

## **COST-BENEFIT ANALYSIS**

**(Ref:MoEF guideline No.7-692011-FC(Pt.) dtd 01AUG.2017)**

**Name of the Project:** Upgradation of National Highway (NH-333A) starting from its junction with NH-33 near Barbigha connecting Sheikhpura - Sikandra - Jamui, JhaJha - Banka - Panjawara - Bihar/Jharkhand border in the state of Bihar to two/four lane with paved shoulder configuration.

**Nature of Proposal:** Diversion of 142.7368 Ha of forest land under FCA, 1980 for road construction.

**Purpose:** The Cost of Benefit Analysis is being undertaken for proposed Diversion of Forest land being affected due to Development of NH-333A Barbigha connecting Sheikhpura-Sikandra-Jamui, JhaJha-Banka-Panjawara-Bihar in forest division, Munger, Jamui and Banka under FCA 1980, falls within existing ROW of Road Construction department, National Highway Division, Lakhisarai, Biharsharif-II and Bhagalpur.

Total length of the road along the PF/RF Under protected Forest start near NH 33 at Barbigha and ends at Bihar Jharkhand Borde passing through Munger Jamui, & Banka forest division. Total length= 190.200 km approx.

Total Forest area proposed for diversion Under protected Forest NH 33 at Barbigha and ends at Bihar Jharkhand Borde passing through Sheikhpur, Lakhisarai, Jamui & Banka forest division. Total forest area= 142.7368 Ha.

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

<b>Sr. no.</b>	<b>Nature of Proposal</b>	<b>Applicable/ Not applicable</b>	<b>Remarks</b>
1	All categories of proposals involving forest land up to 20 hectares in plains and up to 5 hectares in hills	Not Applicable	The proposed project involves 142.7368 Ha of forest land. Hence, the CBA is applicable.
2	Proposal for defense installation purposes and oil prospection (prospecting only)	Not Applicable	
3	Habitation, establishment of industrial unit's tourist lodges/ complex and other building construction	Not Applicable	
4	All other proposal involving forest land more than 20 hectares in plains and more than 5 hectare in hills including roads, transmission lines, minor, medium and major irrigation project, hydel project mining activities, railway lines, location specific installations like micro wave stations, auto repair centers, T.V. towers etc.	Applicable	The proposed project involves 142.7368 Ha of forest land. Hence, the CBA is applicable.



**Table-B: Estimation of cost of forest diversion**

Sr. No.	Parameters	Remarks	Monetary Equivalent (Lakh)
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 the forest land being diverted as prescribed by the Central Government (MoEF&amp;CC).</p> <p>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.</p>	<p>Only one time loss of vegetation occurs during construction and there is no loss of man-hours. As per MOEF&amp;CC guideline for diversion of fresh forest land for non-forestry purpose, collection of Net Present Value (NPV) for class III open forest as on 01.01.2022 is 9.58 Lakhs per Hectare.</p> <p>Hence, the total loss of timber, fuel wood and minor forest produce for 142.7368 hectare of forest may be calculated <math>142.7368 \times 9.58 = \text{Rs. } 1367.42 \text{ Lakhs.}</math></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.	$10\% \text{ of NPV} = 10\% \text{ of } 1367.418544 = 136.74 \text{ Lakhs.}$
3	Cost of human resettlement	To be quantified and expressed in monetary terms as per approved R&R plan.	Nil. Human resettlement is not required since no family residing in forest land.
4	Loss of public facilities and administrative infrastructure (Roads, building, school, dispensaries, electric lines, railways, etc.) on forest land, which would require forest land if these facilities were diverted due to 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 the district should be added as a cost component as possession value of forest land whichever is maximum.	<p>Possession value of forest land will be @30% of NPV=</p> $0.3 \times 1367.418544 = 410.23 \text{ lakhs}$



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.	Nil
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 = $0.50 \times 1367.418544 = 683.71$ 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.	Diversion of land involved = 142.7368 ha Compensatory afforestation will be done in Double Degraded Forest Land of 285.4736 Ha = or 286.00 Ha, value of afforestation @ 3.5 lakh per ha = 1001 lakhs

**Total estimated cost as per Table B => Rs. 1367.42+136.74+410.23+683.71+1001  
=Rs. 3599.10 lakh**

  
 23/12/25  
**Executive Engineer**  
**N.H. Division, Lakhisarai**  
**At-Munger**

**Table C: Existing guidelines for estimation benefits of forest diversion in CBA**

S. no.	Parameters	Remarks	
1	Increase in productively attribute of the specific project	To be quantify & expressed in monetary terms avoiding double counting.	The proposed project doesn't involve any manufacturing or production. Hence, this section is not applicable.
2	Benefits to economy due to specific project	The incremental economic benefit in monetary terms due the activities attributed to the specific project.	Currently an average daily traffic on the existing route is 4168 PCU. The current route between Barbigha and Banka measures about 198.450 Kms following the existing route without bypasses. Current ScenarioDistance= 198.450 Kms Fuel used per PCU=19.845 litres (@10 Km/litre) Cost per PCU= Rs. 1587.6 per PCU per day Total Cost= Rs. 6617116.8 per day= Rs. 4830495264 for 2 years. Modified ScenarioDistance= 190.200 Kms Fuel used per PCU=12.68 litres (@15 Km/litre) Cost per PCU= Rs. 1014 per PCU per day Total Cost= Rs. 4228019/-per day= Rs. 3086454016/-for 2 years. <b>Thus total amount to be saved in 2 years= Rs. 17440.41248/- Lakh</b>
3	No. of population benefits due to specific project	As per the detail project report.	Population of surrounding districts Sheikhpura (6,36,342), Lakhisarai (10,00,912), Jamui (17,60,405) & Banka(2,034,763) will get benefited due to proposed development. In addition to the above, the man hours required for the commuters to travel the existing route shall be reduced by 8.3 km. Current scenario Distance= 198.450 Kms Time required= 4.4 hours(@45 Kms/hr) Total man hours= 4.4x4168x4= 73524 man hours per day= 44114112 man hours for 2 years (300 working days/year). Modify scenario Distance= 190.200 Kms Time required= 2.4 hours(@80 Kms/hr) Total man hours= 2.4x4168x4= 39638 man hours per day=23782608/- man hours for 2 years (300 working days). Hence, a total of 20331504 man hours shall be saved by the construction of the project. As per Business world, the average per capita income in the year 2019-20 was estimated to be Rs. 34413/- per year i.e. Rs. 14.3 per hour. Hence, monetarily a total amount of <b>Rs. 2915.28353/- Lakh</b> shall be saved in terms of man hours by the project in two years.
4	Economic benefits due of direct and indirect employment due	As per the detail project report.	Assuming 1294 number of manpower for the project length for 2.5 Years of construction period. The man days of 1294 persons x 25 working days/month x 30 month = 970500 Man days. Employment will be given by the

	to project		Contractor during Construction.. Hence, monetarily the project shall generate employment worth of <b>Rs. 2949.19216 Lakh.</b>
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 benefit Compensatory *For benefits guideline of the NVP estimation may be consulted.	In lieu of total trees to be affected in forest land it is proposed to be undertake at least twice of the affected trees as compensatory afforestation as per Forest (Conservation) Act. So the net productivity will increase. Apart from compensatory plantation. The compensatory afforestation will be done in 324.02 ha of degraded forest land, which is down the line would be having a density of minimum 0.4. The ecological value for a 50 years period for the density of 1.0 is INR 126.74 lacs per hectare. By considering minimum density as 0.4 gains in density, the ecological gain for this project would be INR Rs. <b>16426.51792</b> Lakh down the line. The compensatory afforestation will be added later after receiving from DFO.

**Total benefit as per Table C = Rs. 17440.41248+2915.28353+2949.19216+16426.51792**  
**= 39731.40609 lakhs**


**Total environmental loss (B) = 3599.10 lakh**

**Total benefit to society (C) = 39731.41 lakh**

**Hence cost benefit ratio = Rs. 3599.10 lakh : 39731.41 lakh**  
**= 1 : 11.04**

**Date:-**

**Place:- Lakhisarai**

  
**Executive Engineer**  
**NH Division, Lakhisarai at Munger**  
