

An Analysis of Forest Diversion for Developmental Projects and Its Environmental Impact: A Case Study of Chandrapur Forest Circle in Maharashtra, India

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Abstract: *Forest diversion is process of land use change from area under forest to non forest purposes. Once much of the surface of earth was under forest land use, but today it is a trend in every nation to divert the forest land into agriculture, industry, housing, roads, railways and many other civil as well as developmental works, consequently area under forest is reducing rapidly and it is becoming impossible to maintain 33 percent forest area as stated in National Forest Policy, 1952. It is stated in this forest policy that, if India need the balance development; it should bring 1/3 of its total geographical area and 2/3 of hilly area under forest. But till today India has not achieved this target; contrary forestlands are reducing, degrading and diverting for other developmental projects. These diversions of forest is keeping its intensive negative impact on ecological aspects including local climate, agriculture, soil, temperature, forest based employment, fertility, wildlife corridor movement, food chain, soil erosion and man-animal conflict etc. Chandrapur forest circle is a unique area regarding man animal conflict in India; it is considered as an important source region of tigers, it is also biggest forest circle of tigers in the world having more than 150 tigers. So far, the forest diversion keeps negative impact on ecology and environment in the district which should be analyze; this is an effort to establish the ecological loss due to forest diversion in Chandrapur district of Maharashtra.*

Key words: *Forest diversion, developmental projects, adverse impact, solutions*

I. Introduction

Today we are living in an era of Industrialization, privatization, globalization and liberalization. All these economic processes have pushed the Indian forests in the crunch of deforestation and degradation. Many of the companies are being operated in dense forests for their economic reimbursement. Mostly the economic activities in forest are related with mining which degrade forest beyond regeneration and revitalization. Every state of India is facing problems related with the mining activities; but some other industrial activities are also contributing to degrade the forest resources and hamper the balance flora and fauna. Mining activities in India has destroyed about 95,003 ha of forest land between 1980 and 2005. According to one estimate about 1, 64,610 ha of forest land is diverted from forest to other purposes in India. Forests in Maharashtra are facing acute danger from developmental projects. Expansion of airports on mangrove, permission to new tourist towns on the hillocks i.e. Ambi valley; Lavhasa; various SEZs and mines are destroying and degrading the rich forest in the state of Maharashtra. Major forest areas of the state are also potentially mineral areas; Nagpur, Chandrapur, Yeotmal, Bhandara, Kolhapur, Raigarh, Sindhudurg, Gadchiroli and Thane are mineral district as well as forest district in the state. According to one official estimate about 4057 ha forest land of the state has been diverted for the developmental projects in 1980 - 2005. This is a legal and official data; however no data is available about minor mines and illegal mines which are operating in the forest of the district as well as in the state of Maharashtra. All these developmental projects operating in deep forest of state are hampering the ecology and environment beyond repairable limit. Chandrapur district is being appeared as most influenced district in the concern of developmental projects and its environmental impact. This is very important district in whole Maharashtra state in the concern of wildlife. This district has about 150 tigers in its territory; highest in any district of the world, about 69 tigers roam in TATR territory alone and rest in the buffer forest of the district. This district is also important in the concern of man animal conflict between people and tigers as about 70 people have lost their lives in the tiger attack in last 5 years. All these incidents are increasing rapidly nowadays mining and many other projects are introducing in the deep forest of the district. So far, it is very essential to calculate the real impact as well as a potential impact of mining and other developmental activities on the flora and fauna of district.

II. Study area

Chandrapur circle is located in eastern Maharashtra. The forests of Chandrapur circle are dense and deep from historic times. Forests of study area are known as Dandakaranya from epic times. The Chandrapur

district has 11443 sq. km geographical area, of which 5010 sq. km area is under forest. The forest area is divided in regular forest area (3969 sq km); revenue forest area (102 sq km) and FDCM forest area (939 sq km), while Chandrapur forest circle has about 9870.68 sq km of forest area of which forest cover is 2730.49 sq km i.e. about 27.66 percent. The circle lies between $18^{\circ} 24'$ north to $20^{\circ} 3'$ latitudes and $78^{\circ} 30'$ to $80^{\circ} 36'$ east longitudes. The study area has three forest divisions i.e. Chandrapur, Central Chanda and Bramhapuri. About 1101.77 sq km area of the circle has been transpired to TATR in 2011 for tiger project. The entire study area falls under tropical deciduous forest; leaves of the trees drop in summer times; while new buds to branches appears in beginning of monsoon. The forest circle consist 15 talukas; having about 1736 villages; most of the southern part of the Chandrapur forest circle is affected by the Naxalite activities. Madia, pardhan and gond are the tribal people residing in the forest of Chandrapur circle. Northern limit of the study area touches to Nagpur forest circle; Eastern limit with newly made Gadchiroli forest circle, western limit touches to Yaotmal forest circle and southern with forest territory in Andhra Pradesh.

III. Review of literature

Many of the forest conservator, environmentalist, Non Governmental Organizations and governmental bodies have studied the degradation of forest in entire India as well as world. A Comprehensive study of Impact of Mining activities on forest in India has been studies by Centre for Science and Environment; New Delhi (2008) studied comprehensively the Impact of mining activities in forest areas and published ‘State of India’s Environment 6th report’ i.e. Rich lands Poor people. R K Tiwari (2001) has studied the impact of coal mining on water regime and its management. Anil Chitade (2010) has analyzed the impact of coal mining activities through GIS techniques; in Irai river bank of Chandrapur district. He concluded that the dense vegetation of study area has been converted into mine pits or artificial hillocks. A governmental monitoring agency i.e. MPCB has comprehensively analyzed the mining as well as other developmental project’s impact located in study area and prepared a detailed action plan to curb the environmental pollution (2006); as per this plan the Chandrapur city has critical pollution level as there are about 702 industrial units which are pollution the surrounding in study area. Present author also analyzed the land use change in study area because of urbanization and industrializations. Greenpeace India (2011) has also studied the landscape of Chandrapur district to interpret the impact of coal mining activities in deep forest of Chandrapur and buffer zone of TATR. Greenpeace warned to the state and center government in their report about the grave consequences if further diversion of forest is granted in Chandrapur district. This author (2012) also has studied; how potential impact will occur of upcoming thermal power plants in study region. According to author, present man animal conflict existing in the district forest will intensify if the development projects granted in the district.

IV. Objectives of study

The present paper has to analysis current adverse impact of developmental projects in Chandrapur forest circle as well as to predict the future similar impact and suggest to the state govt. regarding any inverse impact of current forest diversion.

V. Database and Methodology

Present study is based on secondary data got through right to information act, 2005 from the PCCF office, Nagpur. Data is also collected through open sources i.e. govt. of Maharashtra forest department site as well as RTI information from CF office, Chandrapur. Study period of this study is selected for 30 years to analyze the adverse impact of different development projects. To estimate the impact absolute area which is diverted from forest to non forest is considered. Analysis is based on Chandra Bhushan and Monali Zeya Hazra (2008) analysis devoted interprets mining impact on the forests of India. Evaluation of the forest loss is calculated through comparing actual forest cover at present time with previous forest maps and statistics. Satellite imageries provided by earth.google.com and Land sat imageries from <http://glovis.usgs.gov/> have been used to assess the land use change because of developmental projects.

Data for this study is taken from 1981 to onwards as it the forest conservation act 1980, implemented in whole India except Jammu and Kashmir, and data regarding diversion of forest form forest to non forest use is available from 1980. Statistical data from the office of PCCF, Maharashtra has been acquired through right to information act, 2005 and analyzed to establish the overall impact of developmental projects. As there is already much loss of forest area before 1981; of which the statistical data is not available, satellite imageries of the district is used to calculate the forest diversion. The coal mining in Chandrapur district are operating from 1860; and some of the mines are in forest area before 1981 of which images are available, satellite images considered a tool to compute the mining impact on forest area.

VI. Chandrapur forest circle

Chandrapur forest circle has three divisions i.e. Chandrapur, Central Chanda and Bramhapuri. All these three divisions are rich in the concern of wildlife; but same time this entire forest is facing a threat of various developmental projects in the deep forest. Chandrapur forest circle consists with regular forest; Tadoba Andhari Tiger Researve (TATR) forest and Maharashtra Forest Development Corporation (FDCM) forest area. All the Chandrapur forest circle is divided on three levels i.e. Division, range, Round and beats for the better management purposes. The Chandrapur division is divided into 8 Ranges; 24 Rounds and 100 Beats. While Bramhapuri Division is divided into 7 Ranges, 27 Rounds and 116 Beats, and Central Chanda Division is divided into 7 Ranges 74 Rounds and 95 Beats. The entire territorial parts with their respective areas are as under.

Table 1, Forest in Chandrapur district **(Area in Sq. Km.)**

Division	Geographical area	Reserve forest	Protected forest	Unclassified forest	Total area	Percent of forest
Chandrapur	3252.50	227.79	116.80	17.64	362.23	11.14
Bramhapuri	3863.54	802.22	437.30	11.92	1251.44	32.39
Central Chanda	2754.64	862.87	195.75	58.20	1116.82	40.54
Chandrapur circle	9870.68	1892.88	749.85	87.76	2730.49	27.66
TATR		1165.20	145.56	14.93	1325.69	13.43
West Chanda (FDCM)		167.16	--	--	167.16	1.69
Central Chanda (FDCM)		311.35	2.26	--	313.61	3.18
Bramhapuri (FDCM)		281.37	--	--	281.37	2.85
Total Chandrapur district		3817.96	897.67	102.69	4812.32	48.81

(Source: <http://www.mahaforest.nic.in>)

Above data regarding forest clearly indicate that there is much forest area in Chandrapur district. About 48.81 percent of the total geographical area is under forest and it is much high as compare to minimum criteria drawn by forest policy of India. The data itself indicate how forests are important in the district. But actual forest cover in the district is much less, as per the satellite data and governmental agencies forest cover in Chandrapur district is about 34.49 percent only. Therefore it is very important to conserve the forest to maintain to the criteria of national forest policy, 1952.

VII. Developmental projects in Chandrapur forest circle

Developmental project which have been finally sanctioned in the forest of Chandrapur circle are related with forest department rehabilitation projects, irrigation projects, MSEB (Maharashtra State Electricity Board) projects, mining projects, water supply projects, railway projects and other projects. All these projects in Chandrapur district stands to 69 in strength and destroying the forest in study area. Different developmental projects and their respective land in ha are as under

Table2, Mining projects in Chandrapur forest circle

Sr. No.	Name of the project	Area in ha	Date of proposal	Sr. No.	Name of the project	Area in ha	Date of proposal
1	Murpar Underground coal mine	680.78	13/07/2001	2	Padmapur Opencase mine	5.66	16/10/1998
3	Dhorwasa Opencast mine	26.44	16/10/2002	4	Vekhande Minerals, Nanduri	2.43	03/09/1998
5	Basalt Mine, S. Chanda	8.093	30/01/1982	6	Manikgarh Cement, Limestone mine	264	04/02/1986
7	White clay mine	17.81	22/09/1989	8	WCL opencast, Padmapur	18.44	08/10/1998
9	Durgapur Opencast, coal mine	136.54	19/0/2006	10	Durgapur Rayyatwari, UG	1172.74	11/08/2006
11	Jaidip Minerals, Nanduri	2.65	24/07/1998	12	Hindustan Lalpath, Opencast	72.22	08/05/2001

13	Jaidip Minerals, Nanduri	7.7	24/07/1998	14	Durgapur Opencase Mine	172.54	12/06/2002
15	Gohara Ironore, mine, Gunjewahi	4.63	09/11/2005	16	Durgapur Opencase Mine	80.77	08/11/2005
17	Maratha Cement, Pagdiguddam	0.3524	26/12/2005	18	Quarries proposal	47.847	15/12/1995
19	Belgaon UG Coal mine	55.91	02/02/2011	20	Manikgarh Cement, stone	247.96	28/11/2001
21	Subai coal mine, Virur	676.87	20/03/2001		Total Area 3702.3824 ha		

Table3, Irrigation projects in Chandrapur forest circle

Sr. No.	Name of the project	Area in ha	Date of proposal	Sr. No.	Name of the project	Area in ha	Date of proposal
1	Bhipiti Chuwa Mit	47.2	28/07/1995	2	Laying of 11 K.V. Electric line for Kirimiri Darur life irrigation scheme	1.7185	18/01/2008
3	Pagdiguddam Project	23.3	04/02/1993	4	Bhasboram Mit	88.056	31/07/1995
5	Bhendara Medium Project	64	13/09/005	6	Gosekhurd left bank canal Realignment (Orignal 713.127 ha)	17.8	23/06/2011
7	Pimpri Dixit Mit (Chanda)	91.34	28/07/1995	8	Umri Mit	139.76	09/02/1976
9	Jamkhurd lift scheme	0.954	24/01/1993	10	Chak Asta No. Li. M. I. t	11.65	15/07/1999
11	Dongargaon Mit (South Chandrapur)	237.59	22/06/2010	12	Borghat Lift Irrigation Scheme	0.71	02/03/2009
13	Labhansarad Nullah Project	99.424	28/09/1987	14	Golabuj Mit (Chanda)	35.1	30/04/2001
15	Construction of Rbc Main Canal 28 Mto 50 km, Gosekhurd project	105.605	01/10/2001	16	Palasgaon Amdi lift irrigation shcheme	11.5	23/05/2008
17	Wagholi Buti lift irrigation scheme	1.46	26/02/1997	18	Mangli Mit Chanda	133.13	28/07/1995
Total area : 1110.2975 ha							

Table 4, MSEB Projects in Chandrapur forest circle

Sr. No.	Name of the project	Area in ha	Date of proposal	Sr. No.	Name of the project	Area in ha	Date of proposal
1	66 K.V. T/l Chandrapur	10.8	13/05/1992	2	33 K.V. Chimur to Murpar	4.68	03/07/2000
3	400 K.V. Bhilai Wadasa Chandrapur	155.23	05/05/1989	4	66 K.V. T/l Chandrapur	7.74	13/05/1982
5	400 K.V. T/l Chandrapur to Ramagundam	3.64	05/01/1989	6	500 K.V. K/l Chandrapur to Padga	0.8521	18/05/1992
7	200 K.V. Warora to Chanda (WCL)	2.70	30/05/1987	Total Area: 185.6421 ha			

VIII. Major findings

Statistics regarding forest diversion for the developmental projects shows that about **4998.322 ha** of the forest land has been diverted in alone Chandrapur Circle between 1981 and 2010. This diversion has kept its impact on the ecology and environment of the district. Various environmental problems in the district exhibit this impact. About 3702 ha of forest land has been diverted for mining activities, 1110 ha for irrigation projects and about 186 ha of forest land is diverted for MSEB i.e. electricity purposes. Total forest diversion in study area goes to 4998.322 ha in study period and it is huge area. Chandrapur is a mining district having about 34 coal mines and producing about 8 lac tones of coal per year. But these coal mines influences intensively on the flora in study area. 3702 ha of forest land which is diverted to the mining purposes; consist about 74.06 percent of the total diversion in Chandrapur forest circle. Second developmental sector which diverts the forest land is irrigation sector which comprises about 22 percent of the total diversion and about 6 percent diversions held related with power sectors; in study period.

Concluding remarks

- I. **Loss of forest corridors:** The forest corridors in the circles are encroaching as well as degrading because of mining activates. Loss in the forest corridors kept its influence on food sequence of wild animals. Satellite images clearly indicate that the north and south corridors of the TATR are cutting. North corridor in the circle joins TATR to Nagzira as well as Bor wildlife sanctuary while south corridor joins TATR to Kawal as well as Indrawati wildlife sanctuary.
- II. **Increase in the man animal conflicts:** Man animal conflict in Chandrapur forest circle is very high; about 80 people have been killed by the wild cats in the district along with destroying the agriculture crops. This conflict increase in recent year and sanctuary in this circle i.e. TATR become much notorious for this conflict. Beside this poachers have killed about 40 tigers in Chandrapur district in last 5 years. In the month of Feb 2013 alone about 8 people loose live in man-animal conflict.
- III. **Restriction on wild animals:** google.earth.com and Land sat images clearly indicate that the over bund dumps of the coal mines as well as deep quarries are becoming an obstacle in the way of wilds, consequently the wilds are entering in the city area along with the over bund dumps. Events of entering the wilds in settlement area have frequently appeared recently.
- IV. **Reduction in forest area:** Chandrapur circle merely maintaining the minimum forest area as per forest policy of India, 1952 as it has only 27.66 percent forest area in the circle, and very far from the 1/3 forest cover.
- V. **Power line thread:** poachers are using the electricity to kill wild animals in the forest area, wires form the above electric poles have runs to the waterhole and killed to tigers in some places.
- VI. **In-breeding of wilds:** Inbreeding is a big danger for wild animals, the forest and its corridors are degrading due to various developmental activities in the district which tend to the animals to inbreed within them. Animals keep sexual relation with the animals having blood relation; which results the week cubs, reduce in fertility, Genetic disorder, lower birth rate, higher infant mortality, slower growth rate, smaller adult size, loss of immune system, fluctuating facial asymmetry etc.
- VII. **Warming of the area:** Chandrapur is an industrial as well as pollution hub; the forests around the city are responsible to reduce the impact of pollution. Diversion of the forest in Chandrapur circle has shown the increase in the night temperature in the region. The Chandrapur city is known in India as a hottest city, night temperature do not fall considerably.

Suggestion

- I. The forest diversion in Chandrapur forest circle has lead to destruction of forest in large scale and lead to create the man-animal conflict. It is suggested to maintain the forest cover in the district up to 1/3rd as stated in the National forest policy. Present forest cover 27.66 percent should be increased to threshold level.
- II. Important corridors of the forest circle should be recovered through forestation to allow the animals to access through.
- III. It is strongly suggested not to divert the forest further for developmental projects as it is already huge diversion beyond recover.
- IV. Translocation of the wilds is suggested to control the inbreeding among wild.
- V. Rehabilitation of the core villages should be take place to avoid the man-animal conflict.
- VI. Coal mines are became the big threat to the forest cover and should be restricting to maintain the green cover.

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