



ENVIRONMENTAL IMPACT OF URBANISATION: - A STUDY OF KERALA

Resmi C Panicker

Assistant Professor, Department of Economics, Government College for Women, Thiruvananthapuram.

Abstract

Urbanisation is the product of titanic move of labour and capital from fundamentally rustic to fundamentally built-up undertakings. It poses a serious intimidation to the environment in many aspects. Not long ago, in Kerala, urban growth has led to the diminution of natural resources in a precipitous fashion, resulting pollution and climate changes which triggers severe extortions to human health and well being. It also leads to detrimental changes in the structure of rural and urban societies in the State. Furthermore, many problems like deterioration of water quality, too much air pollution and waste dumping have been occurring very rapidly throughout the State. The focal point of this paper is to probe the spread of undesirable effects of urban expansion on environmental system of Kerala. The study is primly based on secondary sources of data analysis. It reveals that if the current trend of urbanisation continues, it will be a considerable strain on the local environment and biodiversity. Consequently, it is high time to evolve a framework for sustainable development of resources and appropriate management of action plans.

Key Words: *Urbanisation, Pollution, Biodiversity, Sustainable Development.*

Introduction

Whether we like it or not there is a titanic move of labour and capital from fundamentally rustic to fundamentally built-up undertakings. It is a major topic of discussion today particularly because of the precipitous and problematic growth of large cities all over the world. According to Davis and Golden (1954) “urbanization is a finite process – a cycle through which nation pass as they evolve from agrarian to industrial society. As Lipton (1978) says “urbanization remains the hope of the hopeless, the outlet of the occasional exceptional villager, but the opium of the development expert.” Geyer and Kontuly (1993) have opined that urbanization process occurs in a series of stages. In the context of ‘continuum of development’ the urban units of various size classes in a given nation go through successive periods of fast and slow growth spurts, the effect of which are reflected in the evolution of urban systems in both the developed and the developing countries. The morphology, the structure, the functional fabric of an urban centre may undergo transformation in the evolution of the urban system, affecting, in turn, the socio-economic dynamics of the region.

The inception of modern urbanisation is more or less a recent phenomenon and considered as a product of industrial revolution in the Western Europe. Most of the emergent countries started to experience urbanization only since the middle of 20th century. Currently, developed countries are characterised by high level of urbanisation and some of them are in final stage of urbanization process (Brockerhoff, 1999). It poses serious intimidation to the environment in many aspects. Such issues have received the attention of scholars in the various fields of social science.

Objective and Methodology

The study tries to trace out the trend of urban growth in Kerala. The paper tries is to probe the spread of undesirable effects of urban expansion on environmental system of Kerala in the last fourteen years. It is primly based on secondary sources of information. The cities of Thiruvananthapuram and Kochi are selected to highlight the environmental impact of urbanisation. Data from various census reports, economic reviews, and other reports are collected for the purposes.

Definition of an Urban Area

The census of India 2011 identified two types of towns.

1. Statutory Towns: All places with a municipality, corporation, Cantonment board or notified town area committee, etc. so declared by the State law.
2. Census Towns: All other places which satisfied the following criteria.
 - a. Minimum population of 5000.
 - b. At least 75% of the male working population engaged in non-agricultural pursuits: and
 - c. Density of population of at least 400 per sq.km

Urban Development

In Kerala the urban system consists of 6 municipal corporations, 87 municipalities and 19 urban agglomerations (Census, 2011).



Table 1: Trends in Urbanization of Kerala from 1901 to 2011

Census year	Total no. of urban towns	Total population(in crores)	Total urban population (in crores)	%of urban population	Decennial growth (%)
1901	21(9)	0.64	0.04	7.11	-
1911	27(14)	0.71	0.05	7.34	+15.44
1921	44(23)	0.78	0.07	8.73	+29.78
1931	53(23)	0.95	0.09	9.64	+34.58
1941	62(23)	1.10	0.12	10.84	+30.47
1951	94(25)	1.35	0.18	13.48	+52.72
1961	92(30)	1.69	0.25	15.11	+39.89
1971	88(32)	2.13	0.35	16.24	+35.72
1981	106(48)	2.55	0.48	18.74	+37.64
1991	197(65)	2.91	0.77	26.39	+61.65
2001	159(60)	3.18	0.83	25.96	+7.64
2011	520(59)	3.34	1.59	47.72	+92.72

Source: Census 2011 Govt. of India New Delhi.

Note: No. of statutory towns is given within brackets.

Kerala has a unique settlement pattern of rural urban continuum with concentration in coastal and midland regions. In Kerala urban content has been increasing from 7.11% in 1901 to 47.72% in 2011. During 2001-2011, Kerala experienced an urban population growth rate of 92.72. But during 1991-2001, the urban population growth actually declined from 61.65 to 7.64. The growth in urban population is due to the increase in no. of urban areas and urbanization in the fringe areas. The Urban population content is about to cross 50% mark with high rate of urbanisation. If this trend is continued Kerala will become 100% urban in the future (Kerala State Urbanisation Report, 2012)

Components of Urban Growth

There are 3 important components in urban growth.

- Natural increase
- Rural to urban migration
- Reclassification and boundary changes of the existing urban centre.

Features of Urbanisation

Early cities emerged to facilitate trade or as centres of political and religious authority (Smart, 2003). Therefore, urban centres are largely categorized as commercial towns, temple towns, tourist towns, industrial towns etc. Table 2 shows the district wise growth of urban population in the last decade.

Table 2: District wise Urban Growth

District	Urban Content 2001	Urban Content 2011	Change in Urban Content
Alappuzha	29.46	54.06	24.6
Ernakulam	47.56	68.07	20.51
Idukki	5.1	4.7	-0.4
Kannur	50.35	65.05	14.7
Kasargod	19.41	38.25	18.84
Kollam	18.02	45.11	27.09
Kottayam	15.35	25.58	13.23
Kozhikode	38.25	67.15	28.9
Malappuram	9.82	44.19	34.37
Palakkad	13.62	24.09	10.47
Pathanamthitta	10.03	11	0.97
Thiruvananthapuram	33.75	53.8	20.05
Thrissur	28.22	67.19	38.97
Wayanad	3.79	3.87	0.08

Source: -Kerala State Urbanisation Report, 2012



It is clear from the table that the urban growth has been increasing in all districts except Idukki. At the same time, the pace of urban growth is negligible in district like Wayanad and Pathanamthitta. Another noticeable point is population density in Kerala is 859 persons per sq. km as per 2011 census, one of the highest in the country. Though the decadal population growth rate of Kerala is very less (as per 2011 it is only 4.86) when compared with the National population growth rate (of 17.84), its growth of urban population is phenomenon. When compared to the World and National scenario, where urban population growth rate is showing a decreasing tendency, Kerala shows an increasing tendency in the urban population growth rate. Urban population growth rate of Kerala shows an increase by 83.82% within a decade between 2001 and 2011. Areal reclassification (the declaration of a hitherto rural area in to urban due to the shift in occupational structure) is the main reason for the high level of urbanisation noted here. Low population growth rate with high level of urbanisation will increase the scarcity in labour force, especially agricultural and related activities.

Environment of Kerala

Kerala is divided into three geographical regions namely highlands, midlands and lowlands. Highlands, the area of major plantations like tea, coffee, rubber and various spices. This area is often known as the Cardamom Hills. This region is one of the largest producers of many spices especially cardamom from which it earns its name. Midlands is an area of intensive cultivation. Cashews, coconut, are canut, tapioca, banana and vegetables of different varieties are grown in this area. Lowlands are also known as the Coastal Area. It covers an area of almost 4000 sq.km. It is made up of numerous shallow lagoons known locally as *kayels*, river deltas, backwaters and shores of the Arabian Sea and is essentially a land of coconuts and rice. This area is very fertile and most of the paddy cultivation is along this area.

Urbanization and Environmental Degradation

Urbanisation is growing at a tremendous pace leading to "a world of agglomerations, megapolis piled on megapolis" (Karnath, 1976). He also extend that as the urban man satisfies his needs and desires, he spoils the environment. So urbanisation is considered as a menace to the survival of homosapiens and a crime against humanity.

Cities are major polluters of environment. Managing the urban environment is a daunting problem. Currently, awareness of urban environmental problems continues to centre on air and water pollution. Industrial emissions are significant but vehicular pollution is the single most important source of air pollution. (Sivaramakrishnan, 2000)

The provision of infrastructural facilities required to support large concentration of population is lagging far behind the pace of urbanisation. As a consequence, the urban environment, particularly in large cities, is deteriorating very rapidly. All cities have severe shortage of water supply, sewerage, developed land, housing, transportation and other facilities.

Air Pollution

A major cause of air pollution is due to emission from the vehicles.

Some of the specific factors are listed below:

- High emission from two and three wheelers
- Adulteration of fuel
- Violation of emission norms
- Lack of vehicle maintenance
- Large number of old vehicles in use
- Erratic traffic behavior
- Older engine technologies
- Inadequate road space preventing better mobility of traffic
- Poor maintenance of roads
- Inadequate traffic management
- Increase in population of vehicles

In Kerala, the growth of motor vehicle is alarming. In 2001, it was 2097863 and it shot up to 7834862 in 2013. It is said that vehicles contribute about 80% of carbon monoxide pollution, 90% of oxides of nitrogen and 65% of hydrocarbons. These are no doubt critical to the sustainability of the environment.



Table 3: Growth of Motor Vehicles in Kerala

year	No. of Motor Vehicles	% Growth of Vehicles
2000-2001	2097863	
2001-2002	2299445	9.6
2002-2003	2533490	10.2
2003-2004	2772116	9.4
2004-2005	3101678	11.9
2005-2006	3537952	14.1
2006-2007	4003677	13.2
2007-2008	4421089	10.4
2008-2009	4857097	9.9
2009-2010	5374692	10.7
2010-2011	6049059	12.5
2011-2012	6870354	13.6
2012-2013	7834862	14.0

Source: Kerala State Motor Vehicle Department, 2014

Industrial Wastes

Of the eighty three red category industries situated in Greater Kochi area, 79 are situated in Eloor-Edayar and Ambalamugal industrial cluster and hence those clusters are concentrated upon. It is a matter of credit that all the said industries have adopted pollution control measures. But there is need and scope for making the measures more effective individually and collectively. (Pollution Control Board, 2010)

Water Pollution and Solid Waste Management

Another serious problem is related to treatment of sewage collection and disposal of waste materials. Hardly any city in India has 100 percent sewage collection treatment and waste disposal facilities (Singh, 1993). Most of these wastes directly enter the nearby rivers. This in turn affects the river water quality. The sewage without proper treatment contains organic and inorganic pollutants along with pathogenic micro-organisms responsible for various water-borne diseases like typhoid, cholera and dysentery. Water borne diseases, gastroenteritis in particular, is widely spread along the coast that becomes infectious agents. The effect of domestic sewage on the ecology of the backwater is significant. Environmental and health problems associated with solid waste mismanagement. A variety of environmental hazards are associated with the mishandling or mismanagement of refuse. The solid waste which is not properly stored, collected, transported and disposed off will lead to short-term as well as long term health risks. In the long term, there may be dangers arising from waste dumps particularly from it to the pollution of our drinking water sources. Fly breeding will be encouraged by uncovered piles of rotting refuse and the flies may play a role in the mechanical transmission of faecal-oral diseases. Piles of refuse will also contain mosquito-breeding sites where pools of rain water form in discarded cans, tyres etc. The mosquito *Aedes aegypti* will survive in these conditions and may transmit dengue, yellow fever, and other arboviral infections. Rats will also breed and live in and around refuse. The main source of food for rats and other small rodents is refuse, and in dump yards they quickly proliferate and spread to neighboring houses. They may promote and transmit a variety of diseases, including plague, leptospirosis, rat bite fever etc. (Centre For Environment and Development, 2003)

The water is found to be highly acidic, loaded with ammonia, fluorides and phosphates, resulting in massive fish kills. The area of the water bodies has been getting reduced at an alarming rate by the bunding, reclamation and encroachment for the purpose of agriculture, aquaculture, harbour development etc. The depth of the backwaters is also getting considerably reduced due to siltation. As a result of all these activities, the system now is unable to perform most of the normal ecological functions. Due to urbanisation and consequent change in lifestyle, the domestic solid waste volume is increasing alarmingly. Almost fifty percent of waste in urban area goes uncollected from the road sides and other places of dumping. (State Environment Report, 2007)

Case of Kochi

The significant demographic fact about Kochi is that the city lies in Ernakulam District which is the most urbanized region in the state. The percentage of urban population of district (68.07%) is far beyond the urban content of the state (47.72%). Kochi generates around 255 mld of urban sewage that directly enters the backwater. Total dissolved solid content of water here may be as high as 53750 mg/l during summer which may come down to 16 mg/l during the rainy season. Major industries on the



banks of Periyar are located in the Udyogamandal area, outside the Corporation. It is estimated that nearly 260 million litres of trade effluents reach the estuary daily from the industrial belt of Kochi. The pathalam bund, a temporary structure, is constructed each year on the Eloor branch of Periyar river since 1981, to prevent salinity ingress from Vembanad backwater and contamination of the water supply from the industrial units located there. (Pollution Control Board, 2010)

Case of Thiruvananthapuram

Since July 2000, about 80% of the waste generated in Thiruvananthapuram is being transported to a waste composting plant and a dumpsite in Vilappilsala village. Since the same month, respiratory illnesses reported in Vilappil Primary Health Center increased by 10 times from an average of 450 to 5,000 cases per month. Now the situation has changed in Vilappilsala. But the problem of waste disposal remain unsolved in the city.

Dengue and Chikungunyain Kerala

The trend of dengue in Kerala in comparison to India during 2001 to 2005 shows that dengue cases in the state was highest during the year 2003 and after that there is a reduction in number of c reported cases. The reported dengue cases emerged in the year 2001 with Ernakulum, Idduki and Kottayam as the first report such cases. In subsequent years the disease spread to 12 districts and by 2003, the state saw an outbreak of dengue with more than 3800 cases reported from al the districts. Though a decline in reported dengue cases is noticed in 2004 and 2005 the diseases were reported from all the districts. It is important to note that the state with 3% of total population is contributing to more than 8% of Dengue cases for the last five years, every year.

Since May-June 2006, Kerala has reported outbreaks of Chikungunya in some localities of Kozhikode, Trivandrum, Ernakulam and Alappuzha districts. These four districts have highest population density in Kerala.

Climate Change

Kerala has high population density along the coastal villages along with equally high density of open wells. The climate induced changes are going adversely affect livelihood options of the people of Kerala, which has a 590 km long coastline. This clearly indicates the vulnerability of the coastal population of Kerala even to a few millimetre rise in sea level. (Sundaresan & Patel, 2011)

According to the National Data Centre of IMD, Pune (2006) There was an increase in maximum temperature over Kerala by 0.64° C during the period of 49 years from 1956 to 2004. The study revealed that increase in minimum temperature was 0.23° C and overall increase in annual average temperature was 0.44° C. It indicated a clear upward trend in surface air temperature of Kerala.

Indian Meteorological Department made a study between 1961 and 2003 which shows that the mean annual maximum temperature over Kerala has risen by 0.8 degree centigrade and the mean annual minimum temperature has risen by 0.2 degree Celsius. According to the study report of Indian Institute of Tropical Meteorology, Pune (2010), annual maximum temperature of North Kerala increased by 1.2.degree Celsius per 100 years and the annual maximum temperature of South Kerala increased by 1.0.degree Celsius per 100 years. The increase in temperature was 0.4 degree Celsius per decade during the past three and half decades. The annual mean surface air temperature is projected to rise by 1.7°C and 2.0°C in 2030s. The mean sea level rise trends in Kochi based on 54 years of available data is 1.75mm per year.

Rainfall data for the IMD stations of the State of Kerala for the period from 1871 to 2008(140 years) revealed a declining trend in annual and southwest monsoon rainfall during the past 60 years and an increasing trend in post monsoon rainfall, indicating likely shifts in rainfall patterns. Experts suggest that this untimely rain is a clear evidence of climate change.

Conclusion

Rapid urbanization has caused wide spread environmental degradation in the State. The major outcome of urbanization which poses serious threat to environment is population concentration in cities. Ever growing traffic is another major cause of pollution in these areas. Major cities in Kerala face serious issues like solid waste management, air pollution, poor drinking water quality and the like due to high urban content. Provision of urban housing in these areas is a big challenge and which adversely affects the local environment.

Moreover, these environmental degradation affect climate adversely and in turn affect the production of food crops and create health problems in the State. Therefore the ultimate loser of this environment degradation is human beings. It is our responsibility to preserve our natural resources for the sustainable development. The study reveals that if the current trend of



urbanisation continues, it will be a considerable strain on the local environment and biodiversity. Consequently, it is high time to evolve a framework for sustainable development of resources and appropriate management of action plans.

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