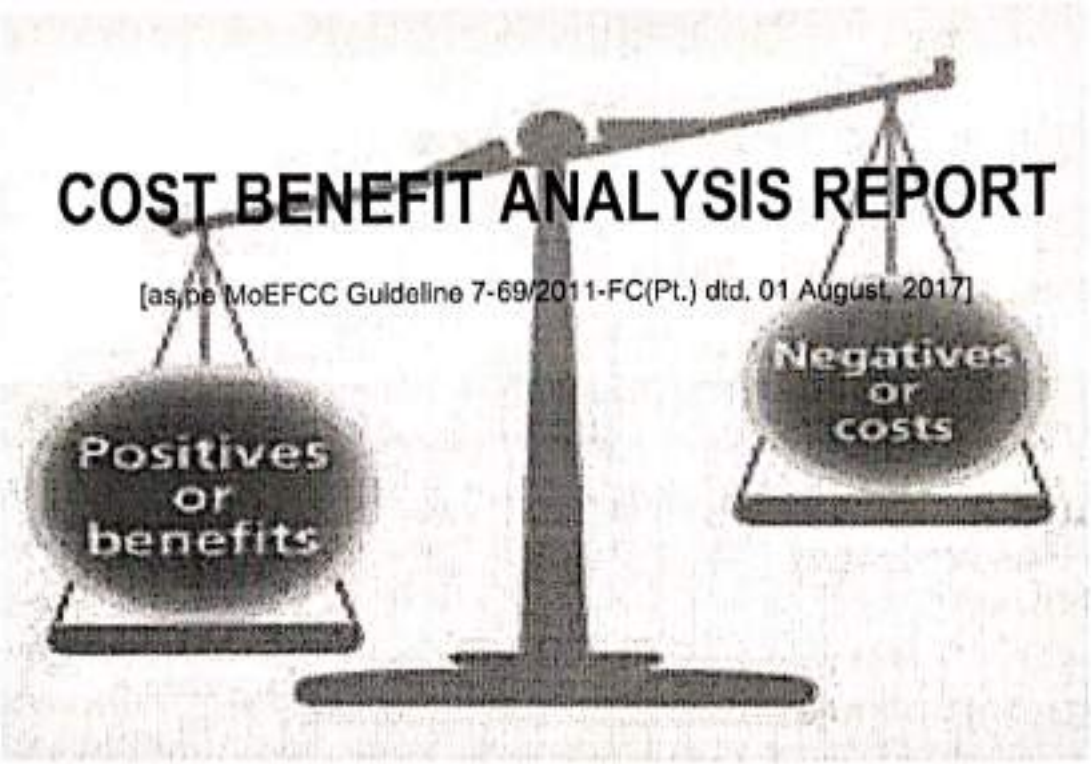

COST BENEFIT ANALYSIS REPORT

[as per MoEFCC Guideline 7-69/2011-FC(Pt.) dtd. 01 August, 2017]

CHANDRAGUPT OCP
(699.38 Ha Forest Land)

Chandragupt Open Cast Project
Amrapali & Chandragupt Area
Central Coalfields Limited
(A Miniratna Company)

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MANAGER
CHANDRAGUPTA OPENCAST PROJECT
CCL, AMRAPALI-CHANDRAGUPTA AREA

Cost Benefit Analysis Report

Name of Forest Proposal	Area
Chandragupt OCP (699.38 Ha)	Amrapali & Chandragupt Area

Introduction:

The Chandragupt Opencast project falls within Pachra and Pachra South geological blocks. It is located in the northern part of North Karanpura Coalfields and is included in survey of India toposheet no. 73A/13 and 73E/1 in Hazaribagh district of Jharkhand. Pachra Integrated project is bounded between latitude 23051'30" to 23054'45"N and longitude 85001'15" to 85003'15". Area of the Project: 14.95 sq km. The nearest railway station is Ray, which is at a distance of 37 km from the block on the Barkakana-Dehri-on-sone loop line of North-Eastern Railways. Tori is another railway station, located south-west of the block at a crow-fly distance of about 55 km on the above loop line. Coal mining activity has not yet started in these blocks. Mining activity in the adjoining block to the west of Barki River, namely Amrapali OCP is undergoing. The block is covered by different land types viz., forest, tenancy, GMK, GMA and JJ. The normative production of the project is 15.0 MTY of G-11 grade coal. The present report envisages the implementation of project in MDO Mode. This Report is being prepared for the partial fulfilment of making Forest Application for diversion of forest land for non forest use under Section 2 (ii) of FC Act 1980.

2.0 Purpose for Cost benefit analysis:

Cost benefit report is required for making on line application in Part 1, G.i.a. The report has been prepared on the basis of MoEFCC circular no. 7-69/2011-FC(Pt.) dated. 01 August, 2017. (copy Attached as Annexure A).

Table 1(a) : Breakup of Land

Area	Name of Project	Area as per Mine Plan	Total Area as per forest Application	Forest Land as per Application	Notified Forest as per Application	GMK JJ/Revenue Forest as per Application	Non Forest Land as per Application
A&C Area	Chandragupt OCP	1495	1495	699.38	498.17	201.21	795.62
							All figures in Ha

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3.0 Details of Project Affected Family (PAF):

Table 1(b) : Detail of Household shifting

No. of villages. to be rehabilitated	Name of village to be Rehabilitated	No. of Project affected person	No. of PAF to be shifted at R&R site	No. of tribal amongst PAF	No. of Tribal PAF opting for shifting within District
7	Bhadaikhap;Bukru;Chattibariyatu; Jordag;Nawakhap; Pachanda/Pachra;Peto; Sijhua;Ursu;	500	400	150	20

Table 2 (a) : Current Different Rates
Eco Value Class : Class III
Forest type group : Tropical dry deciduous forest

Sl no.	Different Rates	VDF(very dense forest)	MDF(moderately dense forest)	OF(open forest)	LDF (Low Density Forest)
1	NPV Rates in Rs./Ha	8,87,000	8,03,000	6,26,000	
2.	Rates of Compensatory Afforestation in Rs. / Ha	1,76,009	1,76,009	1,76,009	1,76,009
3.	Economic value of carbon storage in Rs./Ha	3,00,064	2,70,040	95,721	95,721
4.	Rate of moisture conservation cost Rs/ Ha/Year	1,951	1,269	527	103
5.	Economic value of carbon storage in Rs./Ha	13,947	9,024	4,101	823

Source: Revision of rates of npv applicable for different class/category of forests published by centre for ecological services management (CESM), Indian Institute of Forest Management (IIFM)), Bhopal in collaboration with Forest Survey of India (FSI), Dehradun, Nov. 2014

4.0 The details of nature of forest land for which application for diversion of forest land applied are as under:

Table 2 (b) : Rates of Net Present Value, Compensatory Afforestation, Carbon StorageS, Soil Conservation, Moisture Conservation applicable to forest application

Area	Name of Project	Economy Class of Forest	Type of Forest	Rate of NPV in Rs/Ha	Rate of CA in Rs/ha	Rate of Soil conservation in Rs/Ha/Yr	Rate of Moisture conservation in Rs/Ha/Yr	Rate of gain in Forest Cover due to CA in Rs/Ha	Rate of increase in Carbon Storage Cap due to CA in Rs/Ha
A&C Area	Chandragupta OCP	III	OF	626000	176009	4101	527	177000	174319

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Table 2(C) : Amount in Rs. Lakhs as per Table 2 (b) above for the forest application

Area	Name of Project	Amount of NPV	10 % NPV Amount	30 % NPV Amount	50% NPV Amount	Loss due to CA	Loss due to Soil & Moisture Conservation	Benefits due increase in Forest cover due to CA	Benefits of Carbon Storage due to CA
A&C Area	Chandragupta OCP	4378.12	437.81	1313.44	2189.06	1969.55	1061.65	1980.64	1950.64

Table 3 : Cost of Land as per Prevaling Circle Rate

Name of Village	Type of Land in Vicinity	Cost of Land as per Circle Rate in Rs. Lakhs
Bhadaikhap; Bukru; Chattibariyatu; Jordag; Nawakhap; Pachanda/Pachra; Peto;Sijhua; Ursu;	Agricultural	8168.77

Table 4 : Cost of human resettlement in Rs Lakhs

(As per R&R Policy)

Monetary Compensation to PAFs	Compensation to homestead for Alternate housing	Compensation to Homestead as Subsistence Allowance	Compensation to landless Tribal family	Cost of human settlement
8129.71	307.5	360.29	48.75	8846.26

5.0 Taxes levied and collected by Government

These taxes collected are used for the people and is thus directly related to benefits to economy / society.

Table 5 : Taxes collected by Government in Rs. Lakhs

CSR - 2% of Retained Profit	Royalty 14% of sales value	District Mining Fund	National Mineral Fund	Taxes levied as Coal Cess	GST collected for Expenditures (Capital/Revenue)	Stowing Cess	Other taxes if any (Management Tax Rs 1/te)
51605.92	717298.89	215189.67	14345.98	2007328	14018.42		0

Benefits due CSR activities as per Company's Act 2012.
Royalty Reference : (I)Extraordinary gazette , part II – Sec 3(i), MoC Notification New Delhi , the 10th May 2012
(II) Extraordinary gazette , part II – Sec 3(i), MoC Notification New Delhi , the 31st Aug 2016

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CALCULATION AS PER MOEFCC CIRCULAR NO. 7-69/2011-FC(PT.) Ddt. 01 AUGUST, 2017.

I. Estimation of cost of forest diversion

1. Ecosystem services losses due to proposed forest diversion

   Economic value of loss of ecosystem services due to diversion of forest = Net present value (NPV) of the forest land being diverted as per prescribed by the Central Government (MoEF&CC). As the Forest land proposed does not fall in National park & Wild life sanctuary

Therefore Ecosystem Service Lossess due to proposed diversion in Rs. lakhs= 4378.12
[(Ref Table - 2 (c))]

2. Loss of animal husbandry productivity, including loss of fodder

As per guidelines issued by MoEFCC, Loss of animal husbandry productivity, including loss of fodder is to be quantified and expressed in monetary terms or 10% of NPV applicable whichever is maximum.

Assuming no. of husbandry as 4 per family and factor of husbandry as 60 then,

No. of Project affected person	Loss of animal husbandry etc as per calculation in Rs. lakhs	Loss of animal husbandry etc as per NPV in Rs. lakhs
500	438	437.81

Since 10% NPV is more than calculated value.

Thus, as per guideline Loss of animal husbandry productivity, including loss of fodder in Rs. lakhs = **Rs 437.81 lakhs**

3. Cost of human resettlement

As per MoEFCC guidelines the cost of human settlement is to be quantified and expressed in monetary terms. For expressing the cost of human settlement the R&R policy of Coal India has been taken into consideration. The different components that has been considered are as follows:

(As per R&R Policy)

Monetary Compensation to PAFs - Monetary compensation @ Rs.5.0 Lakh per acre subject to a minimum of Rs. 0.50 Lakh. The compensation can be paid in form of annuity also on monthly, quarterly, annually etc. upto 60 years of age or life of project, whichever is earlier. Note : A person receiving employment forgoes all claims to monetary compensation and a person receiving monetary compensation forgoes all claims to employment. Compensation to homestead for Alternate housing - Compensation for homestead building as per

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standard valuation method under LA Act. Payment of Rs 3.0 Lakh in lieu of alternate housing site, assistance in designing & shifting, compensation for construction cattle shed and working shed etc.

Compensation to Homestead as Subsistence Allowance - Subsistence allowance to each affected family @ 25 days Minimum Agricultural Wages per month for one year. Compensation to landless Tribal family - Affected landless tribal families will be provided one time financial assistance equivalent to 500 days MAWs as a compensation for loss of customary rights.
Cost of human resettlement as per R&R Plan (in Rs. Lakhs) = **Rs. 8846.26**
(Ref Table – 4)

4. Loss of public facilities and administrative infrastructure:

As per MoEF guidelines the loss of public facilities and administrative infrastructure is to be expressed in monetary term which would require forest land if these facilities were diverted due to the project. The facilities may include roads, buildings, schools, dispensaries, electric line, railways, etc. On forest land.
Loss of public facilities and administrative infrastructure=**Rs 0**

5. Possession value of forest land diverted:

As per MoEFCC guideline 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. The Circle rate and 30% NPV calculated are as follows:

Possession value of Forest Land diverted as per Circle Rate in Rs. lakhs	Possession value of Forest Land diverted as per NPV in Rs. lakhs
3669056	8168.77

Ref Table - 2 (c) & Table - 3
The Cost of land as per circle rate is more than the 30 % NPV Value as such the
Possession value of forest land diverted in Rs. lakhs= 3669056

6. Cost of suffering of oustees

Cost of suffering of oustees As per MoEFCC guideline the social cost of rehabilittion 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 out as 1.5 times of what oustees should have earned in two years has he not been shifted. Accordingly, Cost of suffering of oustees in Rs. Lakhs = Rs. 10872

7. Habitat Fragmentation cost

Habitat Fragmentation cost As per MoEFCC guideline while the relationship between fragmentation and forest goods and services is complex, for the sake of simplicity the cost due to fragmentation

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has been pegged at 50% of NPV applicable as a thumb rule. Accordingly, Habitat Fragmentation cost in Rs. lakhs =2189.06 (Ref Table - 2 (c))

8. **Compensatory afforestation and soil & moisture conservation cost**

Compensatory afforestation and soil & moisture conservation cost As per MoEFCC guideline the actual cost of compensatory afforestation and soil & moisture conservation and its maintenance in future at present discounted value. Accordingly, Compensatory afforestation and soil & moisture conservation cost in Rs. lakhs = 3031.20 [Ref Table - 2 (b), Table - 2 (c)]

Thus as per MoEFCC guideline the estimated cost for the diversion of forest land is the sum total of Ecosystem services losses due to proposed forest diversion, Loss of animal husbandry productivity, including loss of fodder, Cost of human resettlement, Loss of public facilities and administrative infrastructure(Roads, buildings, schools, dispensaries, electric line, railways, etc.), On forest land, which would require forest land if these facilities were diverted due to the project, Possession value of forest land diverted, Cost of suffering of oustees, Habitat Fragmentation cost and Compensatory afforestation and soil & moisture conservation cost. Accordingly,

Total estimated Cost due to diversion of forest in Rs. lakhs = 37923.22

II. Estimation of Benefits of forest diversion

1. **Increase in productively attribute to the specific project**

These are to be quantified & expressed in monetary terms avoiding double counting. The productivity part is included in the other heads to follow and as such not included in estimating the benefits, though the productivity has been calculatedand tabulated as under :

Increase in productively attribute to the specific project in Rs. Lakhs = 3225370.26

2. **Benefits to economy due to specific project :**

As per MoEFCC guidelines the these befits are incremental economic benefit in monetary terms due to activities attributed to specific projects. These benefits may include benefits due to expenditure made on account of CSR activities as per company's Act 2012, Royalty to the exchequer, contribution to District Mining Fund (DMF), contribution to National Mineral fund, amount collected as Coal cess, Stowing cess where ever applicable and any other benefits. Accordingly, **Benefits to economy due to specific project in Rs Lakh=** 3019786.89

3. **No. of population benefitted due to specific project.**

As per MoEFCC guide lines no. of population benefitted due to specific project is to be worked out on the basis of project report. As such no. of population benefitted for this project has been worked out as under:

No. of population benefitted due to specific project = 37410

[Ref Table - 1(b)]

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4. Economic benefits due to direct and indirect employment due to project:

As per MoEFCC guidelines economic benefits due to direct and indirect employment due to project is to be worked out on the basis of project report. As such no. of economic benefits is as under :

Economic benefits due to direct Employment due to project in Rs. Lakhs	Economic benefits due to indirect employment due to project in Rs. Lakhs
79936.82	2980.33

[Ref Table - 1 (b)]

Economic benefits due to direct and indirect employment due to project in Rs. Lakhs = 82917.15

5. Economic benefits due to Compensatory afforestation:

As per MoEFCC guidelines these benefits are the benefits from such compensatory afforestation accruing over next 50 years monetised and discounted to the present value should be included as benefits of compensatory afforestation - For benefits of CA the guidelines of Ministry for NPV estimation may be consulted accordingly these benefits have been calculated on two heads namely benefits to CA & Benefits due to carbon storage by the afforestation done on CA land. The results are as under:

Economic benefits due to Compensatory afforestation only in Rs. Lakhs	Economic benefits due to Carbon Storage due to CA in Rs. Lakhs
1980.64	1950.64

[Ref Table - 2 (b) & Table 2- (c)]

From the above figure the total Economic benefits due to Compensatory afforestation can be estimated as sum of benefits due to CA & increase in carbon storage for the CA land. Thus the benefits is as follows:

Economic benefits due to Compensatory afforestation in Rs. Lakhs =3931.29

[Ref-Table–2(C)]

Thus as per MoEFCC guideline the estimated Benefits for the diversion of forest land is the sum total of benefits to economy due to specific project ,Economic benefits due to of direct and indirect employment due to project and Economic benefits due to compensatory afforestation. Accordingly, Estimated benefits due to project in Rs. Lakhs= 3106635.32

[Ref Table - 3].

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[illegible] AREA

These estimated Costs & estimated benefits are tabulated at table 7 &table 8 respectively.

Table 7 : Estimated Cost in Rs. Lakhs

Area	Name of Project	Ecosystem Service Lossess due to proposed diversion	Loss of Animal Husbandry Productivity, including loss of fodder	Cost of Human Settlement	Loss of Public facilities and administrative infrastructure	Possession Value	Cost of suffering outstees	Habitat Fragmentation cost	Compensatory afforestation and Soil & Moisture Conservation Cost
A&C Area	Chandragupta OCP	4378.12	437.81	8846.26	0	8168.77	10872	2189.05	3031.20

Table 8 : Estimated Benefits in Rs. Lakhs

Area	Name of Project	Increase in Productivity Attribute to the specific Project	Benefits to Eco due to Specific Projects	No. of Population benefitted due to specific Projects	Economic benefits due to direct and Indirect employment due to Project	Economic benefits due to compensatory afforestation
A&C Area	Chandragupta OCP	3225370.26	3019786.89	37410	82917.15	3931.29

The Cost to benefit ratio is the ratio of estimated cost (table 7) and estimated benefits (Table 8). The cost to benefit ratio for this forest proposal comes out as under:

Total estimated Cost due to diversion of forest in Rs. lakhs	Estimated benefits due to project in Rs. Lakhs	Cost to benefit Ratio
37923.22	**3106635.32**	**81.92**

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Annexure – A

Copy of

MoEFCC circular no.

7-69/2011-FC(Pt.)

Dtd. 01 August, 2017.

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No. 7-69/2011-FC(Pt.)
Government of India
Ministry of Environment, Forest & Climate Change
(Forest Conservation Division)

Indira Paryavaran Bhawan,
Jorbagh Road, Aliganj,
New Delhi-110003.
Dated: 01st August, 2017.

To

The Principal Secretary (Forests)
All States / Union Territories Governments.

Sub: **Guidelines for conducting Cost Benefit Analysis for projects involving diversion of forest land under the provisions of the Forest (Conservation) Act, 1980.**

Sir,

I am directed to inform that in supersession of all earlier orders / guidelines including that referred to at 2.6 of the Handbook of Forest (Conservation) Act, 1980 for conducting Cost Benefit Analysis of projects involving forest diversion, a revised set of guidelines has been prepared by the Ministry and shall be applicable for all projects involving diversion of forest land under the provisions of the Forest (Conservation) Act, 1980, which are required to be undertaken as per Table A of the new guidelines, from the date of issue of this letter. These guidelines will be applicable for all such projects which are yet to be recommended by the State Government on the date of issue of this guideline.

The guidelines for conducting Cost Benefit Analysis for projects involving forest diversion areas is enclosed herewith for further action.

This issues with the approval of competent authority.

Yours faithfully,

Encl: As above.

(Nisheeth Saxena)
Sr. Assistant Inspector General of Forests

Copy to:-
1. Prime Minister's Office (PMO)
2. Secretary, Ministry of Mines, Government of India
3. Secretary, Ministry of Coal, Government of India.
4. Secretary, Ministry of Steel, Government of India
5. Principal Chief Conservator of Forests, all States/UTs.

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6. Nodal Officer, the Forest (Conservation) Act, 1980, all States/UTs.
7. All Regional Offices, Ministry of Environment, Forest and Climate Change (MoEF&/C)
8. Joint Secretary, In-charge, Impact Assessment Division, MoEF&CC.
9. PS to the Hon'ble Minister of State (Independent Charge) for Environment, Forest and Climate Change.
10. Chairman, State Environment Impact Assessment Authority, all States/UTs.
11. Member-Secretary, State Environment Impact Assessment Authority, all States/UTs.
12. All Directors/Assistant Inspector General of Forests in Forest Conservation Division, MoEF&CC.
13. All Advisors/Directors/Dy. Directors in the Impact Assessment Division, MoEF&CC.
14. Director, Regional Office (Headquarters), MoEF&CC.
15. Sr. Director (Technical), NIC, MoEF&CC with a request to place a copy of this letter on website of this Ministry.
16. Sr. PPS to the Secretary, Ministry of Environment, Forest and Climate Change.
17. Sr. PPS to Director General of Forests and Special Secretary, Ministry of Environment, Forest and Climate Change.
18. Sr. PPS to Addl. Director General of Forests (Forest Conservation), Ministry of Environment, Forest and Climate Change.
19. PPS to IGF(FC), MoEF&CC.
20. Guard File.

(Nisheeth Saxena)
Sr. Assistant Inspector General of Forests

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MANAGER
CHANDRAGUPTA OPENCAST PROJECT

Guidelines for conducting cost-benefit analysis for projects involving forest diversion

(i) While considering proposal for diversion of forest land for non-forestry use, it is essential that ecological and environmental losses and eco-economic distress caused to the people who are displaced are weighted against economic and social gains.

(ii) Whenever the forest land is involved in the development projects, the cost of ecosystem services and fragmentation of habitat of wildlife and economic distress caused to people dependent on forests and the cost of settlement of people dependent on forest should also be added as the cost of forest diversion in addition to the standard project cost which would have been incurred by the user agencies without involvement of forest land while conducting the cost benefit analysis of the project. Similarly the benefits from the project accruing due to diversion of forest land and used in the project should also be accounted for in the benefits component in addition to the standard benefits of the project which would have been accrued without involvement of forest land while conducting the cost benefit analysis and determining the benefit and cost ratio (BC ratio).

(iii) The cost of compensatory afforestation and its maintenance in future and soil & moisture conservation at present discounted value and future benefits from such compensatory forestation accruing over next 50 years monetised and discounted to the present value should be included as cost and benefits respectively of compensatory afforestation while conducting the cost benefit analysis and determining the benefit and cost ratio (BC ratio).

(iv) **Table-A** lists the details the types of projects involving forest land for which cost-benefit analysis will be required. **Table-B** lists the parameters according to which the cost aspect of forest land diverted for the development projects will be determined, while **Table-C** lists the parameters for assessing the benefits accruing to the project using of forest land.

(v) A cost-benefit analysis as above should accompany the proposals sent to the Central Government for forest clearance under the Forest Conservation Act.

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

No	Nature of proposal	Applicable/ not applicable	Remarks
1	All categories of proposals 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 defence installation purposes 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 lodges complex and other building construction.	Not applicable	These activities being detrimental to protection and conservation of forest, as a matter of policy, such proposals would be rarely entertained.
4	All other proposals involving forestland more than 20 hectares in plains and more than 5 hectares in hills including roads, transmission lines, minor, medium and major irrigation projects, hydro projects, mining activity, railway lines, location specific installations like micro-wave stations, auto repeater centres, TV towers etc.	Applicable	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.

Table-B: Estimation of cost of forest diversion

SN	Parameters	Remarks
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 the Central Government (MoEF& CC). ***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*
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
3	Cost of human resettlement	To be quantified and expressed in monetary terms as per approved R&R plan
4	Loss of public facilities and administrative infrastructure (Roads, building, schools, dispensaries, electric lines, railways, 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

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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 forestland whichever is maximum
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.
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.
	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

Table-C - Existing guidelines for estimating benefits of forest-diversion in CBA

Sr. No.	Parameters	Remarks
1	Increase in productively attribute to the specific project	To be quantified & expressed in monetary terms avoiding double counting
2	Benefits to economy due to the specific project	The incremental economic benefit in monetary terms due to the activities attributed to the specific project
3	No. of population benefited due to specific project	As per the Detailed project report
4	Economic benefits due to of direct and indirect employment due to the project	As per the Detailed project report.
5	Economic benefits due to Compensatory afforestation	Benefits from such compensatory forestation accruing over next 50 years monetised and discounted to the present value should be included as benefits of compensatory afforestation. *For benefits of CA the guideline of the Ministry for NPV estimation may be consulted.

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.

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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 costs due to loss of forests.

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