

चेक लिस्ट क्रं.सं. 13

कास्ट / बेनिफिट एनालिसिस ।

**COST BENEFIT ANALYSIS IN ACCORDANCE WITH GOI FC
GUIDELINES NO-7-69 / 2011-FC DATED 01-08-2017**

Name of Project: Development of Urga Pathalgaon section of NH-130A (Raipur — Dhanbad Economic Corridor) in the state of Chattisgarh under Bharatmala Pariyojana

Nature of Proposal: Diversion of 169.0231 ha of Forest land under FCA, 1980 for road construction

Purpose: The cost Benefit Analysis is being undertaken for proposed Development of Urga Pathalgaon section of NH-130A (Raipur — Dhanbad Economic Corridor) in the state of Chattisgarh under Bharatmala Pariyojana.

Total Length of the road along PF / RF under

Korba Forest Division	=	17.854 km approx.
Dharamjaigarh Forest Division	=	21.585 km approx.
Jashpur Forest Division	=	0.094 km approx.
Total Length	=	39.533 km approx.

Number of districts involve- 03

Number of forest division involve: 03

S. No.	Forest Division	Proposed Area (ha)
1.	Korba	77.3042
2.	Dharamjaigarh	90.9718
3.	Jashpur	0.7471
Total Length		169.0231

Guidelines for conducting cost-benefit analysis for projects involving forest diversion.

- While considering proposal for diversion of forest land for non forestry use, it is essential that ecological and environmental losses and eco economic distress caused to the people who are displaced are weighted against economic and social gains.
- Whenever the forest land is involved in the development projects, the cost of ecosystem services and fragmentation of habitat of wildlife and economic distress caused to the people dependent on forests and the cost of settlement of people dependent on forest should also be added as the cost of forest diversion in addition to the standard project cost which would have been incurred by the user agencies without involvement of forest land while conducting the cost benefit analysis of the project. Similarly, the benefits from the project accruing due to diversion of forest land and used in the project should also be accounted for in the benefits component in addition to the standard benefits of the project which would have been accrued without involvement of forest land while conducting the cost benefit analysis and determining the benefit and cost ratio (BC ratio).
- The cost of Compensatory afforestation and its maintenance in future and soil & moisture conservation at present discounted value and future benefits from such compensatory

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afforestation accruing over next 50 years monetized and discounted to the present value should be included as cost and benefits respectively of compensatory afforestation while conducting the cost benefit analysis and determining the benefit and cost ratio (BC ratio).

- iv. **Table A** list the details the types of projects involving forest land for which cost benefit analysis will be required, **Table-B** Lists the parameters according to which the cost aspect of forest land diverted for the development projects will be determined, while **Table C** lists the parameters for assessing the benefits accruing to the project using forest land.
- v. A cost benefits analysis as above should be accompanied the proposals sent to central Government for forest clearance under the Forest Conservation Act.

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 up to 20 hectares in plains and up to 5 hectares in hills	Not Applicable	These proposals may be considered a case-to-case basis and value judgments.
2	Proposed for defense installation purpose and oil prospecting only	Not Applicable	In view of national priority accorded to these sectors, the proposal 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 in protection and conservation of proposals would be rarely entertained.
4	All other proposal involving forest land more than 20 hectares in plain and more than 5 hectares in hills including roads, transmission line, minor, medium and major irrigation projects, hydro projects, mining activity, railway line, location specific installations like microwave stations, auto repeater centers, TV tower 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.

Since, the proposal is for diversion of forest land measuring more than 20 hectare in plain area for the road project, cost benefit analysis report is applicable.

Table B: Estimation of Cost of forest diversion


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S. No	Parameters	Given Guideline	Evaluation
1	Ecosystem services losses due to proposed forest diversion	Economic value of loss of ecosystem services due to diversion of forest 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	NPV value has been taken as Rs 12.28 lakhs per hectare as Tropical Dry Deciduous Forest, Eco Class-III, Dense Forest. Therefore losses =12,28,590 X 169.0231 = 2076.60090 Lakhs
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 @ 5ton/Ha/Year @ Rs. 100/- per tonne. Therefore, loss of fodder as estimated for about 169.0231 hectare will be 169 0231 x 5 x 100 x 100 years = Rs. 84,51,155.00 (Rs. 84.51155 lakhs) 10% of NPV =10 % of NPV (2076.60090) = 207.660090 lakhs. So considered amount is Rs 207.660090Lakhs.
3	Cost of human resettlement	To be quantified and expressed in monetary terms as per approved R & R plan.	NIL No resettlement in the forest land that are diverted for the project.
4	Loss of public facilities and administrative infrastructure (Roads, buildings School, dispensaries, electric lines, railways etc) on forest land, or which would	To be quantified and expressed in monetary terms on actual basis at the time of diversion.	The public facilities and administrative infrastructures falling on the diverted forest land will be shifted by project proponent. The utilities shifting cost is Rs. 7178.00 Lakhs.


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S. No	Parameters	Given Guideline	Evaluation
	require forest land if these facilities were diverted due to the project.		
5	Possession value of forest land diverted	30% of environment costs (NPV) due to loss of forests or circle rate of adjoining area in the district should be added as a cost component as possession value of forest land whichever is maximum	<p>The circle rate of adjoining area in the district is about 8 Lakhs per hectare. The amount of 169.0231 ha will be $169.0231 \times \sim 8 \text{ Lakhs/Ha.} = 1352.1848 \text{ lakhs.}$</p> <p>Whereas 30% of NPV is $622.98027 (-0.3 \times 2076.60090)$ lakhs which is less than 8 lakh per hectare.</p> <p>Therefore, Possession Value of forest land will be 1352.1848 lakhs</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	2407.00 Lakhs as Resettlement and Rehabilitation is required in forest land proposed to be diverted.
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 i.e $0.5 \times 2076.60090 = \text{Rs } 1038.30045 \text{ Lakhs.}$
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	Total 338.0462 Hectare of degraded forest land which is about two times of the forest area proposed for diversion has been proposed for CA in lieu of 169.0231 ha forest land. Cost of CA is Rs. 1352.1848 Lakhs (@ 4.00 lakhs per ha)


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Table C: Existing Guidelines for estimating benefits of forest land diversion in CBA

S. No	Parameters	Given Guideline	Evaluation				
1	Increase in productivity attributable to the specific project	To be quantified and expressed in monetary terms avoiding double counting	<p>The proposal for which diversion of forest land is sought is for Development of Urga Pathalgaon section of NH-130A (Raipur — Dhanbad Economic Corridor) in the state of Chattisgarh under Bharatmala Pariyojana.</p> <p>The 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 benefitted. This will accelerate industrialization /commercialization in region and the same will directly generate employment opportunities in these areas and boosting up the economy of the region and the state. Again, directly the project will have the potential for employment generation for local people 1610828 mandays during the construction period. The proposed project does not involve any manufacturing or production.</p> <p>Hence, this section is not applicable. Monetary benefits due to increase in productivity is NIL.</p>				
2	Benefits of economy due to the 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, 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 last and economical transport of goods, after completion of project, the local people and industries situated in the area will be greatly benefitted. The widening of project road will provide safe and fast, economical and environment friendly transportation to the State, which in term will accelerate the rate of growth in this area.</p> <p>Average Annual Daily Traffic = 13808 Passenger Car Unit (PCU).</p> <table><tr><th>Current Scenario</th><th>Modified Scenario</th></tr><tr><td>Present Distance = 107.3 Km</td><td>Distance after development = 87.545 Km.</td></tr></table>	Current Scenario	Modified Scenario	Present Distance = 107.3 Km	Distance after development = 87.545 Km.
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S. No	Parameters	Given Guideline	Evaluation
			<p>Average Fuel Economy = 20 km/litre Total fuel consumption = $107.3/20 = 5.365$ litre/km</p> <p>Average Fuel Economy = 20 km/litre Total fuel consumption = $87.545/20 = 4.37725$ litre/km</p> <p>Fuel saving = $5.365 - 4.37725 = 0.98775$ litre/km Average fuel cost = 90 rupee per litre Fuel saving on 13808 PCU = $0.98775 \times 13808 = 13638.852$ Litre per day Savings (in monetary terms) = $13638.852 \times 90 = 1227496.68$ Rupees per day (Rs. 12.275 lakhs) Total benefits in 5 years ($5 \times 365.4 = 1827$ days) = $1827 \times 1227496.68 = 2242636434.36$ = 22426.364 Lakhs</p>
3	No. of population benefited due to specific project	As per the detailed project report	Population of surrounding districts Korba (1206640), Raigarh (3589049) and Jashpur (2215490) will be benefitted due to proposed development.
4	Economic benefits due to of direct and indirect employment due to the project.	As per the detailed project report	<p>A total of 1610828 mandays employment will be generated during construction phase for skilled/unskilled labour.</p> <p>Average wages inclusive of all cost of living is Rs. 500 per day.</p> <p>Total financial implication will come out to be = $1610828 \times 500 = \text{Rs } 805414000$ (8054.14 Lakhs)</p>
5	Economic benefits due to Compensatory Afforestation	<p>Benefits from such compensatory forestation accruing over next 50 years monetized and discounted to the present value should be included as benefits of compensatory afforestation.</p> <p>*For benefits of CA the guideline of the ministry for NPV estimation may be considered.</p>	<p>In lieu of total trees to be removed from the proposed Row in forest land along the project road, it is proposed to undertake at least twice of affected area as Compensatory afforestation as per Forest Conservation Act, 1980 to increase the net productivity.</p> <p>The Compensatory Afforestation will be done in $169.0231 \times 2 = 338.0462$ 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 year period for the density of 1.0 is Rs. 126.74 Lakhs per hectare. By considering minimum 0.4 density the ecological gain for the project would be $\text{INR } 126.74 \times 0.4 \times 338.0462 = \text{Rs. } 17,137.5901552 \text{ lakhs.}$</p>

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Summary of Cost –Benefit Analysis for the Project

S. No	Loss (in Lakhs)	Benefit (in Lakhs)
1	Ecosystem services losses = Rs2076.60090 Lakhs	Benefits of economy due to the specific project = Rs. 22426.364 Lakhs
2	Loss of Animal Husbandry Productivity including loss of Fodder = Rs 207.660090 Lakhs	1610828 Man days will be generated assuming 500 Rs per Day as wages total benefit = Rs. 8054.14 Lakhs
3	Cost of human resettlement = nil	Ecology gain for Compensatory Afforestation = Rs. 17,137.5901552 Lakhs
4	Loss of public facilities and administrative infrastructure = Rs 7178.00 Lakhs	
5	Possession Value of Forest Land diverted = Rs 1352.1848 Lakhs	
6	Cost of Suffering to oustees = Rs.2407.00 Lakhs	
7	Habitat Fragmentation Cost = Rs. 1038.30045 Lakhs	
8	Compensatory Afforestation and Soil and Moisture Conservation = Rs. 1352.1848 Lakhs	
	Total Loss = Rs. 15,611.93104 Lakhs	Total Benefit = Rs 47618.0941552 Lakhs

Benefit Cost Ratio = Total Benefit / Total Loss


= Rs 47618.0941552 Lakhs / Rs 15,611.93104 Lakhs = 3.050 which is more than 1 hence project is viable.

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 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 environment services in monetary terms which the forest would have provided if the forest would not have been diverted.

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 possession of the user agencies. Therefore 30% of the net present value (NPV) of the forest land diverted or market rate of adjoining area in the district should be added as a cost of component as "possession value of forest land" in addition to the environment costs due to loss of forests.


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(D.D. Parlawar)


Project Director

PIU-Korba

National Highways Authority of India

Date: -

Place: - Korba



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