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

**Name of Project**- "Development of Nagaur Tarnau Section of SH-19 From CH. 0.000 to 39.668 in the State of Rajasthan.."

**Nature of Proposal:** Diversion of 57.778 Ha. of protected forest land under FCA, 1980 for widening to Two lane with paved shoulder of existing road.

**Total Length of Project road section-** 39.668 km

**Number of District through which project road traverse** – 01 No i.e Nagaur

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

(a) Under Notified Protected Forest on PWD Land ( existing km 0/000 to Km 39/676, Design Km 0/000 to Km 39/668 )= 39.668  km ( Design Length)

**Total Forest area proposed for diversion**

(a) Under Notified Protected Forest on PWD Land Division Nagaur = 57.778 Hect.(PF)

Total Forest Land ( Nagaur)= 57.778 hect.

**Purpose:** The Cost of Benefit Analysis is being undertaken as the required forest land is > 20 hectare for proposed Diversion of Forest land being affected due to widening ( Two lane with paved Shoulder) 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

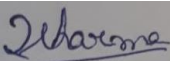| SL | Nature of Proposal | Applicable / not applicable | Remarks |
|---|---|---|---|
| 1 | All categories of proposal involving forest land upto 20 hectares in plains and upto 5 hectare in hills | Not applicable | These proposals may be considered on a case to case basis and value judgement. |
| 2 | 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 |

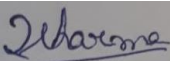| SL | | | |
|---|---|---|---|
| | | | ascertain that the utmost minimum forest land is diverted for non-forest use |
| 3 | Habitation, establishment of industrial units, tourist lodge complex and other building construction | Not applicable | These activities being detrimental to protection and conservation of proposals would be rarely entertained. |
| 4 | All other proposal involving 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 centres, TV towers etc. | <u>Applicable</u> | These are cases where a cost-benefit analysis is necessary to determine when diverting the forest land to non-forest use in the overall public interest. |

<u>Since the proposal is for diversion of forest land measuring more than 20 hectare in plane area for road project, cost benefit analysis report is applicable.</u>

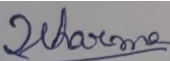Table -B : Estimation of cost of forest diversion

| SL | Parameters | Given Guideline | Evaluation |
|---|---|---|---|
| 1 | Ecosystem services losses due to proposed forest diversion | 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 Central Government ( MoEF & CC).<br><br>**Note-** In case of National Parks the NPV shall be ten | NPV value (as per of forest Conservation act 1980 is in between Rs 5.8 and 9.2 lakh per hectare.<br>However, NPV value for proposed diverted land is calculated by DFO office Nagaur Rs 2,53,06,764 or 253.067 lakh for 57.778 hectare of Eco Vaule Class-IV open forest land.<br><br>. |

| | | | |
|---|---|---|---|
| | | (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.<br><br>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. | |
| 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. | Loss of animal husbandry due to proposed diversion is very moderate and calculated below;<br><br>Gross loss @ 5 ton/Ha./ year. @ Rs. 100/- per tonne. Therefore, loss of fodder as estimated for about 57.778 hect.  will be 57.778 x 5 x 100 = Rs 28889 /yr. X 50 years = **Rs.1444450/- or 14.45 lakh**<br><br>**Further considering 10% of NPV will be** |

| | | | = Rs 253.06764 lakh ( NPV) x 0.1= 25.30 lakh<br><br>**So Considered amount (maximum one) is Rs 25.30 lakh.** |
|---|---|---|---|
| 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 lines, railway, 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 terms on actual cost basis at the time of diversion | 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.<br>The likely cost of these utility shifting is estimated **Rs 96 lakhs.** |
| 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 forestland **whichever is maximum.**<br><br>Note2:- Possession value of forest land diverted:- The forest land diverted for the project such as irrigation, hydropower, railways, roads, wind and transmission lines | Possession Value of forest land will be (considering 30% of NPV) = 0.3 x 253.06764 = **75.9 lakh**<br><br>Per hectare land rate along the highway in district Nagaur is as under:- |

| Village Name | Area in Ha | DLC Rate per Ha | Amount |
|---|---|---|---|
| Nagaur | 0.975 | 1957335 | 1908402 |
| Chenar | 3.645 | 1186240 | 4323845 |
| Fagli | 4.155 | 657374 | 2731389 |
| Athiyasan | 0.57 | 1186240 | 676157 |
| Basda | 3.105 | 543693 | 1688167 |
| Innana | 2.475 | 543693 | 1345640 |
| Ashpura | 3.015 | 543693 | 1639234 |
| Gagwana | 6.285 | 128509 | 807679 |
| Roll | 9.75 | 511586 | 4987964 |

| 5 | | 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. | Bugrda — 1.065 — 511586 — 544839 ... |

| | | | Name | | | |
| --- | --- | --- | --- | --- | --- | --- |
| | | | Bugrda | 1.065 | 511586 | 544839 |
| | | | Tangla | 1.725 | 511586 | 882486 |
| | | | Runiya | 5.115 | 244682 | 1251548 |
| | | | Fardod | 10.02 | 785884 | 7874558 |
| | | | Tarnau | 5.878 | 341044 | 2004657 |
| | | | **Total** | **57.778** | | **32666565** |

So Possession value of forest land (as per circle rate) = Rs.32666565 , **Say 326.67 lakh**

**So Considered amount (maximum one) is Rs 326.67 lakh.**

| # | Item | Description | Value |
| --- | --- | --- | --- |
| 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 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 253.06 lakh x 0.5= 126.5 lakh** |
| 9 | Compensatory afforestation and soil & moisture conservation cost | The actual cost of compensatory afforestation and soil & moisture conservation and its | As per DFO office , Nagaur CA cost estimated Rs 14964000 for 57.778 hect. forest land to be diverted. |

(Sangeeta Sharma)
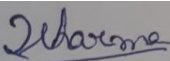12/10/2017
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PPP Division, P.W.D., Jaipur

| | | maintenance in future at present discounted value. | So total CA cost for 57.778 hect. Forest land to be diverted is Rs 14964000 **Rs 149.64 lakh** |
|---|---|---|---|

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

| SL | Parameter | Given Guideline | Evaluation |
|---|---|---|---|
| 1 | Increase in 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 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. Again directly the project will have the potential for temporary employment generation for local people 250 for 2 years generating 182500 mandays during construction period. |
| | | | Due to Up gradation of the existing highway, there will be overall development of the project area in terms of transportation of agriculture produces, easy access to education, health marked etc. As the project road also connect Jaipur, Bikaner, Jodhpur & Sikar, it has coneectivity with world famous Makrana Marble Mines on commercial aspects. |
| 2 | Benefits to | The incremental | Economic benefit in terms of increase in trade, |

| | | | |
|---|---|---|---|
| | economy due to specific project | economic benefit in monetary terms due to the activities attributed to the specific project | saving in vehicular operation and maintenance cost, better connectivity, safer journey to commuter and saving of travel time.<br><br>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 term will accelerate the rate of growth in this area.<br><br>"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. **however they have not been quantified as it will be a function of various govt. policy variables."** Exact quantification of the value is not possible as it is time and policy dependent. |
| 3 | No of population benefited due to specific project | As per Detailed project report | The proposed road section which is part of SH-19, traverses through NagaurDistrict which further connect Jodhpur, Sikar, Bikaner & Jaipur.<br><br>The population of these districts are; Jodhpur – 36,87,165, Sikar- 26,77,333, Bikaner – 23,63,937 and Jaipur – 66,26,178 total 132,54,613 persons which are directly benefited in addition to lakhs of neighbour district commuters as well as long distance travellers and fright. |
| 4 | Economic benefits due to of direct and indirect employment due to the project. | As per detailed project report. | Direct employment to 250 for **2-year during construction period** (accordingly 250- persons x 365 day x 2 years= 182500 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. |
|---|---|---|---|
| 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 of Compensatory afforestation.<br>*for benefit of CA the guideline of the Ministry for NPV estimation may be consulted. | In lieu of total trees to be removed from Proposed PRoW 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.<br><br>Apart from compensatory plantation/road side plantation. The compensatory afforestation will be taken up in about 57.778 hect x 2= 115.6 hect. of Degraded Forest land which is atleast two times of the area proposed to be diverted.<br>The compensatory afforestation will be done in 115.6 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 1.0 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 lakh x .7 x 115.6 = **INR 10255.8 lakh**. |

## Summary of Cost-Benefit Analysis for the Project.

| Sl. No | Loss (in Lakhs) | Benefit (in Lakhs) |
|---|---|---|
| 1 | Ecosystem services losses **Rs 253.06 lakhs** | Ecological gain from compensatory afforestation on 115.6 ( atleast) hectare of land would be **Rs = 10255.8 lakh** |
| 2 | Loss of animal husbandry productivity, including loss of fodder= **Rs 25.30 lakh** | 182500 -man days will be generated for unskilled/semi-skilled worker in terms of Salary and Wages @ Rs 500/day# (average) = **Rs 500 x 182500= 912.5 lakhs**<br>{# considering actual practical wages including lodging the average |

| Sl. No | Loss (in Lakhs) | Benefit (in Lakhs) |
|---|---|---|
| | | cost per day for semiskilled / labourer is approx. Rs 500 per day.}<br><br>Basic living amenities including alternative fuel (LPG, Solar Cooker etc) will be supplied to labours/workers.<br>Construction period- 2 years<br>Number of labours at peak time – 250<br>Approx 50% labour assume to be local<br>Per head cost of fuel –Rs.20/ per day for rest 125 labours<br>Total cost= Rs 20x125 labours x 730 days= Rs 1825000/- or **Rs 18.25 lakhs** |
| 3 | Loss of public facilities = **96.00 lakh** | |
| 4 | Possession Value of Forest land diverted= **326.67 lakh** | |
| 5 | Habitat fragmentation cost = **126.50 lakh** | |
| 6 | Compensatory afforestation and soil & moisture conservation cost= **149.64 lakh** | |
| | **Total cost/Loss = 253.06 lakhs + Rs 25.30 lakh + 96.00 lakh + 326.67 lakh +126.5 lakh + 149.64 lakh**<br>**= 977.20 lakh** | **Total gain/ benefit from project= Rs 10255.8 lakh + Rs 912.5 lakhs + Rs 18.25 lakhs**<br><br>**= 11186.6 lakh** |

**Cost Benefit Ratio** = Total Benefit/ Total Loss = 11186.6 : 977.20 = 11.4 which is > 1, so project is found viable based on given/above described criteria.

(Sangeeta Sharma)
12)10 |2017
Project Director - II
PPP Division, P.W.D., Jaipur

Date      13 10 20176

PD-II(PPP) Jaipur
PWD Rajasthan, Jaipur

Place        Jaipur