

**COST BENEFIT ANALYSIS FOR DIVERSION OF FOREST LAND**

**Name of Proposal:-**Road Construction work in Haldwani Bypass Road to Halduchor Indian Oil Depot in Lalkuan Constituency Distt Nainital Under C.M. Announcement No. 310/2013

**Nature of Proposal:** Diversion of 12.330Hect. of Reserve Forest Land of Tarai East Forest Division (Also part of Lalkuan Van Block & Gola Rokhar Forest Block, Uttarakhand) under FCA, 1980 for the purpose of New Construction of road.

**Total Length of Project road=** 13.700 km

**Total No. of District through which proposed project road alignment traverse --** 01, Nainital

**Total forest area (RF) proposed for diversion=** 12.330 Hectare

**Purpose:** The Cost of Benefit Analysis is being undertaken for proposed diversion of Forest Land for New Construction of road.

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

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

S.I	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	Applicable	These proposals may be considered on a case to case basis and value judgement.
2.	Proposal for defense installation purpose and oil prospecting(prospecting only)	Not applicable	-
3.	Habitation, establishment of industrial units, tourist lodge complex and other building construction	Not applicable	-
4.	All other proposal involving forestland more than 20 hectare in plains and more than 5 hectares in hills including roads, transmission lines, minor, medium and major irrigation projects, hydro projects, mining activity, railway line, location specific installations like micro-wave stations, auto repeater centers, TV towers etc.	Not Applicable	-

Since the proposal is for diversion of forest area measuring more than 5 hectares in Plain area for road project, cost benefit analysis report applicable.

  
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Table-B: Estimation of cost of forest diversion

S.L	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><b>Note-</b> 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><b>Note-1:</b> 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 Handbook/Guideline) land is in between Rs 6,99,000 to Rs 10,43,000 per hectare. Since the reserve forest land is of Eco class-I(Open Forest) Forests having density 0.4 (Dense Forest), per hectare NPV rate is considered Rs 7,30,000.</p> <p>So NPV for 12.330 -hectare land is = Rs 730000 x 12.330 hect. = Rs 9000900.00 or 90.01 Lacs</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 ton. Therefore, loss of fodder as estimated for about 12.330 hect. will be <math>12.330 \times 5 \times 100 = \text{Rs } 6165.00/\text{yr.}</math> X 50 years = Rs. 308250.00 /- or 3.08 Lacs</p> <p><b>Further considering 10% of NPV it will be = Rs 90.01 Lacs</b>  <math>(\text{NPV}) \times 0.1 = 9.00 \text{ Lacs}</math></p> <p><b>So Considered amount (maximum one) is Rs 9.00 Lacs</b></p>



3.	Cost of human resettlement	To be quantified and expressed in monetary terms on actual terms as per R p&approved RI.an	NIL as no human resettlement is required.
4.	Loss of Public facilities and administrative infrastructure (Roads, building, schools, dispensaries, electric lines, railway, etc.) on forest land, which would require forest land and 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	No loss of public infrastructure like Roads, hospital etc are investigated.
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 forest land 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 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 forestland will be (considering 30% of NPV) = <math>0.3 \times 90.01 = 27.00</math> Lacs</p> <p>Average Per hectare land rate along the project in district Nainital is Rs 450 Lacs per hectare of non-commercial area (as per Circle rate 2020). It is to be noted that along the project road section, there is Non agricultural land.</p> <p>So, possession value of forestland (as per average circle rate) = <math>12.330 \text{ hect.} \times 450 \text{ Lacs} = 5548.50 \text{ Lacs}</math></p> <p><b>So, Considered amount (maximum one) is Rs 5548.50 Lacs.</b></p>
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, no resettlement & Rehabilitation is identified or 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/reserve forest area.




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 application as a thumb rule.	Habitat fragmentation cost is 50% of NPV that is Rs 90.01 x 0.5 = 45.00 Lacs
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.	Calculation in district Nainital the CA cost per hectare is considered Rs 32.00 Lacs per hectare for estimation purpose. It may be updated as per actual CA estimate prepared and provided by Forest Department. So, CA cost 12.330 hect. x 2 x Rs 32.00 Lacs = <b>789.12 Lacs</b>

**Table — C- Existing guideline for estimating benefit of forest diversion in CBA**

S.L	Parameters	Given Guideline	Evaluation
1.	Increase in productivity attribute to the specific project	To be quantified & expressed in monetary terms avoiding double counting.	<p>The proposed project for which diversion of forest land is sought is for New Construction of Road, The project road will improve accessibility to the region. This will help in both economic &amp; 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 accelerate 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.</p> <p>Again, directly the project will have the potential for temporary employment generation for 135 local people for 2 years generating 84240.00 mandays during construction period.</p> <p>26 Man-days in month x 24-month x 135 worker = <b>84240 Mandays.</b></p>

  
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2.	Benefits 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, tourism, saving in vehicular operation and maintenance cost, better connectivity, safer journey to commuter and saving of travel time. Improved road connectivity helps in better implementation and management of government schemes. It will provide fast and economical transport of goods. After completion, 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 turn 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 and man animal conflict and animal kill in road accident 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	The road connects Haldwani By Pass Road to Indian Oil Depot at Haldachaur. The Population of village benefited approx 50,000 (Haldachaur, Devrampur, Hathikhal, Kishanpur sakuliya, Bakuliya, Khadakpur, Beriparavand gaujajali etc) this Project.
4.	Economic benefit due to direct and indirect employment due to the project.	As per Detailed project report	Direct employment to 135 people for 2-year accordingly 26 Man-days in month x 24-month x 135 worker = 84240 (Mondays) and substantial indirect employment as a result of development of infrastructure, and tourism industries will also provide direct benefit to small scale industrial units in the area.



5.	Economic benefit due to Compensatory afforestation	Benefit from such compensatory forestation accruing over next 50 years monetised and discounted to the present value should be included as benefits Compensatory afforestation*total benefit of CA the guideline of the Ministry for NPV estimation may be consulted.	<p>In lieu of total trees to be removed from Proposed PRow in Reserve protected forest land along the project road, is proposed to undertake at compensatory plantation least twice of the affected/diverted forest area as per Forest (Conservation Act) So, the net productivity will increase.</p> <p>The compensatory afforestation will be taken up in about <math>12.330 \times 2 = 24.66</math> hectare of Degraded rarest land which is at least two times of the area proposed to be diverted.</p> <p>They compensatory afforestation will be done on 24.66 hectare 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 1.0 is INR 32.00 lacs per hectare (As per Forest Conservation Act (1980). By considering minimum 0.7 density the ecological gain for this project would be <b>INR 1600.00 Lacs</b></p>
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### Summary of Cost-Benefit Analysis for the Project.

Sl.No.	Loss (In Lacss)	Benifit(In Lacss)
1.	Ecosystem services losses Rs 90.01 lakhs.	Ecological gain from compensatory afforestation on 12.330(atleast) hectare on degraded land would be Rs = 1600.00 Lacs
2.	Loss of animal husbandry productivity, including loss of fodder = Rs 9.00 Lacs	<p>Approx. 84240 Mandays will be generated for unskilled/semi-skilled worker in terms of Salary and Wages @ Rs 500/day<sup>#</sup> (average) = <b>Rs 421.20 Lacs.</b></p> <p>(# Minimum wages in Uttarakhand is Rs 10520/month (or Rs. 350/day, but for considering actual practical wages including lodging the average cost per day for semiskilled labourer is approx. Rs 500 per day.),</p> <p>Basic living amenities including alternative fuel (LPG, Solar Cooker etc) will be supplied to labours/workers.</p> <p>Construction period- 2 years Number of labours at peak time - 135 Approx. 20% labour assume to be local Per head cost of fuel -Rs.20/ per day for rest 120 labours Total cost= Rs 20x120 labours x 730 days = Rs 1752000/- or <b>Rs 17.52 Lacss</b></p>
3.	Loss of public facilities = Nil	-
4.	Possession Value of Forest land diverted = 5548.50 Lacs	-

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5.	Habitat fragmentation cost=45.00 Lacs	-
6.	Compensatory afforestation and soil & moisture conservation cost=789.12 Lacs	-
7.	Total cost/Loss = Rs 90.01 Lacs + Rs 9.00 Lacs + Rs 0.00 Lacs + Rs 5548.50 Lacs + Rs 45.00 Lacs + 789.12 Lacs = 6481.63 Lacs	Total gain/ benefit from project= Rs 1600.00 Lacs + Rs 421.20 Lacs + Rs 17.52 Lacs = 2038.72 Lacs


**Cost Benefit Ratio** = Total Benefit/ Total Loss = 2038.72: 6481.63 = 0.31 which is < 1, so project is not found viable based on given/above described criteria.

This is because, project is located in Haldwani (Nainital) and around the project non-forest area is urban area. Circle rate is As 450 Lacs per hectare and possession value of forest land diverted is considered at higher side and it became huge i.e 12.330 hect. x 450 Lacs = 5548.50 Lacs.

However, if possession value of forest land to be diverted is calculated based on 30% of NPV due to loss of forest which is 27.00 Lacs.

The cost benefit ratio will be, Total Benefit/ Total Loss = 2038.72: 960.13 = 2.12 which is > than 1 and found viable based on given/above described criteria.

  
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परियोजना का नाम :- माननीय मुख्यमंत्री घोषणा संख्या 310/2013 के अन्तर्गत जनपद नैनीताल के विधानसभा क्षेत्र लालकुआँ के अन्तर्गत हल्द्वानी बाईपास मार्ग से हल्दूचौड़, इण्डियन ऑयल डिपो हल्दूचौड़ तक मार्ग का निर्माण कार्य।

### Table-A: Cost Benefit Analysis

As per OEF & CC guideline No.-7-69/2011-fc(pt) Dated

S.No.	Parameters	Estiated Cost (Rs. In Lacs)
<b>A.</b>	<b>Cost of Forest Diversion</b>	
1.	Ecosystem services losses due to proposed forest diversion (as per Table-B)	90.01
2.	Loss of animal husbandry productivity, including 1 of fodder (as per Table-B)	9.00
3.	Cost of human settlement (as per Table-B)	0.00
4.	Loss of public facilities and administrative infrastructure (Road, buildings, school dispensaries electric lines, railway etc.) on forest land or which would require forest land if these facilities were diverted due to the project (as per Table-B)	0.00
5.	Possession value of forests land diverted (as per Table-B)	27.00
6.	Cost of suffering of ousters	0.00
7.	Habitat fragmentation cost	45.00
8.	Compensatory Afforestation and soil and moisture conservation cost	789.12
	<b>Total Cost of Forest Diversion</b>	<b>960.13</b>
<b>B.</b>	<b>Cost of Benefits of Forest Diversion</b>	
1.	Increase in productivity attributable to the project (as per Table-C)	250.00
2.	Benefits to economy due to the specific project (as per Table-C)	675.00
3.	Economic benefits due to direct and indirect employment due to project (as per Table-C)	860.00
4.	Economic benefits due to compensatory afforestation Economic benefits due to	1600.00
	<b>Total Benefits Diversion from the project</b>	<b>3885.00</b>

Benefit Cost Ration =3885.00/960.13=4.04

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

S.No.	Parameters	Estiated Cost (Rs. In Lacs)
1.	Ecosystem services losses due to proposed forest diversion (as per Table-B)	The estimated NPV (economic value of loss of eco system services) of the 12.330 hect. Forest land is Rs. 9000900.00/- or <b>Rs.90.01 Lacs</b>
2.	Loss of animal husbandry productivity, including 1 of fodder (as per Table-B)	10% of NPV i.e. Rs. 9.00 Lacs = <b>9.00 Lacs</b>
3.	Cost of human settlement (as per Table-B)	Nil
4.	Loss of public facilities and administrative infrastructure (Road, buildings, school dispensaries electric lines, railway etc.) on forest land or which would require forest land if these facilities were diverted due to the project (as per Table-B)	Nil
5.	Possession value of forests land diverted (as per Table-B)	30% of NPV = <b>Rs 27.00 Lacs</b>
6.	Cost of suffering of ousters	
7.	Habitat fragmentation cost	50% of NPV = <b>Rs 45.00 Lacs</b>
8.	Compensatory Afforestation and soil and moisture conservation cost	The estimated cost for raising the CA in 12.330 ha is RS. <b>Rs. 789.12 Lacs</b>
9.	<b>Total Environmental Loss</b>	<b>Rs 960.13 Lacs</b>

  
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**Table-V: Estimation of Benefits of Forest Diversion in CBA**

S.No.	Parameters	Estiated Cost (Rs. In Lacs)
1.	Increase in productivity attributable to the specific project.	Vegitable and fruits=500 Qtl.per year @ Rs. 1000.00 per Qtl.= 500x1000 =500000.00 Benifits for 50 Years =500000x50=Rs. 2500000 or <b>250.00 Lacs.</b>
2.	Benefits to economy due to the specific project.	Market development - taking 10 shops are established after construction of road taking minimum benefit per shop per day Rs. 250/- for 15 shops per year 15x30x250x12=Rs.13,50,000 Benefit for 50 years :- 1350000x50 = Rs. 6,75,00,000 or <b>Rs. 675.00 Lacs</b>
3.	No. of population benefited due to the specific project.	There is no displacement due to the project,therefore, the cost of human settlement is <b>Rs. 0.00</b>
4.	Economic benefits due to direct and indirect employment due to project.	<p>Employementgeneration due to other activies like transportation, market development etc. take 10 people get per month Rs. 6000 per month.Benefit for 50 years;- 10x6000x12x50 = Rs. 3,60,00,000 or <b>Rs. 360.00 lacs</b></p> <p>Tourism :- Employment growth due to tourism activities = 100000.00 per year man if 10 people get employment.Benefit for 50 Year 00000x10x50 = rs. 5,00,00,000.00 or <b>500.00 lacs</b></p>
5.	Economic benefits due to compensatory afforestation.	They compensatory afforestation will be done on 24.66 hectare 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 1.0 is INR 32.00 lacs per hectare (As per Forest Conservation Act (1980).By considering minimum 0.7 density the ecological gain for this project would be <b>Rs 1600.00 Lacs</b>
6.	<b>Total Benefits derived from the project</b>	<b>Rs 3385.00 Lacs</b>

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