

**COST BENEFIT ANALYSIS FOR DIVERSION OF PROTECTED (PF) FOREST LAND**

**Name of Project:-** " Rehabilitation and Up-gradation of Widening & Strengthening of Meerut Budaun Road (SH-18) Ch. 163.000 to 208.400 Two lane from to Four Lane. "

**Nature of Proposal:-** Diversion of 64.60 Ha protected forest land under FCA 1980 for Widening from Two Lane to Four Lane of existing road.

**Total Length of Project Road section:-** 45.40 Km.

**Number of District through which project road traverse -** 01 No. i.e. Budaun.

**Total length of the project road along the Protected Forest/Reserve Forest.**

Under Social Forestry Division, Budaun (Existing Km. 163 to 208.400) = 45.40 (Design Length)

**Total Forest area proposed for diversion**

Under Social Forestry Division, Budaun = 64.60 Hect(PF)

**Purpose:-** The Cost Benefit Analysis is being undertaken as the required forest land is > 20 hectare for proposed diversion of Forest land being affected due to widening (Four Laning) of existing road for above said project.

**Cost Benefit Analysis as per Guideline for Forest Land Diversion - 2017**

**Table- A:-** Cases Under Which a Cost - benefit analysis for forest diversion are required

Sl.	Nature of Proposal	Applicable / Not Applicable	Remarks
1.	All Categories of proposal 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 judgments.
2.	Proposal for defense installation purpose 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 lodge complex and other building construction.	Not Applicable	These activities being detrimental to protection and conservation of proposals would be rarely entertained.
4.	All other proposal involving forest land more than 20 hectare in plains and more than 5 hectares in hills including roads,	Applicable	These are cases where a cost - benefit analysis is necessary to determine when diverting the forest land to

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transmission line, minor, medium and major irrigation projects, hydro projects, mining activity, railway line, location specific installations like microwave stations, auto repeater centres, TV towers tc.	non-forest use in the overall public interest.
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Since the proposal is for diversion of forest land measuring more than 20 hectare in plain area for road project, cost benefit analysis report is applicable.

Table-B:- Estimation of cost of forest diversion

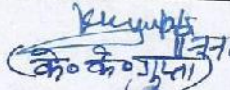
Sl.	Parameters	Given Guideline	Evaluation
1.	Ecosystem services losses due to proposed forest diversion.	<p>Economic value of loss of ecosystem services due to diversion of forests shall be the net present value (NPV) of the forest land being diverted as prescribed by Central Government (MoEF &amp; CC).</p> <p>Note:- In case of National Parks the NPV shall be ten (10) times the normal NPV and in case 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>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.</p>	<p>NPV value (as per of forest Conservation act 1980 is in between Rs. 5.8 and 9.2 lac per hectare.</p> <p>However, NPV value for proposed diverted land is calculated by DFO Office, Budaun Rs. 518.738 Lac.</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.	<p>Loss of Animal husbandry due to proposed diversion is very moderate and calculated below.</p> <p>Gross Loss @ 5 ton/Ha./Year @ Rs. 100/- per tonne. Therefore, loss of fodder as</p>

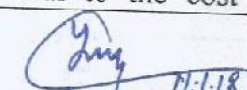
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			<p>estimated for about 64.60 hect. Will be <math>64.60 \times 5 \times 100 = 32300.00/\text{Yr} \times 50 \text{ years} = \text{Rs. } 16,15000/-</math></p> <p>Further considering 10% of NPV Will be = 518.738 lack (NPV) <math>\times 0.1 = 51.874 \text{ Lac.}</math></p> <p><b>So Considered amount (maximum one) is Rs. 51.874 lakh.</b></p>
3.	Cost of human resettlement	To be quantified and expressed in monetary terms on actual terms as per approved R & R Plan.	Nil human resettlement is required since no family residing in forest land.
4.	Loss of public facilities and administrative infrastructure (Roads, building schools, dispensaries, electric line, railway, etc.) on forest land, which would required forest land if these facilities were diverted due to the project.	To be quantified and expressed in monetary terms on actual cost basis of the time of diversion.	<p>No loss of public infrastructure like Roads, hospital etc are investigated. However, there will be some utility shifting like, electricity pole, telephone line, OFC cable etc from Proposed Row located in forest land.</p> <p>The likely cost of these utility shifting is estimated Rs. 670.00 Lac.</p>
5-	Possession value of forest land diverted	<p>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 forestland whichever is maximum.</p> <p>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 forest land" in addition to the environmental cost due to loss of forests.</p>	<p>Possession Value of forest land will be (considering 30% of NPV) = <math>0.3 \times 518.738 = 155.62 \text{ Lac}</math></p> <p>per hectare land rate along the highway in district Buduan it very between 17.00 Lac to 85.00 lac. in different revenue villages along the state highway. For estimation purpose average rate considered along the road is 51.00 lakh per hectare.</p> <p>So Possession value of forest land (As per average circle rate) = <math>64.60 \text{ hect.} \times 51 \text{ Lac} = 3294.60 \text{ lac.}</math></p> <p>So Considered amount (Maximum one) is Rs. 3294.60 Lac.</p>
6.	Cost of suffering of oustes.	The social cost of rehabilitation of oustes (in additional to the cost	Nil. no resettlement & rehabilitation is identified or

  
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		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 oustes should have earned in two years had he not been shifted.	required in forest land which is proposed to be diverted. Also the community residing along the project road is not dependent on forest or forest produce. There will not be any losses on this account as diversion of the forest land to this project will not affect any house or structure in protected forest area which is basically a linear plantation.
8.	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 that is Rs. 518.738 x 50% = 259.37 Lac.
9.	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.	As per DFO Office, Budaun CA cost estimated Rs. 44020971/- for 64.60 Hectare, forest land to be diverted.

Table - C - Existing guideline for estimating benefit of forest diversion in Cost Benefit Analysis (CBA)

Sl.	Parameter	Given guidelines	Evaluation
1.	Increase productively attribute to the specific project.	To be quantified & expressed in monetary terms avoiding double Counting.	The proposed project for which diversion of forest land is sought is for widening of Existing road. The project road will improve accessibility to the region. This will help in both economic & social development in the region. The project will enable smooth accessibility in the region by which people of the region will be directly benefited. This will accelcrate industrialization/ commercialization in region and the same will directly generate maximum employment opportunities in these areas and boosting up the economy of the region and state. Again directly the project will have the potential for temporary employment generation for local people 200-250 for 2 years genercating 135000.00 man days during construction period.

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2.	Benefits to economy due to 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.</p> <p>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 benefited. The widening of project road will provide safe, fast, economical and environment friendly transportation to the State which in term will accelerate the rate of growth in this area.</p> <p>In addition to that there are several other benefits that may accrue due to saving in fuel, reduction in time to commute, vehicle maintenance, reduction in carbon emission etc. <b>"However they have not been quantified as it will be a function of various govt. policy variables."</b> Exact quantification of the value is not possible as it is time and policy dependent.</p>
3.	No of population benefited due to specific project.	As per detailed project report.	<p>The proposed road section which is part of S.H.-18 in district Buduan which further connect Bareilly, Shahjahanpur, Bulandshahar, Merrut, Ghaziabad etc.</p> <p>The population of these districts are; Budaun 3681896, Bareilly 4448539 and Bulandsahar 3499171 persons which are directly benefited in addition to lac of neighbour district commuters as well as long distance travellers and freight.</p>
4.	Economic benefits of direct and indirect employment due to the project.	As per detailed project report.	<p>Direct employment to 200-250 for 2 year during construction period (accordingly 225 - persons x average 25 working days/month x 24 months 1350000 Man days) people and substantial indirect employment as a result of development of infrastructure and will also provide direct benefit to small scale industrial units in the area.</p>
5.	Economic benefit due to compensatory afforestation	Benefit from such compensatory afforestation accruing over next 50 years monetised and discounted to the	<p>In lieu of total trees to be removed from Proposed Row in protected forest land along the project road, it is proposed to undertake at least twice of the affected trees as compensatory afforestation and as per Forest (Conservation) Act 1980. So the net productivity will increase</p>

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		present value should be included as benefit of CA the guideline of the Ministry for NPV estimation may be consulted.	<p>Apart from compensatory plantation and on road divider plantation. The compensatory afforestation will be taken up in about 64.60 hect x 2 = 129.20 hect of Degraded Forest land which is at least two times of the area proposed to be diverted.</p> <p>The compensatory afforestation will be done in 129.20 hect. of degraded forest land, which is down the line would be having a density of minimum 0.7. The ecological value for a 50 years period for the density of 10 is INR 126.74 lacs per hectare (As per Forest Conservation Act 1980). By considering minimum 0.7 density, the ecological gain for this project would be 126.74 lac x 0.7 x 129.20 = INR 11462.37 lac.</p>
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Summary of Cost- Benefit Analysis for the Project.

Sl. No.	Loss (in Lac)	Benefit (in Lac)
1.	Ecosystem services losses Rs. 518.738 Lac	Ecological gain from compensatory afforestation on 129.20 (atleast) hectare of land would be Rs. = <b>11462.37 lac.</b>
2.	Loss of animal husbandry productivity, including loss of fodder = Rs. 51.874 Lac	<p>135000-man days will be generated for unskilled/semi-skilled worker in terms of Salary and Wages @ Rs. 500/day* (average) = Rs. 500 x 135000 = 675.00 lac)</p> <p>(A Minimum wages in Uttar Pradesh is Rs. 174.00 but for considering actual practical wages including lodging the average cost per day for semiskilled / skilled labourer is appros. Rs. 500 per Day)</p> <p>Basic living amenities including alternative fuel (LPG solar Cooker etc) will be supplied to labours/workers in construction period by contractor- 2 years.</p> <p>Number of labours at peak time - 225</p> <p>Approx 50% labour assume to be local.</p> <p>Per head cost of fuel-Rs. 2.00/- per day for rest 112 labours. Total Cost = Rs. 2.00 x 112 labours x 730 days = Rs. 163520.00/- of Rs. 1.64 lac</p>
3.	Loss of public facility = 670 lac.	
4.	Possession Value of Forest land diverted = 3294.60 lac.	
5.	Habitat fragmentation cost = 259.37 lac.	
6.	Compensatory afforestation and soil & moisture conservation cost = 440.21 lac.	

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<p>Total Cost/Loss = 518.738 Lac + Rs. 51.874 lac + 670.00 lac + 3294.60 lac + 259.37 lac + 440.21 Lac = 5234.792 Lac.</p>	<p>Total gain/benefit from project = Rs. 11462.37 Lac + Rs. 675.00 lac. + Rs. 1.64 lac = 12139.01 lac</p>
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Note:- As the project is proposed to be development under EPC mode thus financial model have not been carried out for the project road for general estimation purpose cost benefit analysis has been done in terms of Environmental aspects.

Cost benefit Ratio = Total Benefit/Total loss = 12139.01 / 5234.792 = 2.32 which is >1, so project is found valuable based on given/above described criteria.

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(Pramod Kumar)  
Executive Engineer  
Construction Division, P.W.D  
Budaun.

Place: Budaun

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