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## THE EFFECT OF URBANISATION ON ENVIRONMENT: WITH SPECIAL REFERENCE TO THE CITY OF GUWAHATI, ASSAM

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### **Abstract**

Urbanisation is a process whereby population move from rural to urban area leading to an increase in the number of population living in the towns and cities and thereby further leading to growth and expansion of the towns and cities. Urbanisation is one of the key features of the developing countries. It has both positive as well as negative effects. On one hand urbanisation has provided better health facilities, better educational facilities, and more employment opportunities. On the other hand it has also become a potential threat to our environment as uncontrolled urban population growth has resulted in environmental degradation in the form of increase in the slum areas, worse water quality, excessive air pollution, noise pollution and problems of waste disposal. Urbanisation cannot be restricted as it is considered as an indicator of development but it has to be ensured that it proceeds in the right manner within its appropriate limit, taking proper care of the environment. In this paper an attempt has been made to analyse the effect of urbanisation on environment. The focus of the study is on the city of Guwahati which is one of the largest and fastestgrowing cities of the North-East India. Guwahati has also been the centre of attraction for various commercial and industrial activities due to its favourable geographic location. The pressure of the ever increasing human population and expanding commercial and industrial activities has resulted in significant risks of environmental degradation in the city. Based on secondary data this paper tries to explain how urbanisation has brought about a situation of trade-off between development and environment protection.

### **1. Introduction**

Urbanisation is a process whereby population move from rural to urban area leading to an increase in the number of population living in the towns and cities and thereby further leading to growth and expansion of the towns and cities. Urbanisation is the process by which an increasing proportion of the country's population starts residing in urban areas which increases the urban settlements. Urbanisation is a process that leads to the growth of cities due to industrialisation and economic development and that leads to urban specific changes in specialisation, labour division and human behaviour. (Uttara *et*

al,2012). According to Rai(2017), urbanization happens because of the increase in the extent and density of urban areas.

Urbanisation is one of the key features of the developing countries like India. Urbanisation has both positive as well as negative effects. On one hand urbanisation has provided better health facilities, better educational facilities, and more employment opportunities. On the other hand it has also become a potential threat to our environment as uncontrolled urban population growth has resulted in environmental degradation in the form of increase in the slum areas, worse water quality, excessive air pollution, noise pollution and problems of waste disposal.

Guwahati is one of the largest and fastest growing cities of the North-East India. Guwahati has also been the centre of attraction for various commercial and industrial activities due to its favourable geographic location. The pressure of the ever increasing human population and expanding commercial and industrial activities has resulted in significant risks of environmental degradation in the city. The high population growth with enormous human migration in the last decade has resulted in urban sprawl in the city. (Talukdar, 2018)

Due to uncontrolled urbanization in Guwahati, environmental degradation has been occurring very rapidly and causing many problems degraded water quality, excessive air pollution, noise pollution, problems of disposal of wastes, etc. which causes serious health problems. With the above background an attempt has been made to analyse the effect of urbanisation on the environment with a special reference to the city of Guwahati.

## **2.Data Source and Methodology**

The present study is based on the secondary sources of data which have been collected from various journals, books, reports, official websites of Government of India like Census Reports, Statistical Handbook of Assam, Economic Survey of Assam, Guwahati Metropolitan Development Authority, Pollution Control Board, Assam etc.

## **3.Causes of Urbanisation**

The cities and towns have always been a big attraction for the people especially from the rural areas. The most common causes of urbanisation are industrialisation, commercialisation, better employment opportunities, health facilities, educational facilities, access to modern modes of entertainment and recreation facilities etc. The causes of urbanisation have been discussed in the following.

(a) Industrialisation: The growth of industries is one of the most important reasons for urbanisation. With the development of industries in country like India it has also provided many employment opportunities. Therefore people from the rural areas migrate to urban areas mostly in search of better employment for themselves. Apart from employment opportunities industrialisation has also changed the living style of the people. People have become familiar with modern technology

(b) Commercialisation: Cities have been always a great centre for trade and commerce which is also one of the factors of urbanisation.

(c) Employment opportunities: Most of the people migrate to the urban areas in search of livelihood. In the rural areas the scope of employment opportunities is very limited and this causes a large no. of people to move towards the cities.

(d) Educational facilities: Higher education system is more developed in the urban areas. This is also one of the factors that lead to urbanisation. Today people have become conscious about the quality of education for their children

which ultimately makes them to move towards the urban areas for better educational facilities.

(e) **Health facilities:** Cities and towns are well known for their advanced health facilities which is lacking in the rural part of our country. Therefore to avail the better and advanced health facilities people prefer to live in the urban areas.

(f) **Modernisation:** The modern culture and standard of living of the urban people have always attracted the people. Access to modern modes of entertainment, recreational facilities, sports, comfortable life style etc in the cities has acted as pull factors for the people of rural area.

#### **4. Impact of Urbanisation on Environment**

The rapid growth of urban population has put heavy pressure on public utilities like housing, sanitation, transport, water, sanitation, transport, water, electricity, health, education, and so on. The provision of infrastructural facilities required to support such large concentration of population is lagging far behind the pace of urbanization. (Rai, 2017) According to Uttara *et al.*, due to uncontrolled urbanization in India, environmental degradation has been occurring very rapidly and causing many problems like shortages of housing, worsening water quality, excessive air pollution, noise, dust and heat, and the problems of disposal of solid wastes and hazardous wastes. As a result of all these the environment in the urban area is deteriorating very rapidly. The various issues regarding the environment due to urbanisation have been discussed below.

##### **(a) Over exploitation of natural resources**

Due to the rapid increase in urban population the rate of consumption of natural resources like water, forest, fossil fuels, energy etc have increased to very high level. Forests are being cleared to provide land to the increasing population. Rapid development in the urban population can result in very high levels of erosion and sedimentation in river channels. (Uttara *et al.*, 2012). Yadav & Barua (2016) have founded that there is a direct link between deforestation and urbanisation and urban built up. They further found in their study that forest reserves within the city of Guwahati have declined with increase in urbanisation. According to a study conducted on land use by Talukdar (2018), the natural vegetation is continuously decreasing. The forest area reduced to 33.99sq km in 2016 from 35.98 sq km in 2006.

##### **(b) Air pollution**

According to a study conducted by Kaur (2017) air pollution has increased rapidly due to urbanization and industrialization as urban areas are the main sources of anthropogenic carbon dioxide emissions from the burning of fossil fuels for industrial processes, transportation of people and goods etc. The main sources of green house gases are industries and motor vehicles which are abundant in the urban areas.

##### **(c) Water pollution**

With increasing urbanization, there is also growing amount of wastes, in term of water, huge quantities of waste water enter into rivers and canals and have overtaxed their natural recycling capabilities (Kaur, 2017). The water quality has degraded with time due to urbanization that ultimately leads to increased sedimentation there by also increasing the pollutant in run-off (Uttara *et al.*, 2013). The disposal of human wastes as well as from the industries directly into the water bodies has increased the level of water pollution in the urban areas.

**(d) Noise pollution**

Urban areas are well known for many vehicles on road, many industries producing sounds, many kinds of social gatherings and functions. The noise produced from these automobiles, vehicles, social functions, industries etc. cause noise pollution in the urban areas which causes many psychological and physical ailments. (Rai, 2017)

**(e) Increase in the slum areas**

The areas within the cities and towns without civic and basic amenities are called Slums (Rai, 2017). The slum settlement arises due to the migration of rural peoples into urban areas in large numbers which creates shortage of housing facilities for them. Consequently they construct their dwellings with stuffs like rusted tins, sacks etc which are mostly in a condition not suitable to live. These areas become overcrowded by them which lack civic amenities like electricity, water supply, proper drainage, roads, toilets and medical facilities. The areas of slums become centres of a number of environmental problems. These people of these slum areas dispose their waste in the nearby water bodies or near their place of dwelling which pollutes air and water badly. The problems like open defecation, unhygienic surroundings cause health hazards not only in slum areas but also in other nearby places.

**(f) Solid waste disposal**

The main source of urban environmental pollution is decomposition of waste material into constituent chemicals. Urbanization directly contributes to waste generation and intuitive waste handling which causes health hazards and urban environment degradation. (Kaur, 2017) Urban population growths together with the development of markets and new industries resulted in the quantum of a huge amount of hazardous organic and inorganic waste daily in the city of Guwahati. (Gogoi, 2013)

**5. Urbanisation in Assam**

Assam is a state which is predominantly rural in character where most of the population depends on agriculture and allied activities as their primary occupation. However Assam has the largest urban population among the north-eastern states of India. Over the years there has been a gradual increase in the level of urbanisation in the state. From Table.1 it can be observed that up to 1941 the share of urban population in the total population was at a very low level. The share of the urban population has increased rapidly the post-independence period

**Table.1: Trend of Urbanisation in Assam**

Census Year	Urban Population	% to Total Population	%Decadal Growth
1911	92916	2.41	20.55
1921	127107	2.74	36.80
1931	162166	2.92	27.58
1941	208067	3.11	28.30
1951	344831	4.29	65.73
1961	781288	7.21	126.57
1971	1289222	8.82	65.01
1991	2487795	11.10	92.97
2001	3439240	12.90	38.24

2011	4397542	14.10	27.89
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Source: Statistical Handbook Of Assam 2016

**Table.2: Growth in Urban population in the district of Kamrup (Metro)**

	Kamrup Metro
Urban population in 2001	850136
Urban population in 2011	1037011
% of Urban population in 2001	80.23
% of Urban population in 2011	82.70
Decadal Growth Rate 2001-2011	21.98

Source: Statistical Handbook of Assam 2016

Table .2 shows the urban population in the district of Kamrup (metro). The city of Guwahati comes under the district of Kamrup (metro). And it is clearly shows that the percentage of urban population is quite high in the district. The decadal growth rate for 2001-2011 is 21.98%

### 6. Urbanisation in Guwahati

According to the 2011 census, Guwahati municipal area had a population of 963,429. The municipal area is under the jurisdiction of the Guwahati Municipal Corporation (GMC) whose limits were last extended in 1991 to cover an area of 216.79sq.km. It is visible from table 3 that Guwahati witnessed a very high rate of growth in the period from 1971 to 1991; 8.1 per cent p.a.

**Table 3: Guwahati Population Growth**

Year	GMCA*	
	Population	CAGR (%)
1961	1,00,707	8.7
1971	1,23,783	2.1
1991	5,84,342	8.1
2001	8,09,895	3.3
2011	9,63,429	1.8

\*GMCA-Guwahati Municipal Corporation Area;

Source: (i) Census of India (various issues)

However after that the rate has declined to a certain extent. But still high urban population is still a serious issue to be concerned for.

### 7. Impact of Urbanisation in the Environmental Quality

#### i) Slum Situation in the city of Guwahati.

In spite of low rate of urbanisation in the city in the last two decades, it has not been able to provide the growing urban population with viable housing, potable water, adequate sanitation, employment that gives them reasonable wages, etc. As a result, a large proportion of the urban population is constrained to live in slums or informal settlements and depend on the informal sector for their livelihood. The following table shows the slum population under Guwahati Municipal Corporation.

**Table.4: Slum population in Guwahati (Municipal Corporation), Census 2011**

Area Name	No. of Households	Total Slum Population
Guwahati (M.Corp)	5883	25739
Assam	42533	197266

Source: Statistical Handbook of Assam 2016

It can be seen from table.4 that according to Census 2011, approximately 13.05% of total population of the state comprises of the slum population that live in the city of Guwahati. A total no. of 5883 households live in the slum areas under Guwahati Municipal Corporation.

#### (ii) Status of Municipal Solid Waste Generation in Guwahati

The uncontrolled growth in the urban population has left many cities deficient in infrastructure services such as water supply, sewage and municipal waste management. Guwahati is one of such cities. Generated solid waste is not fully collected and sizeable amount of waste remains uncollected at the streets, road sides, slum areas, open places etc. which pollutes the environment and causes several health problems. The ULB(Urban Local Bodies) in the Assam state on an average generates about 1124 Tonnes of waste per day. The quantities of waste are growing at the rate of 3% annually with the increasing per capita generation. It can be observed from table. 5 that GMC generates amount of 396 MT per day as per Census 2011 which is very high and need to be improved further. High solid waste generation leads land pollution when it is dumped openly, it leads to water pollution when it is dumped in low lying areas and the water bodies and it further causes air pollution when it is burnt. According to a study conducted by Rahman it has been found that the water contamination is directly linked with various water borne diseases in the Guwahati .

**Table.5: Generation of Solid Waste in Guwahati Municipal Corporation (As per Census 2011)**

Particulars	Guwahati Municipal Corporation(GMC)
Total Population (2011)	<b>963429</b>
Total Waste Generation (MT per day)	<b>396</b>

Source: Assam Urban Solid Waste Management Policy, 2018

### (iii) Growth of motor vehicles in the district of Kamrup Metro

Over the years there has been a rapid increase in the number of motor vehicles on road in Assam. The on road vehicles population in the district of Kamrup Metro in which the city of Guwahati lies has also experienced a gradual increase over the past few years. As evident from table.6, the total no. of vehicles registered increased from 57509 in the year 2010-2011 to 71906 in 2015-2016. A similar trend can be observed in the total no. of vehicles on road which increased from 532933 in 2010-2011 to 852522 in 2015-2016. The increase in the growth of motor vehicles can be attributed to the rapid urbanisation. With the increasing growth of motor vehicles the quality of air has also deteriorated in the city causing excessive air pollution. The harmful emission from the vehicles has various health risks and it adversely affects the environment.

**Table.6: Growth of motor vehicles in the district of Kamrup Metro and Assam**

	Total no. of vehicles registered		Total no. of vehicles on road	
	2010-2011	2015-2016	2010-2011	2015-2016
Kamrup Metro	57509	71906	532933(p)	852522
Assam	241247	290874	1320867	2666589

Source: Economic Survey, Assam, 2016-2017

### (iv) Average Air Quality Index of Guwahati

The growth of motor vehicles and industries in the urban areas has degraded the quality of air. Due to excessive industrial emissions and vehicles emissions air pollution has increased substantially in Guwahati. The presence of various harmful pollutants in the air has also given rise to various kinds of diseases and ailments among the people. It is evident from Table.7 that as per the recent survey the AQI value of the stations in Guwahati city is 146 and head office Bamunimaidam in Guwahati is 322. The values show that the city is under potential health risks like breathing discomfort, heart and lung diseases, respiratory illness among the children, adults and older people which is a very serious issue to deal with.

**Table.7 Average Air Quality Index (AQI) values of Guwahati City for the month of January, 2018**

Pollutants /stations	Guwahati city	Bamunimaidam, Guwahati city
	Concentration in $\mu\text{g}/\text{m}^3$ (except for CO)	
PM10	169	171
PM2.5	-	148
SO2	8	8
NOX	23	17
CO( $\mu\text{g}/\text{m}^3$ )	-	2
O3	-	-
NH3	-	19
<b>AQI</b>	<b>146*</b>	<b>322**</b>

\*Moderate(101-200): Breathing discomfort to the people with lung, heart disease, children and older adults

\*\*Very Poor(301-400): Respiratory illness to the people on prolonged exposure

Source : Pollution Control Board, Assam

## 8. Conclusion

From the above results and discussion we can conclude that urbanisation is a potential threat to our environment. Urbanisation can cause several damages to the environment in the form of global warming, water pollution, noise pollution, air pollution and air quality degradation etc. Failure of governance in today's cities has also resulted in the growth of informal settlements and slums which has created pathetic situation in the cities.

As far as the city of Guwahati has been studied, urbanisation has affected the environment of the city by several ways like reducing the forest cover, increasing the slum population, increasing the AQI values, increasing the solid waste generation and increase in the no. of motor vehicles in the city etc. Urbanisation has resulted in a situation of trade-off between developmental activities and environmental degradation. Urbanisation has led to the development of the cities in many ways but all development was made at the cost of environment. There should be proper maintenance of the balance of the development the city with the environment. Sustainable development approach should be followed strictly for the conservation of environment.

Compressed Natural Gas(CNG) can be introduced by the government for the vehicles at affordable prices to reduce the air pollution. Proper management of the solid waste and water treatment can also lower the pollution. In addition to that adequate social amenities like housing facilities, drinking water supply, sewage facilities etc. should be provided to the urban dwellers so that they can lead a healthy and descent life.

Proper planning should be done and effective strategies should be made by the government, policy makers and the regulating agencies of the urban areas keeping in mind the protection of environment from all possible damages in the city and its developmental activities.

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