

COST BENEFIT ANALYSIS AS PER GOI GUIDELINES 01-08-2017

Name of the Project: 4 Laning of Indore - Muktainagar Section of NH-753L from Boregaon Bujurg, Khandwa District in Madhya Pradesh Design Ch 139+000 to Muktainagar, Jalgaon District in Maharashtra Design Ch 216+278 (length 77.278 Km) under Bharatmala Pariyojana

Table-A: Cases under which cost- Benefit Analysis for forest Diversion are required

| Sr No | Nature of Proposal | Applicable/ Note Applicable | Remarks |
|-------|--|-----------------------------|---|
| 1 | All categories of proposals 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 purposes 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 lodges complex and other building construction. | Not applicable | These activities being detrimental to protection and conservation of forest, as a matter of policy, such proposals would be rarely entertained. |
| 4 | All other proposals involving forestland more than 20 hectares in plains and more than 5 hectares in hills including roads, transmission lines, minor, medium and major irrigation projects, hydro projects, mining activity, railway lines, 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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Table-B: Estimation of cost of forest diversion

| Sl. No. | Parameters | Remarks | Response |
|---------|---|--|--|
| 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 forest land being diverted as prescribed by the Central Government (MoEF&CC)</p> <p><i>Note: In case of National parks the NPV shall be ten (10) times the normal NPV and in case of Wildlife Sanctuary the NPV shall be five (5) times the normal NPV or otherwise prescribed by the ministry or any other competent authority</i></p> | <p>Forest under project site area are Tropical Dry Deciduous Forest (Eco Class III) and Forest canopy cover is and area is under Open and MediumDense as below:</p> <p>(A) Under Stock Area: 0.2 to 0.4 Density = 70.6637 Ha</p> <p>NPV for 70.6637 ha @ Rs. 9,57,780 = Rs. 6,76,80,279</p> <p>(B) Age in Dense Forest: Young Age & Middle Age Normal Density 0.5 to 0.7 = 16.9072 Ha</p> <p>NPV for 16.9072 Ha @ 12,28,590 = Rs 2,07,72,017</p> <p>Total NPV = A + B = 6,76,80,279+2,07,72,017 = Rs 8,84,52,296</p> |
| 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 | 10% of NPV = Rs. 88,45,229 |
| 3. | Cost of human resettlement | To be quantified and expressed in monetary terms as per approved R&R | No Human displacement involved |
| 4. | Loss of public facilities and administrative infrastructure (Roads, building, schools, dispensaries, electric lines, railways, 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 | Nil |
| 5. | Possession value of forest land diverted | 30% of environmental costs (NPV) due to loss of forests or circle rate of adjoining area in district should be added as a cost component as possession value of forestland whichever is maximum | 30 % of NPV= Rs. 2,65,35,689 |
| 6. | Cost of suffering to ousters | The social cost of rehabilitation of oustees (in addition to the cost likely | To be Calculated |


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| Sl. No. | Parameters | Remarks | Response |
|---------|--|---|--|
| | | to be incurred in providing residence, occupation and social service as per R&R plan) be worked out as 1.5 times of what oustees should have earned in two years had not been 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. | 50% of NPV= Rs. 4,42,26,148 |
| 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 | Yes, To be calculated by Forest Department |

Table-C - Existing guidelines for estimating benefits of forest-diversion in CBA

| Sl. No. | Parameters | Remarks | Response |
|---------|--|--|--|
| 1. | Increase in productively attribute to the specific project | To be quantified & expressed in monetary terms avoiding double counting | The project is desirable from society point of view. Found to be economic for NPV & Economic Internal Rate of return (EIRR) – 12% |
| 2. | Benefits to economy due to the specific project | The incremental economic benefit in monetary terms due to the activities attributed to the specific project* | <p>The Indore – Khandwa – Muktainagar Section on NH 753L. This road will provide uninterrupted free flow of Traffic and shall result in:</p> <ul style="list-style-type: none"> • Saving in travel time and Cost • Saving in foreign exchange due to less consumption of fuel. • Increase in income of trucks, bus, taxi etc owners as they will be able to communicate maximum distance in shortest time • Reduction in accidents as it will provide safe travel • Will act as catalyst to the Industrial development • Will boost the local and national tourism industry. |
| 3. | No. of population benefited due to specific project | As per the detailed project report. | Entire population of the project road will aid accessibility directly to people of Three districts like Khandwa, Burhanpur & Jalgaon. The road will traverse through numerous villages laying along both side of PROW. It is expected that proposed project road will |


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| | | | have direct positive impact on more than 62.97 Lakhs people residing in these districts. Other population which will be benefited will be tourists, industrialist etc |
| 4. | Economic benefits due to of direct and indirect employment due to the project | As per the detailed project report. | A total of 300000 man days employment will be generated during construction phase for skilled/ unskilled labour. Average wages inclusive of all costs of living is Rs. 500/day. Total financial implication will come out to be = $300000 \times 500 = \text{Rs}1500 \text{ Lakhs}$ |
| 5. | Economic benefits due to Compensatory afforestation | 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. *For benefits of CA the guideline of the Ministry for NPV estimation may be consulted. | 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. The Compensatory Afforestation will be done on $87.5079 \times 2 = 175.0158$ hectare of degraded forest land which is down the line would be having a density 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 period would be $\text{INR } 126.74 \times 0.4 \times 175.0158 = 8872.60 \text{ Lakhs (88.72Crore)}$ |

Summary of Cost – Benefit Analysis

| Sr No | Loss (in Lakhs) | Benefit (in Lakhs) |
|-------|---|--|
| 1 | Ecosystem Service losses = Rs. 884.52 Lakhs | Ecological gain from Compensatory afforestation = Rs. 8872 Lakhs |
| 2 | Loss of Animal Husbandry productivity including loss of Fodder = Rs 88.45 Lakhs | 30000 man days will be generated assuming 500 per day as wages total benefit = Rs 1500 Lakhs |
| 3 | Possession Value of Forest land Diverted = Rs 265.3 Lakhs | |
| 4 | Shifting of public utility = Rs 0 | |
| 5 | Habitat Fragmentation = Rs 442.26 Lakhs | |
| 6 | Compensatory Afforestation and soil and moisture conservation. = To be calculated by forest Department (in Lakhs) | |
| | Total Loss = Rs 1680 Lakhs | Total Benefit = Rs 10372 Lakhs |


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Benefit Cost Ratio = Total Benefit / Total Cost

= Rs 10372 Lakhs / Rs 1680 Lakhs = 6.17 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 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.

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 forest land diverted or market rate of adjoining area in the district should be added as a cost component as "possession value of forestland" in addition to the environmental costs due to loss of forests


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