PH.D. SUMMARY

URBAN GROWTH AND CHALLENGES OF AN INDUSTRIAL CITY: A CASE STUDY OF BOKARO STEEL CITY

THESIS
SUBMITTED FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY
IN THE FACULTY OF SOCIAL SCIENCES
(GEOGRAPHY)
PATNA UNIVERSITY
PATNA
2018

UNDER THE SUPERVISION OF
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RESEARCH SUMMARY

Industrialization and urbanization or urban growth is a phenomenon through which all civilizations, societies, states and regions go through. Urban growth is an indicator and manifestation of economic as well as social development. Urbanization and industrial development leads to the switch over of the economy from initial primary sector to secondary and tertiary sectors. Urban growth and industrialization involves rising in the standard of living of the people through steady increase in economic level. The process of urbanization is accompanied with the growth of urban population. There are exists a positive correlation between the process of industrialization and urbanization. In rural areas the process of industrialization and urbanization leads to rural transformation in socio-economic and demographic aspects. According to a report published by United Nations (U.N) in 2007 the urban population of the world has equated its rural population and in the coming years more people will be living in urban areas as compared to the rural areas. In the census of 2011, 31.16% of the Indian population was classed as urban. In the same census year Bokaro district of Jharkhand state emerged as a highly urbanized region with 47.7% of its population as urban, after Jamshedpur, Dhanbad and Ranchi. Bokaro district of Jharkhand state emerged as a highly urbanized region due to Bokaro Steel Plant in Bokaro Steel City. Urbanization can be the result of a variety of factors. The process of urbanization in Bokaro district is directly linked to the Bokaro Steel Plant and industrial as well as mining belt. In the present research work, the researcher has made an attempt to study the urban growth and challenges of Bokaro Steel City. The research work is divided into eight chapters.

The first chapter is the Introduction. The chapter is divided into three broad sections, viz. (i) Conceptual framework, (ii) Review of literature and (iii) Analytical framework.

Under the conceptual framework, concept and definition of urbanization, determinants of urbanization, relationship between industrialization and process of urbanization and acceleration of the process of urbanization are discussed.

The researcher has also presented a brief description of recent point view on Industrial Location and Industrial complexes viz. Growth of industrial complexes depends upon different factors like, coal fields, raw materials, population agglomeration. A brief description regarding the definition of urban settlements, viz. town, city, town group, urban agglomeration, standard urban area, urban sprawl has also been given.
Under the Review of literature, the author has presented a chronological list of various works in urban, economic and environmental geography and other fields, along with the name of their respective author/ authors that were consulted by the author during the research work. In review of literature detailed account of relevant literature has been presented.

In the Analytical framework, the researcher first states the significance of the present study, objective and hypotheses of the research work. The present research work is based on one objective i.e. ‘To identify the problems related to population growth and changes in physical, environmental, urban morphology and suggest some solutions for the same’ and the four hypotheses viz.

❖ Original layout of the planned town has changed from point view of urban morphology.
❖ Public utility services are not coping with the growing population.
❖ Unchecked urban growth experiences within and peripheral areas of the Bokaro Steel City.
❖ Environmental degradation has taken place.

The methodology of the research work comprises of selection of study area, sources of data and information, sources of maps. For the completion of any research work it is important to follow appropriate, rational and practical methodology. A research work needs some necessary steps.

❖ **Design of the Study:** - The present study was an empirical observations and detailed micro level survey type study.

❖ **No. of respondents:** - 978 respondents of B. S. City were interrogated for obtaining relevant information.

❖ **Sampling Method:** - The purposive random sampling was used for the selection of the sample.

❖ **Tools and Techniques:** - The following tools and techniques were used to collect data for the study:-
  ➢ Questionnaire
  ➢ Interview Schedule
  ➢ Observation Schedule.
  ➢ Data for the study was collected from the secondary as well as primary sources.
Data was compiled, computed and analyzed according to research methodology.

Suitable maps and diagrams were incorporated to make the analysis more illustrative.

Data analyzed with the help of statistical methods like percentages, correlation, regression, ANOVA (F-ratio test), Chi Square test and Kendall’s Method.

In completion of this research work the author has consulted a large number of published and unpublished works for procurement of data and maps for having a knowledge regarding Bokaro Steel City, its industrial development and its impact on demographic, socio-economic, physical and environmental aspects. The census of India and Department of Town Administration, Bokaro Steel Limited (BSL) has formed the chief source of population data, while other information and maps were obtained from various department of Bokaro Steel Plant, government offices and the local people. Field investigation was done with the help of questionnaires served on selected samples. The data was collected and computed and analyzed with the help of relevant maps and diagrams which was drawn with the help of modern techniques and computer added technologies like Arc GIS. An Identification of the study area is also discussed.

Second chapter deals about the Origin and Plan of Bokaro Steel Project. In September 1955, the Government of India decided to develop the Bokaro as a site for the possible location of a future fourth steel plant in India. The land for Bokaro Steel Project has acquired from 41 villages of Bokaro. The chapter is divided into seven categories i.e. (i) The Site, (ii) Site Work, (iii) Land Acquisition, (iv) Displacement, (v) Rehabilitation – (a) Replacement and (b) Recruitment, (vi) Russian Collaboration, (vii) Detailed Project Report (DPR) – (a) The Plant, (b) The Garga Dam and Reservoir and (c) The Township.

Third chapter deals about the Physical Setting of the study area. Bokaro Steel City is the administrative headquarter of Bokaro district lying in the eastern part of Jharkhand district. Bokaro Steel City lies between 23* 40’ N to 23* 67’ N latitude and between 86* 09’ E to 86* 15’ E longitude. Geologically the Bokaro Steel City forms a part of Chota Nagpur plateau. The chapter is divided into different parts they are – (i) Geology, (ii) Topography – (a) Surface Elevation and Forms – High Land, Moderately Undulating Land and Low Land. (b) Relative Relief with the help of Smith Method – Moderately High Relative Relief Zone (> 20 mt), Moderate Relative Relief Zone (15.01 – 20.00 mt), Moderately Low Relative Relief Zone (10.01 – 15.00 mt), Low Relative Relief Zone (<10.00 mt), (c) Average Slope with the
help of Went Worth’s Method – Areas of Moderately Steep Slope (> 6 degree), Areas of Moderate Slope (4-5 degree), Areas of Gentle Slope (< 4 degree).

(iii) Drainage – (a) Drainage Pattern, (b) Surface Drainage and (c) Drainage Density – High Drainage Density (> 2 km per sq. km), Medium Drainage Density (1.01 – 2.00 km per sq km), Low Drainage Density (< 1.00 km per sq km). Damodar River, Garga River and Jhari Nala were the important drainage of the study area. (d) Ground Water, (iv) Climate – the climate of the study area belongs to the category of sub-tropical monsoon type (v) Soil – the soil found here is mainly red and yellow soil, laterite soil and deposited soil. Till now low lands of the Garga river are used in agriculture specially growing vegetables for ready supply in the city, because these spaces are not used for direct city construction, (vi) Vegetation – (i) Natural Vegetation – Natural Vegetation of the study area is the tropical dry deciduous and (ii) Plantation – Plantation in township area is being considered.

Chapter Four deals about the Background of Urban Growth in India, Jharkhand, Bokaro and Bokaro Steel City. This chapter also deals about the Trends of Urbanization in India, Jharkhand and Bokaro Steel City. This chapter also deals about the Decadal Growth Rate and different phases of Urban Growth of Bokaro Steel City. The population growth rate of the district does not make an even graph. In different decades the district has recorded a very high, high, moderate and low growth rate, the details of which have been discussed. The newly formed town showed an increase of 138.39% growth rate during the first decade after its birth 1964-1971. It was the period of creation and development of the town. But after one decade i.e. 1981 there were a sharp down fall in the growth rate and it was only 48.80%. Again in 1991 the increase of growth rate showed a sharp fall and it fell to 18.15%. In 2001 it registered only 5.33% but in 2011 census there were 0% decadal growth rate registered, which indicates the negative growth rate. In this chapter researcher also deals about the Class Size of Towns and Urban Growth. Census of India has classified towns in six categories on the basis of population size. During 1971 there were 10 towns registered in Bokaro district but none of them were in Class I and Class VI towns. But in 1991 and 2001 the number of towns increased to 12 and 16 respectively. During 1981, 1991 and 2001 there was only one town in class I category i.e. Bokatro Steel City, which was sharing about 51.04% in 1981, 51.42% in 1991 and 48.94% in 2001 urban population of Bokaro district. In 2011 there were 2 towns in class I category i.e. B. S. City and Chas, and they shared 56.57% of urban population of Bokaro District.
Chapter Five deals about the Demographic Characteristics of Bokaro Steel City. Here researcher deals about the demographic characteristics like growth of population, distribution of population, density of population, migration, sex ratio, age composition, religious and caste composition of population, educational composition and family size. According to Department of Town Administration, Bokaro Steel Limited shows the population of 49114 persons in 1965 to 418428 persons in 2015. The city has recorded an approximately eight fold increase in its population within only five decades.

In this chapter researcher deals about the temporal and spatial growth of population in B. S. City, which was divided into three parts i.e. (i) Western Suburban, (ii) Northern Suburban and (iii) Sectors- I, II, III, IV, V, VI,VIII, IX, XI and XII. Density of population of Bokaro Steel City is categorized in seven parts i.e. (i) 0-25, (ii) 25-50, (iii) 50-75, (iv) 75-100, (v) 100-125, (vi) 125-150 and (vii) Above 150. This chapter also deals about the migration to Bokaro Steel City. 98% of the total population of the city is migrated from different parts of the country, 990/1000 in 1971 and 997/1000. Migration in Squatters’ Settlement, Comparison of Squatters to non-squatters population of B. S. City is also discussed in this chapter. According to 2011 census the sex-ratio of Bokaro Steel City was recorded as 889 females per 1000 males, which was less than the national and state average. According to 2011 census the literacy rate of B. S. City was recorded as 83.5% which was higher than the state and national average. Male literacy was 90.6% which was also highest in Jharkhand. Female literacy was 75.5% which was 2nd highest after Jamshedpur.

As per 2011 census, the religious composition of population is dominated by Hindus which constitute 82.9% of the total population and 11.3% of Muslims. According to 2011 census, 79% of the city’s population was of general caste, 11% of scheduled caste and 9.9% was of scheduled tribe. The researcher has also made a study of the economic composition of population of Bokaro Steel City. According to the census of 2011, the work participation rate in the city is 28.20%. The work participation rate has fluctuated during 1971 to 2011 primarily due to change in the definition of workers in different censuses. The male workers participation rate has always been more than the female workers participation rate due to existence of an economy based upon steel industry in the region. Such an economy promotes selective in-migration and out-migration in this region. In 2011 census, out of the workers 22.7% were main workers and 5.50% were marginal workers.

The sixth chapter deals the Urban Morphology and Landuse of Bokaro Steel City. The urban morphology is categorized into two groups, i.e. Unplanned and Planned morphology. Bokaro Steel City is a well planned city which is divided into six functional zones i.e.
residential, commercial, industrial, administrative, educational and cultural zones. In this chapter researcher deals about the Structural Morphology of Bokaro Steel City which is further divided into three parts i.e. (i) Western Suburban, (ii) Northern Suburban and (iii) Planned township divided in Sectors – I, II, III, IV, V, VI, VIII, IX, XI, XII, Co-operative colony, BIADA-BMP Camp Complex. In this researcher deals about the Infrastructural Development of Bokaro Steel City like water supply, drainage and sewage disposal, roads, railways, airways, post, electricity, C.B.D. Residential Areas in Bokaro Steel City are an important factor to realize the character or economic standard of a city.

Maximum number of dwelling units are built by BSL for its own employees and these dwelling units are commonly called as Quarters and these quarters are further divided into seven categories i.e. ‘A’ to ‘E’ types, hostel and Labour Hutments (L.H.). Chronological growth of dwelling units and its density are important to understand the physical growth of the city which has been described in detail. In this chapter author deals the Functional Morphology of Bokaro Steel City like chronological change in land-use like residential, commercial, transportation, institution, road with plantation, area under construction, intensive plantation, land for further expansion, remaining of original villages, pockets of squatters settlements of the city from 1965 to 2015 have been described in detail. The Seventh chapter is divided into two parts – ‘A’ and ‘B’. Part- ‘A’ deals with the Urban Challenges in Bokaro Steel City. Bokaro Steel City is one of the cities in Jharkhand where urbanization grew with high rate in a short period. The decade 1971-81, considered as the maximum pace of urban growth but subsequent decades it experienced a declining trend due to non-expansion of industrial township area. The cities are expected to be engines of growth but their overall development depends on the quality of life in the urban areas. After completing almost five decades of its growth and development, several problems have come up which the city is experiencing as challenges. Not only the challenges have cropped up within the city margin but also it has increased in the peripheral zone outside the city margin.

The major related challenges within and outside city limits are: - Rapid population growth. Problems related with urban morphology like residential areas have become more congested, encroachment in residential areas, commercial activities in residential area and planned buildings of BSL became unplanned. Problems related with urban land-use like, rise of squatters’ settlements, lack of urban renewal schemes, unplanned and haphazard growth in most parts of the city, reduction in open space, severe encroachment problem in most parts of the city, growth of urban sprawl. Challenges related to public utility services like, sewerage, sanitation, drainage, power supply, water supply, health services, and Solid waste disposal
and management, recreational facilities, maintenance of roads, accessibility to residential areas, degradation in urban amenities. Challenges related to environment like, land degradation, noise pollution, air pollution, water pollution and green cover area. All these challenges have been described in detail. Positive and negative aspects of the urban changes towards the city also discussed in detailed.

In seventh chapter Part – ‘B’ deals the data analysis of all the challenges with the help of different statistical techniques like Coefficient of Correlation, ANOVA or F-Ratio test, Line of Regression, Chi – Square test and Kendall’s method, which also helps in the testing of hypotheses and findings. The all hypotheses formulated at the beginning of the research work have been tested in Part- ‘B’ of chapter seven. All the hypotheses have positive findings.

The eighth i.e. present chapter deals with summary and conclusions and some suggestions.

**CONCLUSION:**

It can be concluded that in Bokaro Steel City of Bokaro District of Jharkhand state, Bokaro Steel Plant and its allied activities have long remained as the backbone of the economy providing livelihood to a large number of workers, attracting large influx of immigrant population from nearby districts, states and countries and providing the driving force to the process of urbanization. The Bokaro Steel Plant and the process of urbanization reveal a direct and positive correlation in Bokaro Steel City. The city presents a true picture of industrial based urbanization.

The process of urbanization is started after 1965, and within a period of five decades, it has emerged as the most urbanized city of Bokaro District and fourth most urbanized city of Jharkhand after Jamshedpur, Dhanbad and Ranchi. Bokaro Steel City has 100% of their working population engaged in non-agricultural occupations. Bokaro Steel City recorded very high urban growth rates during the first and second decades i.e. 1965-1971 and 1971-1981 of establishment of Bokaro Steel City. After 1981, the growth of towns and urban population continued, but the pace of urbanization process become slow, further it recorded a decline in the growth rate of urban population in Bokaro Steel City since 1991. During the decade 2001-2011 the absolute increase in total population was 21015 persons showing a marginal growth rate of 5.33 percent.
During this period ‘squatters’ settlement’ and ‘urban sprawl’ developed around B.S.City as a large section of urban population preferred to move towards the outlying suburban areas due to overcrowding in urban built-up areas. In newly developing urban areas both planned and unplanned colonies are developing while within and outside the Bokaro Steel City a large number of squatters’ settlements have developed.

In previous chapter -7 positive and negative aspects of urban growth have been discussed in detail. Recent trends show that the process of economic development as well as urbanization process has slowed down in Bokaro Steel City. B. S. City, the most urbanized city of the Bokaro District has uneven growth rate because it has based on Heavy Iron Steel Industry but it possesses a large number of Government offices, educational institutions, research centers, etc.

Decadal growth rate of Bokaro Steel City does not make an even graph. In different decades the Bokaro Steel City has recorded a high, moderate to slow growth rate. The newly formed town showed an increase of 138.39% growth rate during the first decade after its birth 1964-1971. It was the period of creation and development of the town. But after one decade i.e. 1981 there were a sharp down fall in the growth rate and it was only 48.80%. Again in 1991 the increase of growth rate showed a sharp fall and it fell to 18.15%.

In 2001 it registered only 5.33% but in 2011 census there were 0% decadal growth rate registered, which indicates the negative growth rate. It means population is getting fewer opportunities for job. Somehow, it is obvious as Bokaro Steel Plant is not expanding anymore and Bokaro Steel City is made for that single industry. Here, it is different from other growing metropolitan cities. So, these unplanned portions of the planned city can be looked after with more farsighted planning.

As it has been observed that the persons living in squatters have been a very supportive population for different function required for city life and they are earning well. There is no other way except providing basic facilities for their rehabilitation so that they can lead a descent way of life and continue to provide some basic functions of city life. In a planned city like Bokaro Steel, the BSL management only can do this job properly and perfectly.

Till now, the BSL management’s activities in relation to squatters and their settlements are rather passive. The BSL management has taken following prevention against the squatters’ and their settlements.
1. **To arrange intensive plantation in the city: -**

   It has been seen that normally squatters’ do not prefer BSL cared area to settle down. It is commonly found that either squatter’s settlement starts or ends at the line of intensive plantation. Only during last ten years some khatals have been spring up with strong political backing by the side of the road without caring plantation, but management is not very strict about it.

2. **To fence by barbed wire along roads: -**

   It is mainly done along roads of important crossing or along those roads which spots are prone to unauthorized shops. Again it is not fool proof mainly because there is no regular follow up checking on behalf of the management.

3. **To remove encroachment: -**

   It is very difficult to take pain of forcefully removal of encroachment. However, the management did it four times to make the city clean. In 1976, than Managing Director (M. D.), Mr. K. C. Khanna cleared all khatas and other squatters’ settlements specially from Sector II and III because only those two sectors were completed at that time. All other main roads were also cleared at that time.

   In 1996, 2001 and 2008 during ‘operation sunshine’ the management abolished many unauthorized structures which were within 20 feet of the road. In due time many of these areas again recaptured because of lack of follow up action.

4. **To allot 16 hectare land for khatals in Sector VI: -**

   This was a sincere effort to shift khatas from the city. Though it flopped in respect to squatters’ settlement.

5. **To develop peripheral areas: -**

   With a view to improving civic amenities in the rehabilitation sites where thousands of people are residing, B.S.L. has taken up peripheral development activities as per the guide lines issued by the Board of Directors of SAIL in its 56th meeting held on 31st May 1979, provide that;

   (i) Steel Plant in the first instance would limit the scope of the peripheral development to areas within 5 kms of the Steel Plant Township.
(ii) The participation of villages in the provision of facilities under the scheme to be ensured.

(iii) With regards to the maintenance of facilities, efforts should be made to encourage the local residence of the village, to undertake its work, but Plant may step in, if necessary to maintain the services where local initiatives in this regard is not for coming.

(iv) That the services being provided in the context of the peripheral development should not be mixed up with the services being provided to the Steel Towns as this would lead to lowering of standard of service in the town.

(v) The following items identified to be undertaken by the Plant according to need:
   (a) Road and improvement of existing roads,
   (b) Drainage,
   (c) Drinking water facilities,
   (d) School building and Community centre,
   (e) Adult education,
   (f) Employment generating scheme,
   (g) Periodical medical care for villagers and their livestock’s,
   (h) Desalting and renovation of community wells, tanks, ponds etc,
   (i) Agricultural improvement including distributing of seeds and fertilizers.
   (j) Sanitation of villages,
   (k) Development of poultry, dairy, piggery.

At present there are 150 villages falling within peripheral development which are in the 20 km radial distance from Bokaro Steel City perimeter. There are 20 rehabilitation sites, where displaced persons had been rehabilitated by the Government of Jharkhand (Erstwhile Bihar) who failed to provide adequate facilities.

Now, the question is when B.S.L. is spending, so much for its outside peripheral development why not any for inside squatters’ settlements. The researcher talked to officials of B.S.L. about it. On paper, B.S.L. management cannot agree with presence of any squatters’ settlements because than it becomes their legal responsibility for clearing those up.

The under privileged class of the society has to be uplifted by already privileged class. History can produce several examples to support this view. But the author surprises to observe the absence of this natural flow of humanitarian obligation in this city.
After several interviews and consultations with the residents of the city, the author comes to the conclusion that people do not have that attachment to the city which develops automatically for that place where they bring up. Generally people migrate here from different places being appointed for the job. A large number of students from neighbouring regions came here for getting better quality of education upto class XII after that they take admission in better institutes in India and abroad.

Urbanization has both positive and negative aspects. Due to negative impact of urbanization of Bokaro Steel City is facing several problems related with urban land-use and environmental problems. After development of squatters’ settlement in most of the places of Bokaro Steel City the environmental degradation is important issue observed during the research work. The process of industrialization has laid some adverse effects on the environment causing the environmental degradation. However, this issue can be overcome by proper use and management of industrial wastes, controlling air pollution through modern technologies and adopting methods of effluent water treatment and recycling to protect and conserve these precious components of environment. Since environment cannot be protected amidst poverty therefore, economic sustainability is of equal importance to environmental sustainability. According to Madhumita Debnath, in the township, the population is divided into two cultural segments according to dwelling units and the way of occupation; these are quarter’s dwellers and squatters’. Both are interdependent and make society stronger. It is the social system which incorporates Redfield’s “little tradition”, Opler’s “extensions” of the village, Kohn’s “little kingdom” and Smith’s “interlocking mesh” of villages. So, it is an automatic and natural process. Administrative efficiency and look after can make it healthier and effective.

The Bokaro Steel City has still the potential for sustainable urban development, which may be attained by the joint efforts of B.S.L. management as well as Government authorities. It can be hoped that the urban centers of Bokaro Districts will support the economy of the region and at the same time have a clean and green environment for a healthy urban life.

At this stage the role of B.S.L. management and government of Jharkhand becomes more significant for the economic revival of this region and the planners and policy makers must take necessary steps in the right direction.
**SUGGESTIONS:**

Urbanization is a most important indicator of development, but it should be planned in a positive direction. It is necessary that an urban development, planning and renewal programs must be carried out in the Bokaro Steel City so that the city continues its urban growth process without any obstacles and hurdles. After identification of major challenges related to the township profile and future requirements, it is most important to suggest some strategy to deal with these challenges.

All these challenges require in depth understanding and technical knowledge to solve these. From the experience of the researcher intensive field study and 25 years living experiences, the researcher likes to suggest some possible ways to get rid of the negative aspects of urbanization and avail the positive aspects in a better way in the condition of Bokaro Steel City. However, some general strategies may be suggested for the proper growth and development of Bokaro Steel City to make it comparatively better.

1. The basic function of Bokaro Steel City is related to Bokaro Steel Plant and this will continue for a considerable demand of products. But due to several reasons demand of the production is not so much high that’s why Plant is not running too good. Its production is used only for the heavy steel industries not for local markets. Only one bi-product i.e. Galvanised Sheets of the Steel Plant is supplied to local markets. Management of the BSL, SAIL have to think about to creates new bi-products for the consumption in local market. If its potentialities and consumption will became high then it creates new opportunities for Bokaro Steel City. To prepare for that time it is necessary that urban centers of peripheral areas should develop a diverse economic base, like manufacturing, processing, servicing, repairing and trade and commerce, transport, storage and communication and services contribute to a major extent in providing employment in such areas. Small scale industries manufacturing consumer goods for which there is already a demand should be promoted. Industries based on recycling of waste, eco-friendly raw materials and processes should be encouraged. Similarly electronic and computer and IT based industries should be emphasized, power generating, coal based chemical industries can be developed.

2. To develop periphery of the city, B. S. L. Management is caring on quite a big project. But the author suggests, it is more important to look after inside the city first. Same or more importance should be given for betterment of those people
who have come to serve the city. So, BSL may establish a separate department or township department (as squatters are within the township mainly) may look after squatters’ upliftment and handle their problems like peripheral department of BSL.

3. Infrastructural facilities should be more developed in all over the city and its peripheral areas. It will lead to the development of trade and commerce.

4. The upper limit of the individual encroachment must be restricted and maintained strictly, otherwise people with political support may occupy majority of the allotted land.

5. Basic infrastructure must be guided by B.S.L. At least layout of roads and drains has to be maintained. B.S.L. may provide street light for road safety and minimize crime. The infrastructure can give ‘a model smart city’ look with tidiness and security.

6. Though house can be built according to householder’s own requirement, capacity and tradition, but they must follow the basic conditions of health and environment like drain, garbage deposition, proper sanitation, plantation etc. these should be guided by health workers who may be appointed by the department looking after needed peoples’ betterment.

7. It is difficult to introduce rent or lease in squatters’ settlement because it may establish a sort of right. But a type of city tax or toll tax must be introduced in squatters’ settlement. This will help to keep records of squatters’ people and at the same time shed extra population in squatters’ settlement.

8. Water supply is free for everyone in the city. Even periphery of the city gets free filtered water. But wastage of water should immediately be stopped. It is better to introduce taps in that particular colony and the tapes should be used and maintain strictly. Any type of sabotage on water pipeline like opening of valves, breaking of pipe should be handled firmly.

9. In every sector an area should be specified for the service colony i.e. the settlement of out comers who are needed for the city. Only individual sectors are not too big and accessible easily from one corner to another by foot. By this way supporting services can be provided easily within walking distance in each sector separately. Only this action will reduce many problems at a time.
a) Instead of being scattered, it is better to stay together, not only for social and cultural unity but also to control environmental pollution. It is easy to keep clean a certain area instead of the whole city regularly.
b) Roadsides areas will be clear up immediately that will future increase city beauty and road safety.
c) B.S.L. officials can monitor the area regularly so that no new encroachment takes place.
d) It will not allow calling them squatters anymore and at the same time it gives recognition of their service to the society.

10. The specified area for them will be obviously along riversides. Riversides are already excluded from any constructive work in Bokaro general plan and kept for plantation. Many squatters’ settlements are already developed along riversides. Only taking pain of removal some desperately build up khatals and comparatively new settlements from central part or roadsides of the sector will show desirable results. Till now, there is no record of any protest against shifting, generally only announcement works for majority. However, area selection along riversides involves minimum shifting.

This suggestion is applicable in practical field easily because only exert two small sectors like Sector II and Sector III (riverside of Sector I is within walk able distance from Sector II and Sector III), all other sectors are by the side of either the River Garga or the Jhari Nala. The Jhora Nala should be excluded because it is following through central part of Sector IV.

11. There should be a Compact and phase wise development of peripheral areas of Bokaro Steel City, planning should be perceivable. Residential colonies of peripheral areas of B. S. City should be developed with all infrastructure facilities. Administration of B. S. City and state government should in-courage the group housing and discourage the separate housing.

12. Development of regional level transport facilities like roads and railways to be strengthened. Development activities along the important transport corridors need proper planning and also these corridors are not so much congested. Administration takes responsibility for no illegal construction should be allowed along major roads and inspects it regularly.

13. Electricity tapping should be stopped immediately and strictly. It is not only question of revenue loss; it is related with safety too. They tap electricity through
low grade wires with hundreds of joints and hang dangerously here and there as if these are wire to dry cloths. The author thinks, it is better to provide meter to get electricity connection properly interested and capable persons. A strong administration can easily do this.

14. Proper education must be providing for the children as well as adults. It is important and the basic responsibility of the Management or the Government because only proper education can save next generation from unemployment and crime.

Schools with nominal fees or adult education must be introduced in squatters’ settlements. The Government carries on various literacy programmes. But in B.S.City, the state government does not interfere as it is an institutional city. So, B.S.L. has to take more care on these programmes. It is seen that rate of school level dropouts are very high due to poor economic condition. Eligible children can be allowed in B.S.L. schools along with other children of the city. Limited number of scholarship can be introducing to attract them for higher education.

15. Facilities of mobile dispensary can be introduced on humanitarian ground. A mobile dispensary can give turn wise weekly service in each those colonies, which will help to keep city disease free and to alarm from any epidemic attack overall. This facility can be given on chargeable basis too.

16. Bokaro General Hospital has free family planning unit. This facility should be easy accessible to the service colony dwellers.

During the field survey the author has found many persons interested in family planning, especially women do not know how to avail this facility. It can be done through the mobile dispensary.

17. Sewerage and drainage system have to be separated, sewerage treatment plant should be properly maintained. Maintenance department should become more active and attentive to maintain drainage system. Solid waste collection and disposal should be encouraged by administration of B.S.L. and state government. There is no proper maintenance of drainage system and solid waste management in the squatters’ and peripheral colonies.

18. Development of open and green spaces is very important. Natural vegetation land should be preserved and developed in a planned way. Service colonies should be surrounded by intensive plantation. This will help to make air fresh, to keep area
green and pollution free. At the same it will help to keep privacy of the colony dwellers and increase city beauty.

19. Time to time visits of BSL higher officials is essential. Strict and disciplined attitude and regularity may solve most of the problems. Basically common people are very simple and like to lead secure and peaceful life. They feel safe under strong but fair and compassionate administration and appreciate it. Regular visits of higher officials will make outcomes disciple as it was already experienced in 1976-77.

20. Awareness should be generated among public regarding the impacts of degrading urban environment, judicious use of water and electricity and proper disposal of solid waste and also maintain drainage system.

21. If needed help of private as well as state government sector should be taken for the development of recreational facilities, maintenance of health and sanitation, development of transport in the interior part of the city and this hopefully remove the financial crunch.

22. New entrepreneurs should be attracted to the district by developing exclusive economic zones and by improving the law and order situation.

Besides those above mentioned points which are directly related with the management with urban challenges, the author has some more suggestions for the other city dwellers. She thinks that they too have some responsibilities and obligations to the city where they live. Moreover, the state government must take some more responsibilities. Through the city is under public sector, but it is within the state.

1. City dweller should be accept all types of milk (like fresh and dairy both) and other dairy products. People must believe that dairy milk is as nutritious as fresh milk. Simultaneously, the Government of Jharkhand should take care of standard production of milk and regular supply to the city.

2. The city is habituated by a large number of highly educated people. They can be motivated to come forward and form NGO’s. They can work excellently to promote education, health and environmental consciousness. They can motivate service-colony women for shelter to make better way of living and for family planning.

In conclusion, the author has some proposals to the planners for future planned city of the country, in relation to squatters and their settlements.
Acquisition of land involves many harassment and unpleasant procedure for both the Government officials and original land owners. The original land owners give their ancestral land with which they are emotionally attached. Somehow, they are compelled to give their land for nation’s requirement. However, they are rehabilited in nearby areas, outside of the township. They can observe the whole process of infrastructural development and encroachment and become shock to see the way of using their land, specially, when after infrastructural development value of those land increases many times more. Therefore, author has presented some proposals for proper utility of acquired land, they are as follows: -

1. Before land acquisition, requirement of land must be calculated as perfectly as possible and every square meter of the land should be utilized properly.

2. The whole process involves huge public money. So, it is the responsibility of all related persons to look after the proper use of that money.

3. Land which will be used in later phases must be protected through proper plan and care.

4. There must be proper pre arrangement for those people who come for supporting services or other activities. As they are needed portion of the society, they have right to settle them in proper manner rather being squatters.

5. They should not be treated as extra population and burden. Rather they must be recognized as human resources and channelized properly towards the sustainable development of the area.

6. If these are thought before, it will be easy to organize them. Any suitable concept can be accepted according to relative conditions, so that they can be incorporated in the main stream. In total developmental activities of the particular city, that portion of the population should be integral part of the integration. Everyone has responsibility for future generations, to give them a healthy society and environment.

At the last, theories or planning does can be performed successfully when these will be activated by a powerful, wishful, adamant administration. We all have to realize that management and discipline in public life is a precondition for any development. With proper strategies and measures the urbanization process of Bokaro Steel City could be given a new stimulus and direction.