

## **COST BENEFIT ANALYSIS**

**Name of Project:** Diversion of Forest land Over an area of 39.1096 Ha under Forest Division Darbhanga (NH-227L, Umagaom to Kaluahi Ch. 0.000 to 21.609. NH-227J, Saharghat to Rahika Ch. 0.000 to 26.130. Part of NH-527A, Bideswar-sthan to Bheja Ch. 0.000 to 25.915) is proposed for diversion Rehabilitation, Up-gradation and Construction of Two Lane with paved Shoulder of Selected road stretches from Hatwaria near Umagaom Junction {Design Km 0.000} to Kaluahi {Design Km 21.609} (Section-I) NH-227L, Saharghat {Design Km 0.000} to Rahika {Design Km 26.130} (Section-II) NH-227J & Bideswar-sthan {Design Km 0.000} to Bheja {Design Km 25.915} (section-IV) NH-527A, total length of 73.655 km in Madhubani District of Bihar for National Highway Bharatmala Highway Project under NHAI, PIU Supaul.

### **COST BENEFIT ANALYSIS AS PER 2017 GUIDELINES FOR FOREST LAND DIVERSION**

**Table -A: Cases under which a cost-benefit analysis for forest diversion is required.**

Si.No.	Nature of proposal	Applicable/ Not applicable	Remarks
1	All categories of proposals involving forest land up to 20 hectares in plain applicable and up to 5 hectares in hills	Not Applicable	These proposals may be considered on 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 forestland is diverted for non-forest use
3	Habitation, establishment of Not 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 forest land 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 microwave stations, auto repeater centre TV tower etc.	Applicable (Road)	The present proposal is for diversion of 32.507 Ha., of forest land for widening and strengthening of existing roads and bypasses for National Highway under Forest Division Darbhanga in District Madhubani, under BRT corridor of NHAI.

**Table -B: Estimation of Cost of Forest Diversion**

Si.No.	Parameters	Remarks	Response
1	Ecosystem services losses due to Economic value of loss of eco-system services proposed due to diversion of forests at 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.</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>Total Forest area = 37.507Ha.  = (37.507 × 9.57780)  = 359.234lakh or 3.59Cr.</p>
2	Loss of animal husbandry productivity, including loss of fodder	To be quantified and expressed in monetary term or 10% of NPV applicable whichever is maximum	35.923 Lakhs or 0.359Cr

3	Cost of Human resettlement	To be quantified and expressed in monetary term as per approved R & R plan	Not Applicable
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 term on actual cost basis at the time of diversion.	Utility Cost (PHED & Electrical) =1104.9438lakh or 11.05Cr.
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 forest land whichever is maximum.	107.7703 Lakhs Or, 1.07Cr
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 service as per R & R Plan) be workout as 1.5 times of what oustees should have earned in two years had he not been shifted.	Not applicable
7	Habitat Fragmentation Cost	While the relationship between fragmentation and forest goods and service is complex, for the sake of simplicity the cost due to fragmentation has been pegged at 50% of NPV applicable as thumb rule.	179.61727 Lakhs Or, 1.79Cr
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.	183.11Lakhs or 1.83Cr
<b>Total =</b>			<b>1968.9Lakh or 19.689Cr.</b>

**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 term avoiding double counting	Due to Rehabilitation, Up-gradation and Construction of Two Lane with paved Shoulder configuration, there will be over all development of the project area. There would be easy and fast movement of the traffic, so that it will save time, save fuel and maintenance cost of the vehicle. This will also result in a reduction in congestion on road, save travel time and reduction in accident. It is assumed that due to widening of road will result in improved traffic conditions and saving the travel time will result in economic benefit of Rs.80,000lakh or 800Cr.
2	Benefits to economy due to the specific project	The incremental economic benefit in monetary term due to the activities attributed to the specific project.	<p>The project usually contributes the growth of local economy by increased commercial and agriculture and tourism activities due to improvement of highway.</p> <p>Following economic benefit due to project below:</p> <ol style="list-style-type: none"> <li>1. Reduce pollution level due to better road surface quality and increased traffic speed.</li> <li>2. Savings of fuel consumption and travel time.</li> <li>3. Vehicle operation cost will be reduced.</li> <li>4.Reduction in accidents as it will provide safe travel</li> <li>5 Social economic growth of unconnected remote area.</li> </ol> <p>Based on the economic analysis of the project. Economic Internal Rate of Return (EIRR) is as follows: 12.29% of 765.85Cr. = 94.122Cr.</p>



3	No. of population benefited due to specific project	As per the Detailed project report.	The Project Road passes through Madhubani, district having population of 44,76,044.				
4	Economic benefits due to of direct and indirect employment due to the Specific project.	As per the Detailed project report.	Direct and indirect employment will be generated during the construction and operation period. The proposed road would act as the prime artery for the economic flow to this region. It will enhance economic development, provide employment opportunities to locals, strengthen tourist development, and ensure road safety. Vehicle operating costs will also be reduced due to improved road quality. = 21.46 Cr.				
			Economic benefits due to direct and indirect employment due to the Specific Project.				
			1	Economic benefits due to Compensatory afforestation	Approx rate	Duration	Total
			a	Permanent/Regular Employment (Number of person): 50	500	6388	159700000
			b	Temporary Employment (Number of person-days): 150000	366	-	54900000
			Total				21.46 Cr.
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.	NPV has been taken at the same rate as taken for calculation of cost. However, CA needs to be done for twice the area to be diverted. Hence, Economic benefit for CA are as follows: - 359.234 x2 = 718.468 Lakhs.				
		*For benefits of CA the guideline of the ministry for NPV estimation may be consulted.					
		Total =	92276.66 Lakhs 922.767 crore				

Sl. No	Description of cost	In Crore
1.	Total Civil Construction cost for the present proposal on pro rata basis	765.85
2.	Table-B, Estimation of cost of forest diversion	19.689
3.	Total Cost (1+2) =	785.539
4.	Total Benefit =	922.767
Benefit-Cost Ratio (B/C) =		1.17