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Impact of Industries and Mining in Bokaro District (Jharkhand) : A Geographical Study

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Abstract :

Urbanization is a dynamic process, which transforms the rural into urban areas and gives the impetus of growth to the other existing urban areas. The rate of urbanization in India has increased after 1951 due to the growth of secondary and tertiary sectors of economy. Jharkhand is one of the richest states of India in terms of its natural resources, forest and minerals etc, but due to rugged topography and dense forest this region remained isolated for a long time from the other parts of the country. Process of urbanization favoured by mineral exploitation and industrialization has been main factors for rapid demographic change in Jharkhand. In Jharkhand, Bokaro district plays a very important role as it is one the most urbanized districts of the state having 47.70% of its population as urban, due to its industrial as well as mining belt. The present paper tries toanalyse the impact of industries and mining in Bokaro district. For this purpose a micro level survey has been conducted on approx. 200 people of Bokaro district. Paper is based on data obtained through primary as well as secondary sources. Findings reveal that industrialization and development process were no doubt beneficial for that area but over exploitation of natural and human resources creates.

Key Words :Industries, Mining, Urbanization, Bokaro, Chotanagpur, Population.

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Introduction :

Urbanization is the process of becoming urban. Geographers use the term "Urbanization", more commonly to describe a process of transformation from rural to urban areas. It is a part and parcel of socio-economic development. It is a dynamic process, which gives the impetus of growth to the other existing urban areas. Urbanization occurs when the rural character of a settlement is gradually replaced by urban character in terms of physical, social-economic and demographic features.

The process of urbanizationdepends upon mainly three aspects,viz. behavioural, structural anddemographic aspects. The behaviouralaspect of urbanization refers to thechanges in the pattern of behavior ofpeople living in urban areas. Butstructural aspect of the process ofurbanization refers to the changes inthe economic structure of the economicactivities of the whole population. Ithighlights the transformation of aprimary activity based economy to anon-primary activity based economy.The demographic aspect ofurbanization refers to the process ofpopulation of total population residingin urban areas of a given regionincreases and it also involves theabsolute and relative growth of townsand cities within a defined region, i.e.the number and size of towns in aregion increases.

Since, 1950 the most rapid growthin urbanization has occurred ineconomically less developed countrieslike Asia, Africa and South America.From 1950 to 1990 the urbanpopulation living in less economicallydeveloped countries became double- InIndia urbanization has a long pasthistory but the country has remainedprominently rural in respect ofpopulation composition. Cities andtowns have been experiencingconsiderable attention due to the largenumber of people migrating to urbanareas and its consequent effect. Urbanlifestyle and consumption patterns havefar reaching and long term effects notonly on its immediate boundaries butalso on the entire region in which it islocated. The rate of urbanization inIndia has increased after 1951 due tothe growth of secondary and tertiarysectors of economy.

Development of mining activitiesalso accelerate the process ofindustrialization and urbanization inany region. Mining is considered as avery ancient human activity, butgenerally has been regarded as aprimary

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activity. In India too, till thecensus of 1961, it was considered aprimary activity but, since 1971census onwards, it has been given thestatus of an industry and has become asecondary sector activity. This wasdone because it was felt that the wholeprocess of mining was highlymechanized and organized on the linesof an industry. Many times, centers ofmining activities develop as urbancentres. The development of miningactivities leads to the establishment ofindustries in many cases and thisresultant industrialization leads to theurbanization in such areassubsequently. The development ofindustries in an area leads to thedevelopment of employment opportunities, new transport network, trade andcommerce and public services. Itsubsequently attracts finance capitaland human capital (money, men andmaterial) to the place which give rise tourban centres.

The increase in urban populationin India from 1951 to 2011 is 377million that indicates urban populationincreased approx. 5.1 times in between1951 and 2011. 31.16% of population was living in urban areas as per2011 census.

During the latter half of the 20thcentury, the newly formed Indiangovernment started setting up severalmining and industrial units forpromoting the process ofindustrialization and urbanization in thebackward regions of India. PrimeMinister Nehru firmly believed that "nocountry can be politically andeconomically independent unless it ishighly industrialized and has developecits resources to the utmost." Nehru'' ideas about India's development werebroadly incorporated in free India's firs'Industrial Policy Resolution adopted bthe constituent assembly in 1948. Ikeeping with resolution it was decideto establish a chain of steel plants aover the country in the public sectoThe first such plant was set up Rourkela in Orissa followed by BhilaiI M.P, Durgapur in West'Bengal and their followed by a steel plant at Bokaro erstwhile Bihar state (presently iiJharkhand state).

Jharkhand is a small state, which is situated in the north eastern part of theIndian peninsular plateau. It was carvedout of the southern part of Bihar on 15Nov. 2000. Due to its ruggedtopography and dense forest thisregion remained isolated for a long timefrom the other parts of the country. Butat present, industrialization andurbanization were main factors forrapid demographic change inJharkhand. According to 2011 censusout of

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32,966,238 total populations, 9,33,061 people (24.06%) were livingin urban areas. The urban populationis growing at a ratio of 2.3% perannum.

In Jharkhand state, Bokaro districtplays a very important role becauseBokaro district is one of the mosturbanized districts in Jharkhand due toits industrial and mining belt. Bokarodistrict also known for the houses ofdifferent companies like Steel Authorityof India Limited (SAIL), BharatRefractories Limited, HindustanSteelworks Construction Limited,Damodar Valley Corporation (DVC),Subsidiaries of Coal India Limited,Electrosteel Casting Limited, BokaroPower Supply Company Pvt. Limited(BPSCL), Indian Explosive Limited,Jaypee Group, Oil and Natural GasCorporation (ONGC) and many more.

However during last 50 years ithas undergone several changesregarding its urban landuse, morphology, environmental degradation etc.which are the part of the impact ofmining and industrial activities. Thegrowing population and haphazardgrowth of new settlements especiallyalong its periphery has posed adverseimpacts which causes urban problemsand challenges. Bokaro district stillpossesses a strong multi-dimensionaleconomic base that attracts people fromall over country.

Study Area :

Bokaro district of Jharkhand is oneof the most industrialized districts ofIndia. It was established in 1991 bycarving out one subdivision consistingof two blocks from Dhanbad district andsix blocks from Giridih district. BokaroSteel City is the district headquarter. Itcovers a geographical area of 2883sq.Km. The population is drawn fromall parts of India. The population is welleducated and urbane. The populationwas 1,777,662 in 2001 censusgrowing to 2,062,330 in 2011 census.It has an average literacy rate of73.48% which is much higher than thenational average of 59.5%. The districtis well served by railways and roadways.

Objective of the Study :

- To study the impact of industriesand mining in Bokaro District.

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Hypotheses of the Study :

- Mining and Industries degrade theland, forest and water resources.
- The pollution of natural resourcesdegrades the quality of human life.

Delimitation of the Study :

- The paper is confined only toBokaro District of Jharkhand.
- The study has been conducted to assess the impact of industries of mining in Bokaro District which may have some generalization.
- The sample size is limited to approximately 200 respondents only.

Methodology :

The paper is based on empiricalobservations and detailed micro levelsurvey conducted by the researcher withthe help of questionnaire cum interviewschedule filled by individualrespondents. A total of 200respondents were interviewed followingthe principle of purposive randomsampling. Some of the findings of thesurvey are in the form of statementswhile some are in the form of figures.Secondary data and relevantinformation have also been obtainedfrom different series of census of India.

Selected Parameters :

- Impact on Land.
- Causes of Severe Soil Erosion:-
- Haphazard Mining.
- Depleting of existing vegetation.
- Shifting of overburden and reject dumps.
- Excessive underground mining etc.
- Mostly fertile land used by the industries.
- Unplanned and haphazard dumping of solid wastes of industries and mining.

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Impact on Water :

Causes of degradationof underground water, rivers and streams.

- By human activities.
- By mining wastes.
- By effluents discharged from mine site.
- By industrial wastes.

Impact on Forest Causes of Forest

Degradation :

- Due to the Industrialization.
- Due to the uncontrolled mining for minerals.
- Due to legal or illegal forest outing.

Impact on Quality of human life.

- Impact on Air.
- Impact on Water.
- Impact on Noise.
- Impact on Green cover and Open space.

Table No. – 1

Sample Survey Selection Procedure

Sl. No.	Mining & Industries	Selected Areas	No. of Respondents
1	Coal mines	Bermo&Phusro	20
2	Coal mines & Explosive factory	Gomia	20
3	Thermal power	Chandrapura	20
4	Do	Tenughat	20

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5	Industry	Telgariya (Chas)	20
6	Do	Mahura&Kanari (Sec – IX)	20
7	Do	Kanphatta&Panchora (Sec. IX)	20
8	Sand mines	Kandra&Namarkudar	20
9	Do	Bhatua&Pupunki	20
10	Stone mines	Patharkatta&Ukrid	20
	Total	10	200

Procedure of data collection

Table no. I gives the detail of sample survey procedure of selected areas and total number of respondent chosen on the basis of above parameters.

Table No. -2

Composition of Respondents of study area

(Based on Primary Data)

No of Household	Total No. of Respondents	Male	Female
100	200	140	60

Result and Discussion :

The purpose of this study is toidentify the impact of industries andmining in Bokaro District. However, theBokaro district at present is facingseveral challenges which are hamperingits prospects of development

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due to theimpact of unchecked urbanization andalso due to the impact of industries andmining. Bokaro district on account ofits richness on some key ores andminerals and its abundance in cheaplabour has been the site of severalindustrial establishments since pre - Independence days. In the process ofthe developmental activity large forestscovered have disappeared. Water in theregion around industrial areas has beenpolluted to an extent far exceeding theprescribed safety level.

In fact polluted water carried downthe streams and rivers spreadshazardous chemicals in distant areasalso. Industrial pollution is alreadyplaying havoc with the life and healthof the people of the region.

Impact of mining and industries in Bokaro district are as follows:

Impact on Land :

The large scale coal mining inChadrapura, Gomia, Bermo andPhusro; sand mining in Kandra,Namarkudar, Bhatua and Pupunkistone mining in Pattarkata and Ukrietc. and allied activities like steel plan in Bokaro Steel City and Electrosteeplant in Telgaria (Chas), Explosivfactory in Gomia, Cement factory I BIADA going on in the Bokarodistrichas caused severe damage to the lanresource of the area- Mining degrade the land because mineral base production units like coal- fired poweplants, Steel plants andCemenfactories are located near the mines Mining exploration in Jharkhand statmainly in Bokaro district has beendetrimental to the environment and ithas caused great soil erosion. Manypeasants working on the land areignorant of the environmental impact ofvarious mining activities. They are notaware of the techniques which are bestsuitable for the environment and canprevent soil erosion.

Causes of severe soil erosion :

- Halphazard mining
- Depletionof existing vegetation.
- Shifting of overburden and reject dumps.
- Excessive underground mining etc.

Vast areas of rich forest and agricultural land belonging to the indigenous people have been laid waste because of haphazard mining.

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Especially of coal is causing subsidence of land in many areas as a result of which such lands have been rendered unsafe for habitation, agriculture andgrazing. Depletionof existing vegetation and alteration of soil profile due to open cast mining operations, including shifting of overburden and reject dumps, have caused sever soil erosion and silting of adjoining courses and degraded the productive capacity of the land in the area. According to the primary sources the present study deals that the 25% i.e. 50 persons of the total respondents reported that the haphazard mining is the min cause of soil erosion or land degradation, 21% (42) said elimination of existing vegetation. 30% (60) said open cost mining operation is the main causes of land degradation and 24% (48) said excessive underground mining harms the land.

Table No. -03

Status of Server Soil Erosion

(Based on Primary Source)

Causes of soil erosion vegetation	**Haphazard mining**	**Depletion of existing**	**Open cost mining operation**	**Excessive underground mining**
%	25%	21%	30%	24%
Total (200)	50	42	60	48

Fertile land used by the mining and industries.

Bokaro district is a part of Chotanagpur plateau; therefore, most of the land is not so fertile. But mosly fertile lands have been degraded by the mining and industrial activities. A precise estimate of the amount of agricultural landlost due to mining and industries is not readily vavilable. Every mining enterprise requires the conversion of land to such purposes like roads, railways and ropeways for mineral transportation, townships for labours and managers, infrastructure for administrative purposes, land forstockyard and preliminary processingoperations. In fact, the total landaffected by mining and industries ismany times larger than the simple leasearea.

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Unplanned and haphazardclumping of solid wastes ofindustries and mining.

Bokaro district is known for itshouses of industries and minings. But(here is no proper planning for the solidwastes of industries and minings. Forexample, Bokaro Steel Plant is wellknown planned industrial unit but thesolid waste of Blast Furnace i.e. Slag isdumped in Kanari village near SGP(Slag Groundation Plant) and dumpingof Ash in Mahuar village near sector IXwhich creates lots of challenges.

Impact on Water Resource

Causes of degradation of under-ground water, rivers and streams

- By human activities.
- By mining wastes.
- By effluents discharged from mine site.
- By Colliery workshops.
- By industrial wastes.

Groundwater pollution is causedby human activities, especially mining.Mining wastes pollute streams andrivers. Ore fines and toxic substancescarried by rain water into nearby watersources and makes the water unfit forhuman use. By locating mineraltreatment facilities near the mines,water pollution problems get worse.These units use enormous quantities ofwater for washing the ores. Theuntreated materials are often releasedinto neighbouring streams or rivers. Inmany cases, the latter are the sourcesof water supply to the population.

Acid mine drainage, liquideffluents from coal handling plants,colliery workshops and mine sites andsuspended solids from coal washerieshave caused serious water pollution inthe region, adversely affecting fish andaquatic life. Chandrapura coal washeryis important one in Bokaro district.Damodar River is the most pollutedamongst Indian rivers and. Ironicallyalmost all polluting industries aregovernment owned. About 130 millionlitre of industrial effluents and 65 millionlitre of untreated domestic water findsway to Damodar drainage system everyday. Bokaro Steel Plant filtration plantnear Kanphatta and Panchora drain intoDamodar River. The

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release of differenttoxic metals like arsenic, mercury,chromium, nickel etc. from theindustries, coal and mine spoil heaps inDamodar and its tributaries havecaused severe damage to water quality.

Table No. – 04

Impact of Industries and mining on Water Pollution

(Based on Primary Sources)

Causes of water pollutuion	**Human activities & rivers**	**Mining wastes pollute streams**	**Effluents discharged from mine sites & industries**	**Colliery workshops**
%	15%	25%	35%	25%
Total (200)	30	50	70	50

Impace on Forest.

Causes of Forest Degradation :

- Due to the Industrialization.
- Due to theuncontrolled mining for minerals.
- Due to legal or illegal forest cutting.

The reports of the Jharkhand government states that forests in Jharkhand cover about 29 per cent for the state's total geographical area. Irrational mining activities for the exploitation of various minerals have turned large tracts of forest land into wasteland. During Pre-Independence, coal companies acquired thousands for hectares of forest in Jharkhand for mining operation in Damodarvelley.

Industrialization is most important factor for the forest degradation in Bokarodistrict.The forest cover in the Damodar valley coalfield, once 65 percent, stands at only 0.05 percent totay. In Bokaro district most of the forests were cut down for the establishment of industries. Besides, for

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industrial setup a large area is required for roads, railways, ropeways for mineral transportation, townships for population, infrastructure for administrative purposes etc. According to the primary data 40% peoples said that forest degradation was due to only industrialization. 30% people said uncontrolled mining for minerals was the main factor for forest degradation and 25% said illegal forest cutting and only 5% people said legal cutting of forest are the factor for forest degradation.

Table No. – 05

Status of Forest Degradation

(Based on Primary Source)

Causes of forest degradation	**Legal forest cutting**	**Illegal forest cutting**	**Uncontrolled Mining for mineral**	**Industrialization**
%	5%	25%	30%	40%
Total (200)	10	50	60	80

Therefore, according to the abovediscussions and table no.l, 2, 3, 4 and5 prove that a first hypothesis of thestudy i.e. 'Mining and industriesdegrade the land, water and forest' istrue. Bokaro district is one of thedistricts in Jharkhand whereurbanization grew with a high rate in ashort period and expected to go forhigher growth rate of urbanization innear future, but it also adversely affectsland, water and forest in the study area.

Impact on Quality of human lifeImpact on Air

Since Bokaro district lies in themining and industrial belt of Jharkhandstate and the most important severeproblem is the air and dust problem. Itwas informed by the local people thatthis problem is caused due to blastingin mining areas, dumping of slag andashes, cement factory, sintering plant,explosive factory etc. Mineral dust is apervasive feature of all mining areas. Itis generated by wind sweeping dustfrom water heaps,

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blasting and the useof heavy machinery. Blasting alsoproduces noxious fumes that arereleased into the atmosphere. Slag andAsh dumping in Kanari village andMahuar village in Bokaro Steel Citymost affected area of air pollution. Airpollution in the mining areas in Bokarodistrict has caused respiratory diseasesand eye ailments. 65% population oftotal sample population says that airpollution is the major problem ofBokaro district- Not only by the miningand industries but also domestic fuelcombustion and vehicular traffic alsoincreased the amount of harmful gasesin the air. In commercial areas the levelof air pollution is very high.

Impact on water

The district is facing medium tohigh level water pollution as per theinformation provided by therespondents. Most of the villagersdepend upon river and ponds.According to above discussion weknow that the rivers, streams and pondswere polluted by the mining andindustrial activities. This has beencaused severe problems. In some citiesof Bokaro district like Bokaro Steel City,Chandrapura, Gumia, Benno, Phusro,Balidhi etc. have water pipe lines. But due to thedamage of main water pipe lines surface run-off carries the dust particles anddrains to themain water pipe lines and pollutes them. Maintenance of water pipe lines and water tanks is not so proper. 13% stated that the water pollution to be low level, 27% stated it to be medium and 60% stated it to be high in problematic level. Solid waste is dumped near the water bodies aggravating the problem.

Table No. -06

Pollution of Natural Resource Degrades Quality of human life

(Based on Primary Sources)

Category	**Level of problem**		
	Low	**Medium**	**High**
Air Pollution	5% (10)	30% (60)	65% (130)
Water Pollution	13% (26)	27% (54)	60% (120)

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Land Degradation	25% (50)	20% (40)	55% (110)
Noise Pollution	37% (74)	48% (96)	15% (30)
	Poor	Satisfactory	Good
Green Cover	10% (20)	48% (96)	42% (84)
Open Space	24% (48)	56% (112)	20% (40)

According to the above discussion and table No. 6 prove that second hypothesis i.e. the pollution of natural resources degrades thequality of human life inthis area is true. And it was concluded that there were lots of challenges faced by the people of Bokaro district which degrade the quality of life.

Impact on Green cover and Open Space. :

Within the district there is a remarkable expansion incommercial and residential areas and consequently a reductionin open space and green cover, which reflects the impact of population pressure on the urban land use. Severe eneroachment is also now become themost important factor for reduction in Open space andgreen cover.

Conclusion :

The dominat mining companies and industrialist of the world are now showing great interest in India, especially in Bokaro district of Jharkhand state. Theentire area of Bokaro district is rich in minerals, willnow throw open for plunder andloot by these vested interest. With the expansion of themining activities, landexpansion of the mining activities, landdegradation, forest, water, air and noisepollution will attain alarming proportions. This will have serious economicimpact upon the villages and theiragrarian proportions. The existingagricultural and forest land will shrinkfurther with the eventual emergence ofmore wastelands. More and moreindigenous people will be forced tomove out of their hearths and homes

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tobrick kilns, stone quarries etc. in searchof livelihood. Their wealth will beforcibly taken away from them leavingbehind heartbreak, destruction anddegradation.

As we know that development is adynamic concept. It keeps on changingits form and dimension from Lime totime. As we know Bokaro district is oneof the districts in Jharkhand whereurbanization grew with a high rate in ashort period and expected to go forhigher growth rate of urbanization innear future. We know that the processof urbanization couldn't be stopped butwe have to contribute in sustainableurban development by making policy atindividual, family, community, townadministration, and district, state andcountry level.

Suggestions :

- Solid waste disposal facilitiesshould be made regular.
- Maintenance of sewerage,sanitation and drainage should bemade.
- Proper planning should be donefor forest and land degradation andit should be strictly followed.
- Strict administrative vigilance canimprove the situation of pollutionof natural resource etc.
- For safety point of view, differentpolitical leaders and the prominentindividuals of Bokaro district to set up an environmental army anddemand that industrial planning inthe area must be weighed againstthe prospective loss of environmentand the existing industrialestablishment must conform toWHO standards for treatmenteffluxes and to ILO standards ofworkplace environments.

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