28/06/21
Place:- Dhamtari

Project Director
NHAI – PIU Dhamtari , Chhattisgarh

Name: - Savyasachi Choudhury


28/06/21
Seal & Signature

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