

**Project Name** *Improvement and Upgradation of existing 2-lane to 4-lane with paved shoulders, with/without Service Roads including Realignments and Shahgarh & Hirapur Bypasses from Mohari to Satai Ghat section of NH-934 & NH-34 (old NH-86) from Design Km 50+300 (Existing Km 49.789) to Design Km 89+878 (Existing Km 90.302) in the state of Madhya Pradesh (Package-2) under Bharatmala Pariyojana*  
**Forest Proposal No.** FP/MP/ROAD/155297/2022

**Cost Benefits Analysis (CBA).** Whether the area is more than 20.00 ha. Proposed Forest Area for diversion is 109.4960 ha (More than 20 hectares) As per cost (Conservation) Rules 2003, Rules 6, Form 'A'S. No. 1 (v) and guidelines (Under Forest Act 1980).

**(a) Parameters for Evaluation of the loss of Forests and estimation of cost of forest diversion**

Sl. No.	Parameters	Remarks																
1.	Ecosystem services losses due to proposed forest diversion.	<p>Economic Value of Ecosystem services due to diversion of forest land = Proposed Forest area x NPV rate per Hectare (Ha)</p> <p>As per the Revision of rates of Net Present Value (NPV) on 06.01.2022 (File No.5-3/2011-FC(Vol-I)) for forest land of</p> <ol style="list-style-type: none"><li>Eco-class III (density range 0.0 to &lt;0.4) = INR9,57,780/- per Ha.</li><li>Eco-class III (density range 0.4 to 0.6) = INR12,28,590/- per Ha.</li><li>Eco-class III (density range 0.7 to 1.0) = INR 13,57,110/- per Ha.</li></ol> <p>Therefore, division wise ecosystem services losses due to proposed diversion of forest land are as follows:</p> <table><thead><tr><th>Division</th><th>Proposed Forest Area (ha)</th><th>NPV Rate</th><th>Ecosystem services Losses in INR</th></tr></thead><tbody><tr><td>Sagar North</td><td>79.9776</td><td>12,28,590</td><td>9,82,59,680</td></tr><tr><td>Chhatarpur</td><td>29.5184</td><td>12,28,590</td><td>3,62,66,011</td></tr><tr><td>Total</td><td>109.4960</td><td>-</td><td>13,45,25,691</td></tr></tbody></table> <p>No. of trees that will be affected due to proposed diversion of forest land are 8215 trees in Sagar North Division and are 17162 in Chhatarpur Division. Total 25377 trees are affected.</p> <p>Tree value @ Rs. 1500/- per trees, therefore, total trees value is = <b>INR 3,80,65,500/-</b>.</p>	Division	Proposed Forest Area (ha)	NPV Rate	Ecosystem services Losses in INR	Sagar North	79.9776	12,28,590	9,82,59,680	Chhatarpur	29.5184	12,28,590	3,62,66,011	Total	109.4960	-	13,45,25,691
Division	Proposed Forest Area (ha)	NPV Rate	Ecosystem services Losses in INR															
Sagar North	79.9776	12,28,590	9,82,59,680															
Chhatarpur	29.5184	12,28,590	3,62,66,011															
Total	109.4960	-	13,45,25,691															
2.	Loss of animal husbandry productivity, including loss of fodder.	10% of NPV = <b>INR1,34,52,569/-</b> .																
3.	Cost of human resettlement.	Nil.																
4.	Loss of public facilities and administrative infrastructure (Roads, buildings, schools, dispensaries, electric lines, railway, etc.) on forest land, which would require forest land if these facilities were diverted due to the project.	There are no public facilities and administrative infrastructure (Roads, building, schools, dispensaries, electric lines, railways, etc.) are not going to be affected due to the diversion of forest land, therefore, the loss on this account will be Nil.																
5.	Possession value of forest land diverted.	30% of NPV = <b>INR4,03,57,707/-</b> .																
6.	Cost of suffering to oustees.	Nil.																
7.	Habitat Fragmentation Cost.	50% of NPV = <b>INR6,72,62,845/-</b> .																
8.	Environmental losses: (Soil erosion, effect on hydrological cycle, wildlife habitat, microclimate upsetting of ecological balance)	<p>As per Forest (Conservation) Act, 1980, the environmental loss for a 50 years period for the density of 1.0 is INR 126.74 Lakhs per hectare. The division wise environment loss is as follows:</p> <table><thead><tr><th>Division</th><th>Proposed Forest Area (ha)</th><th>Density</th><th>Environmental Loss in INR</th></tr></thead><tbody><tr><td>Sagar North</td><td>79.9776</td><td>0.5</td><td>50,68,18,051</td></tr><tr><td>Chhatarpur</td><td>29.5184</td><td>0.6</td><td>22,44,69,721</td></tr><tr><td>Total</td><td>109.4960</td><td>-</td><td>73,12,87,772</td></tr></tbody></table> <p>Hence, total environmental loss for the project is <b>INR73,12,87,772/-</b></p>	Division	Proposed Forest Area (ha)	Density	Environmental Loss in INR	Sagar North	79.9776	0.5	50,68,18,051	Chhatarpur	29.5184	0.6	22,44,69,721	Total	109.4960	-	73,12,87,772
Division	Proposed Forest Area (ha)	Density	Environmental Loss in INR															
Sagar North	79.9776	0.5	50,68,18,051															
Chhatarpur	29.5184	0.6	22,44,69,721															
Total	109.4960	-	73,12,87,772															

*Sd/-*  
**Project Director**  
 PIU Sagar (M.P.)



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**Therefore, Current Environment Net loss**

= INR 13,45,25,691/- (Ecosystem losses) + INR 3,80,65,500/- (Tree values) + INR 73,12,87,772/- (Environmental loss) + INR 4,03,57,707/- (Possession value of forest land) = **INR 94,42,36,670/-**

**Expenditure for development and maintenance of the project for 15 years**

= Cost of Project + Renewal cost of BC for two cycle  
= INR 628,44,00,000 + INR 28,49,61,600 = **INR 656,93,61,600**

**Net Total Losses/Cost** = INR 94,42,36,670 + INR 656,93,61,600  
= **INR 751,35,98,270**

**(b) Parameters for evaluation of Benefit Notwithstanding Loss**

Sl. No.	Parameters	Remarks
1.	Increase in productively attributable to the specific project.	In lieu of total area to be affected in forest land it is proposed to undertake at least twice of the affected trees as compensatory afforestation as per Forest (Conservation) Act, 1980. Since, due to the current project proposed forest land area to be diverted is <b>109.4960</b> ha and total <b>25377</b> no. of felling trees. The CA will be done in <b>220 ha</b> of double degraded land; thus, total <b>220000</b> trees are to be planted as per compensatory afforestation which is down the line after seven years would be having the density of 1.0. The Compensatory Afforestation cost will be <b>INR 8,70,19,287/-</b> The ecological value for a 50 years period of density of 1.0 is 126.74 lac per hectare. By considering the min. 0.5 density the ecological gain for this project would be <b>INR 138,77,52,304/-</b>
2.	Benefits to economy due to specific project.	The proposed highway will provide better, fast, safe and smooth connectivity for the commuters of Madhya Pradesh state. Smooth and fast-moving traffic will cause only lower emissions thereby reducing pollution levels. Accident rates are also expected to come down substantially. Development of the proposed project road will improve the local agriculture and enable farmers to realize better value for their products as well as attract more investment to that region, thus boost economy of the area, state and nation as a whole. The vehicle operating and maintenance cost is expected to go down substantially. The proposed road alignment will also include general amenities like bus bays, truck lay byes, rest areas, service road at built-up locations, pedestrian and cattle underpasses, landscaping and tree plantation, traffic aid post, emergency telecom system, emergency medical aid post, street light at built ups etc. and thus overall facilities to the road users shall improve. People will have increased access to better social and health infrastructure and other services located outside the project area. This will in turn lead to overall improvement of the quality of life of the people residing in the project zone in terms of their economic, social and health status. Growth of local tourism and resultant boost to local economy is also expected due to proposed project. Industrialization of area will be uplifted approximately 30%. The above benefit in term of rupees is about Rs. 300.00 Lakhs per year.
3.	No. of population benefited to specific project.	An average population of 1000000 people from the region will be benefited directly and indirectly.
4.	Economic benefits due to of direct and indirect employment due to the project.	Approximately 5 no. of permanent employment and 728235-man days temporary employment will be generated due to the Project.

*Sanjay Kumar*  
**Project Director**  
**PJU Sagar (M.P.)**



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5.	Economic benefits due to Compensatory afforestation.	The benefit of economy shown in table below:				
		Project Details	Increasing Rate of Cost year	Project Cost after 50 years (INR Crores)	Current Cost Involve in Construction of Project (INR Crores)	Net Profit in 50 Years
		Package-2 (Mohari to Satai Ghat Section)	4%	4466.12	628.44	3837.68
So, benefit of economy in 50 years = <b>3837.68 Crores</b>						
On an average GDP will increase						
Total Saving due to less consumption of fuel and fatalities (VOC) = 949.994 Crores						
Total Time Savings due to the project = 514.335 Crores						

**Therefore, Project Benefit**

= INR 8,70,19,287/- (CA cost)+INR 138,77,52,304/-(Ecological gain)+ INR 3837,68,40,821 (Economic Benefits)+ INR949,99,40,000(VOC Savings)+ INR514,33,50,000 (Time Savings).

**Net Profit =INR5449,49,02,412**

Therefore, Cost Benefit Ratio = 5449,49,02,412 /751,35,98,270  
= 7.25or approx. 1:7

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NHAI, PIU Sagar (M.P.)