URBANIZATION AND EMERGING ENVIRONMENTAL ISSUES IN NAGALAND

A THESIS SUBMITTED TO NAGALAND UNIVERSITY
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY
IN
GEOGRAPHY

BY
MOASANEN LONGCHAR
Registration No. 480/2012

Department of Geography
School of Sciences
Nagaland University
Headquarters: Lumami-798627
Nagaland

2017

Department of Geography
School of Sciences
(A Central University established by an Act of Parliament No.35 of 1989)
Headquarters: Lumami, Dist: Zunheboto, (Nagaland), Pin Code-798 627

DECLARATION BY THE CANDIDATE

I, Mr. Moasanen Longchar, hereby declare that the subject matter of this thesis is the record of work done by me, that the contents of this thesis did not form basis of the award of any previous degree to me or to the best of my knowledge to anybody else, and that the thesis has not been submitted by me for any research degree in any other University/ Institute

This is being submitted to Nagaland University for the degree of Doctor of Philosophy in Geography.

(Moasanen Longchar)

Scholar

(Prof. M.S.Rawat)

Head of Department

(Prof. T.Lanusosang)

Supervisor

Place: Lumami

Dated: ……..

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CERTIFICATE

This is to certify that the thesis entitled "Urbanization and Emerging Environmental Issues in Nagaland", submitted to Nagaland University in partial fulfillment of the requirements for the degree of Doctor of Philosophy (Ph.D.) in the Department of Geography, embodies the original research work carried out by Moasanen Longchar, Registration Number 480/2012, under my supervision and guidance.

Further, I certify that no part of this thesis has been submitted anywhere for any other research degree. The assistance and help received during the course of study have been duly acknowledged.

Place: Lumami (Prof. T. Lanusosang)

Dated: …….. Supervisor

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Acknowledgement

First and foremost, I offer my deepest gratitude and praise to the almighty God for his unfailing grace, strength, wisdom and blessings throughout my entire research work.

I extent my heartfelt gratitude to my Supervisor Professor T. Lanusosang for all the constant and untiring dedication, invaluable advice, guidance and encouragement throughout my research period. If not for his concern, advice and suggestions during my hard and difficult times, I would never have completed my research.

I am deeply grateful to my beloved parents for their untiring love, encouragement, understanding and prayers all through the study.

I am also very grateful to all the staff, both teaching and non-teaching, from the Department of Geography, Nagaland University for the immense help they have rendered all through my research period.

Special thanks go to the Department of Urban Development and all the various departments from all the districts for their help and the invaluable secondary datas, reports, documents etc. which has been very useful for the smooth completion of my thesis. I especially thank Ken Keditsu (Director, Urban Development, Nagaland), Tarachu Fithu (Asst. Director, Urban Devolpment, Nagaland) Dr. Furkumzuk (Nagaland GIS and Remote Sensing Centre) and Keneikhoto Yano (Research Scholar, Department of Geography, Nagaland University) for the help and valuable suggestions during my study.

Thanks to all my colleagues and friends, especially those from Kamnoi Research Scholar's Hostel. I honestly respect and appreciate their spirited interest in the pursuit for higher studies.

Last but not the least, I would like to sincerely thank all those respondents, individuals and families for their valuable information, hospitality and support during my field work.

Dated: Lumami

(Moasanen Longchar)
Department of Geography
Nagaland University

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Urbanization, simply defined, is the shift from a rural to an urban society, involving an increase in the number of people in urban areas during a particular year. It is a process by which people, instead of living in predominantly dispersed agricultural villages, start living in towns and cities dominated by industrial and service functions which in turn leads to multiplication of urban places and/or an increase in the size of existing cities. The United Nations defines it as movement of people from rural to urban areas with population growth equating to urban migration. Closely linked to modernization, industrialization, and the sociological process of rationalization, urbanization is the outcome of social, economic and political developments that lead to urban concentration and growth of large cities, changes in land use and transformation from rural to metropolitan pattern of organization and governance. Though the term urbanization has been defined differently by different disciplines of the academic world, the simplest and most commonly accepted one being that 'Urbanization' refers to the proportion of the population living in urban settlements to the total population or else to a rise in this proportion. Geographers commonly use the term to refer to "a process of transformation from rural to urban", while Urbanism is the concept, mostly used by sociologists, such as Winth (1938), who defined it as "the process by which a section of population adopts an urban way of life even while residing in a rural area."[1] Economists, on the other hand, treat urbanization as the process whereby the primary production is replaced by secondary and tertiary functions. The definition of urbanization, hence, is so diverse that Mc Gee has rightly called it "a balloon into which each scientist blows his own meaning."

[1] Gautam, Dr.A. (2006), *Advanced Geography of India,* Sharda Pustak Bhawan Publisher & Distributors, Allahabad. p.253.

The first notable attempt at comprehending the urban phenomenon in a systematic manner has been made by Louis Wirth (1938) in his classic essay 'Urbanism as a Way of Life'. Following his lead, various social scientists have taken up the study of urban phenomenon and the multidimensional processes of change associated with it. According to Wirth, a city or urban area is a relatively large, dense and permanent settlement of socially heterogeneous individuals. Urbanization on the other hand is essentially a social process by which urban centres emerge and grow, while urbanism is the condition of life or living that results from this process.

Keeping in view the slight differences in the use of the term urbanization, one may agree with Riessman who interprets urbanization as the whole process of change and its consequences when a society gets transformed from an agrarian economy to an industrial economy and from a small homogeneous society to a large heterogeneous mass.[2] Trewartha considers urbanization as a cyclical process through which the nations pass as they evolve from agrarian to industrial societies. It means there is a positive correlation between the degree of industrialization and urbanization implying that urbanization has a beginning as well as an end.[3] Thus, the process of urbanization has many dimensions which range from physical spread of land to the social processes by which urbanism inculcates into a population.

The world at present is in the midst of rapid urbanization. The rapid urbanization of the world's population over the 20th century is described in the 2005 Revision of the UN World Urbanization Prospects report. The global proportion of urban population rose

[2] Reissman, L. (1964), *The Urban Process*, New York.

[3] Trewartha, G.T. (1969), *A Geography of Population: World Patterns*, John Wiley and Sons Inc., New York.

dramatically from 13% (220 million) in 1900, to 29% (732 million) in 1950, to 49% (3.2 billion) in 2005. The same report makes the projection of the figure to 60% (4.9 billion) by 2030. In regard to future trends, it is estimated 93% of urban growth will occur in developing nations, with 80% of urban growth occurring in Asia and Africa with roughly 4% per year.

Thus, it is observed that with such rapid population growth in the developing nations like India, coupled with high rate of rural to urban migration the cities is getting overcrowded. This often creates a situation where the local governments fail to generate the resources to provide even the basic amenities for their residents. Such rapid growth and development also results to various geo-environmental problems like soil erosion, mass wasting, loss of vegetation and biodiversity. These in turn create lesser degree of percolation of water which results to change in the hydrology of the area, change in the micro-climate, and higher degree of pollution of air, water and land.

1.1. Review of Literature

Urban Geography, as a distinct subject is of recent origin and its development took within the last six decades or so. Urban geography consists of the study of towns and their development in all their geographical aspects. The article, “Geography and Urbanism” (Mayer, 1967), outlines the major problems which modern geography deal with. Among these, he stresses the geographer’s interest in the aerial association of activities within urban places. He further describes the growing interest in describing and understanding the spatial frictions existing in cities because of their morphology and the need for planned development of urban centers. “Urban Geography” by Clark (1982) is another commendable book that summarizes and assesses the contribution of geographers to the

understanding of the city and urban society. It also provides a concise statement of those who are new to the field of urban geography and seeks to provide a guide to recent development and contemporary areas of enquiry in urban geography. Various definitions of urbanization given by a number of scholars basing on their orientation and understanding are also reflected in the book. However, there is a general agreement that urbanization is a complex socio-economic process intimately connected with the scientific-technological revolution, and that it exercises a growing influence on all aspects of society's life affecting the nature of economic development as well as the demographic, ethnic, and many other social processes. To make it more clear, according to Kantsebovskaya (1976), 'Urbanization implies changes in the nature of people's activities; in the ratio between population engaged in agricultural activities and rest of the population; in the population distribution according to the types of settlements; in population concentration of man's activities in shaping of urban way of life and its growing influence on the other sections of population.' Further, in the view of R.P. Misra (1998), urbanization deals with the land as well as machine production. It is closely linked with the concentration of people at one place through migration from the fringe and surrounding areas with an ambitious hope of future materialistic self-development. This is often associated with higher incomes, higher literacy and improved quality of life, easier access to information, diversity, creation and innovation.

A host of literature dealing with the subject of urbanization and its related topics have been researched and written by various authors and scholars. One such book is "Key Concepts in Urban Studies" (Gottdiener and Budd, 2006). It refreshes the readers with the ideas and concepts propounded by various schools of thought on the evolution of urban

studies and the spread of urbanization around the world. It also highlights the modern concepts of urbanization such as New Urbanism, Over Urbanization, Postmodern and Modern Urbanism and provides various models of urban growth. “The Urban Transformation of the Developing World” (Gugler, 1996) is a wide collection of valuable papers where his three essays discuss urbanization in the Third World Countries. His efforts, thus, provide an opportunity for comparing the entire range of social science approaches to the study of urbanization. Further, “Economic and Social Geography” (Knowles and Wareing, 1976) attempts to present interlinkages between the environment, population and urbanization; and it also tries to point out what a town or city is like, how it emerges and takes its shape. Another important publication on urbanization is “Handbook of Urban Studies” (Paddison, 2001), which provides a comprehensive appreciation of urban structure and change, and of the theories by which we understand the structure, development and changing character of cities. The volume focuses on specific aspects of the city, and by comparing the cities in different regions of the world aims to take account of the diversity of urban development and change.

A useful source of theoretical and empirical information on migration and urbanization in both developed and developing societies is “International Handbook of Urban Systems (Studies of Urbanization and Migration in Advanced and Developing Countries)” by (Geyer, 2002). It is a collection of up-to-date case studies focusing on the links between population redistribution, migration and urbanization. Apart from being a useful reference source on urban systems, the volume demonstrates the value of comparative analysis, as well as the associated difficulties. Some of the world’s most experienced researchers in this field look at population redistribution patterns and the signs of remarkable similarities,

despite local differences in the underlying forces that drive the migration process and urban development across the development spectrum.

Urbanization and urban development are the catchwords not only in the western world but even in the orient as well. In the Indian context, many authors, both local and foreign, have contributed towards the study of urbanization in India from different viewpoints. One such well researched work is "Urbanization and Urban Systems in India" (Ramachandran, 2006) which attempts to present the salient features of urbanization in India from a geographical point of view and inter-relates it with historical and socio-economic aspects. It gives a holistic view of urbanization and critically analyses the strengths and weaknesses of the Indian urban system and provides new insights into contemporary urban problems. Finally, the author examines the fundamental issues involved in framing a national urbanization policy, and expresses the hope that the development of smaller cities and towns may provide some relief from the problems of overcrowding and unplanned growth. Another book of the same genre is "Urban Geography: A Textbook" (Mandal, 2000). It throws light on trends of urbanization in the global, Third World, and the regional contexts. It also lays emphasis on the problems related with urban development and population growth in the towns and cities along with policy suggestions for urban planning and development. Besides, "Indian Cities: Towards Next Millennium" (Rao and Simhadri, 1999) is an exclusive work aimed at presenting a thoroughly researched view of the complex web of contemporary cities' problems in India. It contains contributions on environmental, social, economic, migration and other issues of relevance by authors of diverse fields in social sciences, adopting an interdisciplinary approach in their respective studies.

A Country Report, "Progress in Indian Geography" (Nayak, 2008) is another notable work that sheds light on the trends and patterns on urbanization in India and its implications on the quality of urban environment and urban life. It suggests that an effective urban planning policy and practice is the immediate need so as to help urban planners and decision makers prioritize environmental problems and other policy options in order to meet environmental challenges. "A Review of Urbanisation and Urban Policy in Post-Independent India" (Batra, 2009) is a Research Working Paper which outlines the general contours of the urbanization process in India since the British rule to the present post-Independent period. It attempts to link up the ongoing neoliberal urban reforms with the current process of urban restructuring in India. A research paper, "Environmental Degradation in the Context of Growing Urbanization: A Focus on the Metropolitan Cities of India" (Maiti and Agrawal, 2005) is yet another commendable work which concentrates on some of the important environmental problems caused by over population growth and rapid urbanization process in the metropolitan cities of India. The problems of slum growth, solid waste management, waste water treatment, vehicular pollution control and state of ambient air quality in Indian cities are some of the topics discussed in the paper. "Urbanization in India: A Demographic Reappraisal" (Bhagat, 2001) gives an overview of the global urbanization trends and India's place in world urbanization. He also presents the main indicators of urbanization and the trends in natural increase and migration of the population in India while projecting the future urbanization of India about a likely increase in intra-urban and urban-rural inequality.

"Urbanisation in India (Basic Services & People's Participation)" (Sivaramakrishnan, *et.al.*, 1993) is an important contribution to the ongoing debate on the problems of

growing urbanization in India and other developing countries. Rapid urbanization in India in the last four decades has brought into sharp prominence the problem of adequate access to urban basic services. This scenario has generated vigorous debate among the city planners, civic administrators, urban specialists and scholars with regard to the provision of these services. This book brings together the key note addresses delivered at the seminars organized by the Institute of Social Sciences in New Delhi, Bhubaneswar and Baroda respectively. Another book 'Quality of Urban Life' (Fakhruddin, 1991) introduces the reader to a new area of urban geography in India. It relates to historical and socio-economic aspects of the geographical and cultural setting in which the research is conducted. Special reference has been made on the residential system of Lucknow city. It also analyses structure and spatial pattern of quality of life in the city.

The deteriorating quality of the environment and the consequent imbalance and disruption in the ecological relationship because of increasing urbanization has become a matter of an ever-increasing concern throughout the world. Our cities are plagued by problems of congestion, waste, and pollution that deplete natural resources, damage the environment, and reduce the quality of life for their citizens. The irony is, as this fascinating new study shows, it doesn't have to be like this. "Building the Ecological City" (White, 2002) describes the problems we face and puts forward solutions to the question – How can we build cities that provide an acceptable standard of living for their inhabitants without depleting the ecosystems and bio-geochemical cycles on which they depend? It also suggests and examines the concept of urban metabolism which characterizes the city as a set of interlinked systems of physical flows linking air, land, and water. A series of chapters looks at the production and management of waste, energy use and air emissions,

water supply and management, urban land use, and air quality issues. “The Challenge of Sustainable Cities: Neoliberalism and Urban Strategies in Developing Countries” (Burgess. *et al.*, 1997) is an assessment of the current state of play between urban theory, policy and architectural and planning practice in developing countries. It explains and criticizes what is happening in cities in an era now dominated by neoliberal development policy. Apart from being a useful reference source on the significance of environmental issues for the sustainability of cities and development models, the book also gives a critical review of the nature of contemporary urban environmental strategies and policies adopted in the developing countries.

“Frontiers in Environmental Geography” (Singh. *et al.*, 1993) is also a noteworthy one that attempts to study the human-environment relationships and analyses the emerging issues and challenges in the study of environment, such as environment vs. development, exploitation of resources, global climatic changes, pollution, policy, legislation and possible approaches. This overview provides a basis for consideration about emerging issues in environmental studies at regional, national and global levels. “Environment Management in India” (Sapru, 1987) is a collection of papers that have drawn the world community to an awareness that its own health and quality of life and the fate of the future generations depend on action to avert environmental catastrophe. His paper also brings to light the need to consider proper utilization of natural resources and protection of the physical environment. Another book “From the Local to the Global” (McCann and McCloskey, 2003) is an accessible and comprehensive introduction to key concepts in development that are central to understanding the causes of poverty, inequality and injustice in developing and developed countries. Chapter 12 of the book specifically

discuses the environmental costs of development, outlines the recent policy developments in regard to protecting the environment, addresses key issues and recent concerns around environmental denudation, and concludes by offering recommendations for progressive action in the future.

The impact of the process of urbanization on the environment is clearly projected in the book “Man, Society and the Environment” (Gerasimov, *et.al*., 1975). It gives an overview of the various features of urban development and growth on the global scale while comparing it to the urbanization status in the Soviet Union. The spontaneous influence of human activity causing disastrous derangements in the dynamic equilibrium between natural processes and disturbing natural links between components on the natural environment is an obvious result of urbanization process. Therefore, the authors suggest that control of urbanization is crucial in order to secure favourable conditions for the life of the population which can be done through the implementation of a wide programme of measures to secure rational uses of the natural environment, to protect and improve it. “Urban Environment Management (Local government and Community Action)” (Ghosh, 2003) provides an insight into the environmental problems plaguing the urban areas in a cross-country perspective. It emphasizes the partnership between the local government and the community in urban environmental management sustainable development. This authoritative book also includes case studies about issues relating to urban environmental planning and management in India.

“Urbanisation in Developing Countries (Basic Services & Community Participation)” (Mohanty, 1993) is a substantial compilation of research papers of scholars, urban planners, administrators and researchers. It provides deep insights into understanding of

the nature and magnitude of problems faced by the cities in the developing world due to rapid urbanization, and emphasizes the need to learn from the experiences of other countries while suggesting concrete recommendations to improve the situation. The dimensions of problems of urban growth, the status of basic services, problems of decentralized planning and resource mobilization, community development and the role of social action groups are some of the other vital aspects that the book consciously takes into account. "Environmental Geography" (Khan and Agarwal, 2004) is another compilation of selected research papers which deals with basic theme of Geography and Environment. The volume provides a comprehensive account of the local, regional and global problems at micro and macro-levels. It also provides both theoretical and behavioural bases as well as case studies focusing on urban growth and its environmental impact in various cities in India.

In 2010, half the world's population lives in cities; by 2030, it will be 60 percent (Population Reference Bureau, 2010). Today, around three-quarters of the poor in developing countries live in rural areas; by 2030, 50 percent will likely live in cities (Ravallion *et al*., 2007). The number of mega-cities (with populations over 10 million) will have risen from 19 in 2007 to 27 in 2025, most of them in developing countries (United Nations, 2008).This phenomenal urbanization process will create many challenges for the Developing countries. The problems of cities are well known**:** cities are congested, polluted, energy-intensive, ridden by crime, corruption and poverty, and difficult to manage (Annez and Linn, 2010). "The way we plan, manage, operate and consume energy in our cities is the key driver behind the phenomenon of global warming. Seventy-five percent of global energy consumption occurs in cities. Roughly half of this comes from

burning fossil fuels for urban transport." (Anna K. Tibaijuka, Under-Secretary-General and Executive Director, UN-HABITAT).

There are also a number of world journals, reports and brochures dealing with the various aspects of urbanization at the global and regional level. "State of the World's Cities 2010/2001: Bridging the Urban Divide" (UN-HABITAT, 2010) and "Climate Change: The Role of Cities" (UN-HABITAT, 2009) raise awareness to strengthen initiatives regarding urban global linkages within cities and highlight the unprecedented challenges which urbanization throws at the world's cities today. A research paper "Urbanisation and Migration: An Analysis of Trend, Pattern and policies in Asia" (Kundu, 2009) gives an overview of the urbanization and migration process in Asian countries at macro level since 1950s, including the projections made till 1930. "Urbanization, Urban Environment and Land Use: Challenges and Opportunities" (Ichimura, 2003) discusses the ongoing process of urbanization in the Asia-Pacific region and focuses on the environmental and social problems plaguing the region. The paper further attempts to encourage countries in the region to take an integrated approach in managing urbanization while also strengthening local initiatives in the management of urban environments.

The urbanization process had a late start in the North-East and gained momentum only since the 1970s. "Urban Development in North-East India: Potentiality and Problems" (Ray, *et al.*, 1999) is a collection of seminar papers on the different aspects of urbanization in the North-East. It covers important topics on the subject ranging from the growth of urban centers, role of towns in the development process, its potentiality, and the resulting ecological and socio-cultural problems. Another book "Essays in Indian Geography" (Gopalakrishnan and Ahmed, 2001), is also a collection of papers presented by different

scholars. The papers deal with the geography of the North-East, urbanization, regional development and population trends in the region. The book “Development Priorities in North-East India” (Deb, 2002) is another indispensible resource for researchers and professionals in studying the impact of development process on the natural environment. Chapter 13 of the book specifically points out that deterioration of the environmental quality is regarded as the inevitable consequence of urbanization. Therefore, one must accept the synthesis that urbanization is a saviour up to a certain limit but detrimental afterwards, if not checked. “Urbanization in North-East India” (Bahadur, 2009) is confined to the pattern of urbanization in northeastern states of India during the 20th century. It also highlights various urban indicators. The trends of urbanization level, degree of urbanization and consequent process of detribalization are the special areas of emphasis in the present study.

”Population, Poverty and Environment in North East India” (Ray, *et.al.*, 2000) is a compilation of papers that deals with population dynamics, poverty, and environment of the region, which are very much interlinked. The overall growth in the urban centres has not been spectacular in recent years, especially in the smaller towns which are characterized by poor infrastructure, growing population and housing shortage, as major investment in urban infrastructure have gone, by and large, to the major metros. The level of urbanization in North East is also relatively low and the civic infrastructure like roads, sewage, water supply and municipal services are deplorable. The rapid growth of population and environmental degradation can ultimately be traced to the alarming poverty of the region which is one of the poorest regions of the country. Thus, the papers

included in the volume make an attempt to study such issues by analyzing them and suggesting counter remedies for the degrading social situation in the region.

In Nagaland, it was only in the post independence period that significant urbanization started with the introduction of the national policy for tribal development. Since the formation of the State in 1963, the small administrative blocks and headquarters have been steadily expanding to accommodate the growing population, as more and more people migrate from the surrounding villages in search of jobs, education, health care and various other lifestyles that are not available in the villages. The report "Rural-Urban Migration: A Thematic Report" (Aier and Kithan, 2009) deals with linkages between rapid urbanization and the impact of continuous rural-urban migration on Nagaland. It lists lack of urban facilities, upward mobility, unemployment and livelihood issues as the main causes for migration. The report also draws attention to issues pertaining to facilities, opportunities, livelihood options, poverty reduction etc. and outlines the need for urban rejuvenation and development, customized to local situation and requirements. Another paper "Understanding Rural to Urban Migration: Through the Case of Nagaland" (Yadav and Shinde, 2015) draws the significance of migration as an important factor in changing the size and structure of the population. It also talks about the serious environmental impact of migration on the urban centres, besides causing strain on the limited urban services and infrastructure which ultimately leads to an increase in urban poverty and unemployment. The paper also gives suggestions as to how problems arising out of rural to urban migration can be minimized through the strengthening rural-urban linkages by providing urban amenities in the rural areas so that rural based activities would take place in the urban areas and the urban oriented activities would also take place in the rural settlements.

A comprehensive and analytical account of infrastructural facilities and the process of economic development in Nagaland have been attempted in the book "Economy of Nagaland in Transition" (Baishya, 2012). The book not only covers the infrastructural facilities but also the socio-economic aspects of the State and explores the economy of the region from its background to its present status. It also identifies the various weaknesses in the present state of infrastructure, its causes, and at the same time provides effective measures to strengthen the governance system of the State by removing the barrier between the common people and the governance through community participation for the overall socio-economic development of Nagaland. The book "Economic Development in Nagaland: Prospects and Constraints" (NUTA, 2006) is a compilation of papers from the seminar on the same theme organized by the Nagaland University Teacher's Association. The topical contents of the book range from various issues and challenges faced and opportunities created by the process of economic development in Nagaland. A clear picture of the potentiality in the human, industrial and agricultural resources of Nagaland has also been presented and elaborated thoroughly. The status of infrastructure and the need for strengthening public services have also been emphasized. Lastly, the role of GIS (Geographical Information System) and RS (Remote Sensing) has been accented in the policy making, planning and resource management for the physical, economic and social development of the State.

"State of Environment Nagaland" (Nagaland Pollution Control Board, 2005) is a draft report on the status of environment with regard to natural resource management, biodiversity, human resource, land degradation, solid waste management and air and water pollution in Nagaland. "Nagaland Action Plan on Climate change" (2012) and "Nagaland

State Climate Action Plan" (2012) are draft papers published by the Government of Nagaland that gives a brief description on the trends and patterns of urbanization in Nagaland. It also highlights the workings of the institutional mechanism governing the urban sector and the actions and strategies thus adopted in mitigating climate change to promote the sustainable growth of towns in the State.

1.2. Statement of the Problem

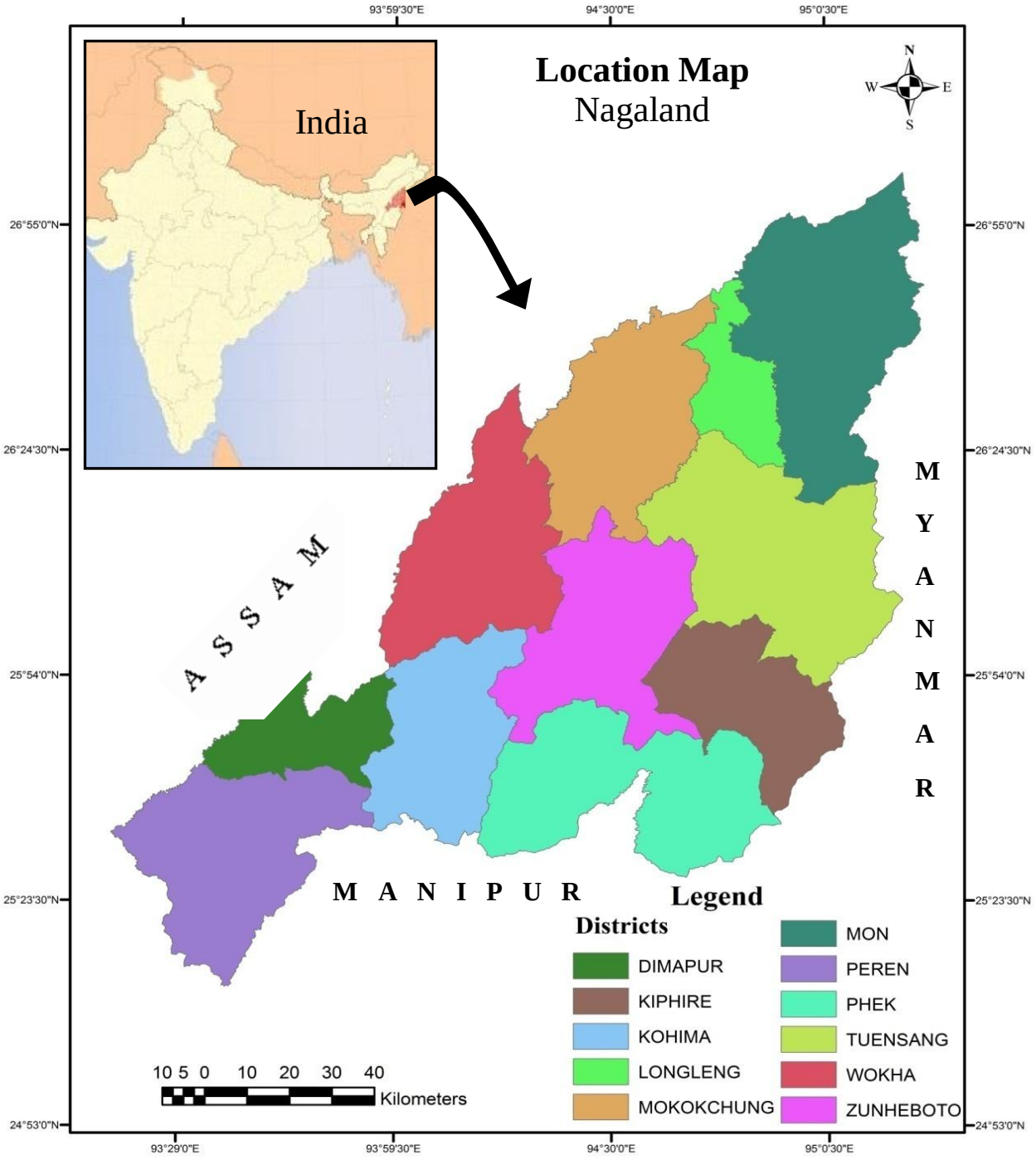
Contemporary urbanization is marked by a unique feature. It is the explosive nature of concentration of urban population in large cities. Earlier, a city with a million populations was a freak. However, today cities with 10 million people are becoming common. This unprecedented increase in the World population irrespective of the causes thereof, has serious implications on the environment and for human survival and development. Although nature supports the upkeep of the environment, the disturbance of urban landscape on account of man-made expansionist activities, fast polluting transport mechanisms, and lack of proper urban policies and management strategies lead to the deterioration of the urban environment. The glaring pathetic condition of urban waste management is just another example of the many issues plaguing today's urban life which needs immediate care and attention.

Geographically, Nagaland is located between 25º 6´ N and 27º 4´N latitude and between the longitudinal lines 93º 20´E and 95º 15´E, having an area of 16,579 sq.km. Nagaland with a total population of 19,78,502 persons (Census, 2011), comprising 16 major tribes is predominantly a rural and an agricultural region. The State has 11 districts, where the primitive and ethnic characters dominate the scenario, with the emotional and high regards of the people for its urban centers. Each tribe takes immense pride and has ardent desire

for placement in these centers like Kohima for Angamis, Mokokchung for Aos, Wokha for Lothas, Zunheboto for Semas and Mon for the Konyaks.

Till the recent past, the people of the region could manage to maintain a balanced relationship with the environment. However, now the explosive character of population growth in the urban centers has become a matter of grave concern. In 1981, the urban population of the state was 1.2 lakhs, which increased to 3.5 lakhs in 2001 and 5.7 lakhs in 2011. In the absence of urban development plans this momentum of growth has created problems. Kohima and Dimapur being the growth centers in the state have witnessed higher growth rates as compared to the other urban centers. Better urban infrastructures and employment opportunities have led to in-migration of people to these urban centers from the rural areas as well as smaller urban centers in the state. This trend of in-migration as well as influx of illegal immigrants have created serious impact on the environment in these urban centers besides causing strain on the limited urban services and infrastructure and increase in urban poverty and unemployment levels. As a result, the state is today struggling to cope with haphazard growth of main urban centers, traffic and congestion, pollution, inadequacy of water and sanitation facilities, sewerage systems, drainage and solid waste management.

Map.1.1



Source: Extracted from GIS

1.3. Objectives and Significance of the Study

1. To examine the decadal growth of population in urban areas vis-à-vis that of the rural areas in Nagaland.
2. To assess the pattern of settlement expansion.
3. To examine the impact of urbanization on environment.
4. To ascertain and identify the environmental problems caused by urbanization.
5. To assess the measures undertaken to mitigate the environmental related problems and to work out the strategies for policy making.

The proposed study entitled '**Urbanization and Emerging Environmental Issues in Nagaland'** is an attempt to trace the trends and patterns of urbanization in the state at the micro level so as to identify the root cause of the degradation of urban environment. The study will be helpful in understanding the dynamic interactions among the major components (Man, Culture and Environment) that facilitate to form the urban ecosystem. It focuses on the major environmental problems brought about by the process of urbanization in the urban centers of Nagaland. Furthermore, suggestions on preventive, curative and punitive measures have been made in order to overcome the problems of environmental deterioration and improvement of the urban environment and quality of urban life. Above all, since no one has so far attempted to study urbanization from the geographical point of view covering the whole state of Nagaland, the present work will be a source of reference for administrators, planners and the researchers.

1.4. Hypotheses

1. Growth of population in urban centers is much faster than that of the rural areas.
2. The process of urbanization attracts more people from the outlying rural areas.

3. Growth of urbanization has an impact on environment of Nagaland.
4. Growth of urbanization leads to congestion, pollution, sanitary problems, deforestation, land degradation, etc.

1.5. Methodology

The following consist of the methodology of the study:

1. Primary Data

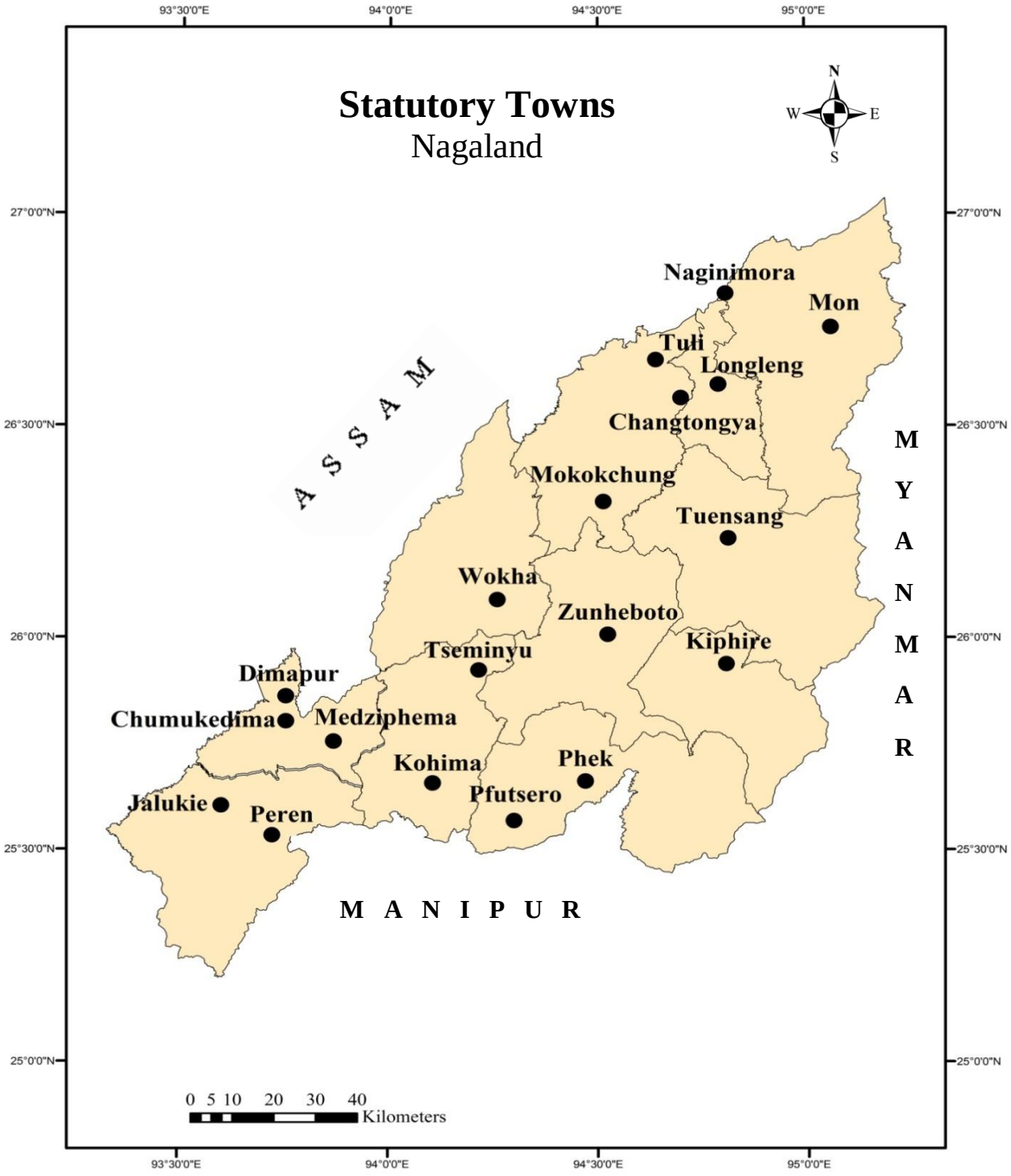
The study is based on the collection of information through field work i.e. to obtain direct information and verify the facts and figures on the actual ground through conducting interviews in the study area. It emphasizes mainly the district and sub-district headquarters of Nagaland, conducting field survey to examine the impact of urbanization and environmental consequences. Spatial analysis of the study area is both of descriptive and analytical type.

2. Secondary Data

The secondary sources of information obtained from authentic government publications, public and official documents, census reports, statistical datas, relevant literature books, journals and magazines, newspapers, research papers and surveys conducted by various organizations and individuals constitute the secondary data. Tables and figures are based on the collected information.

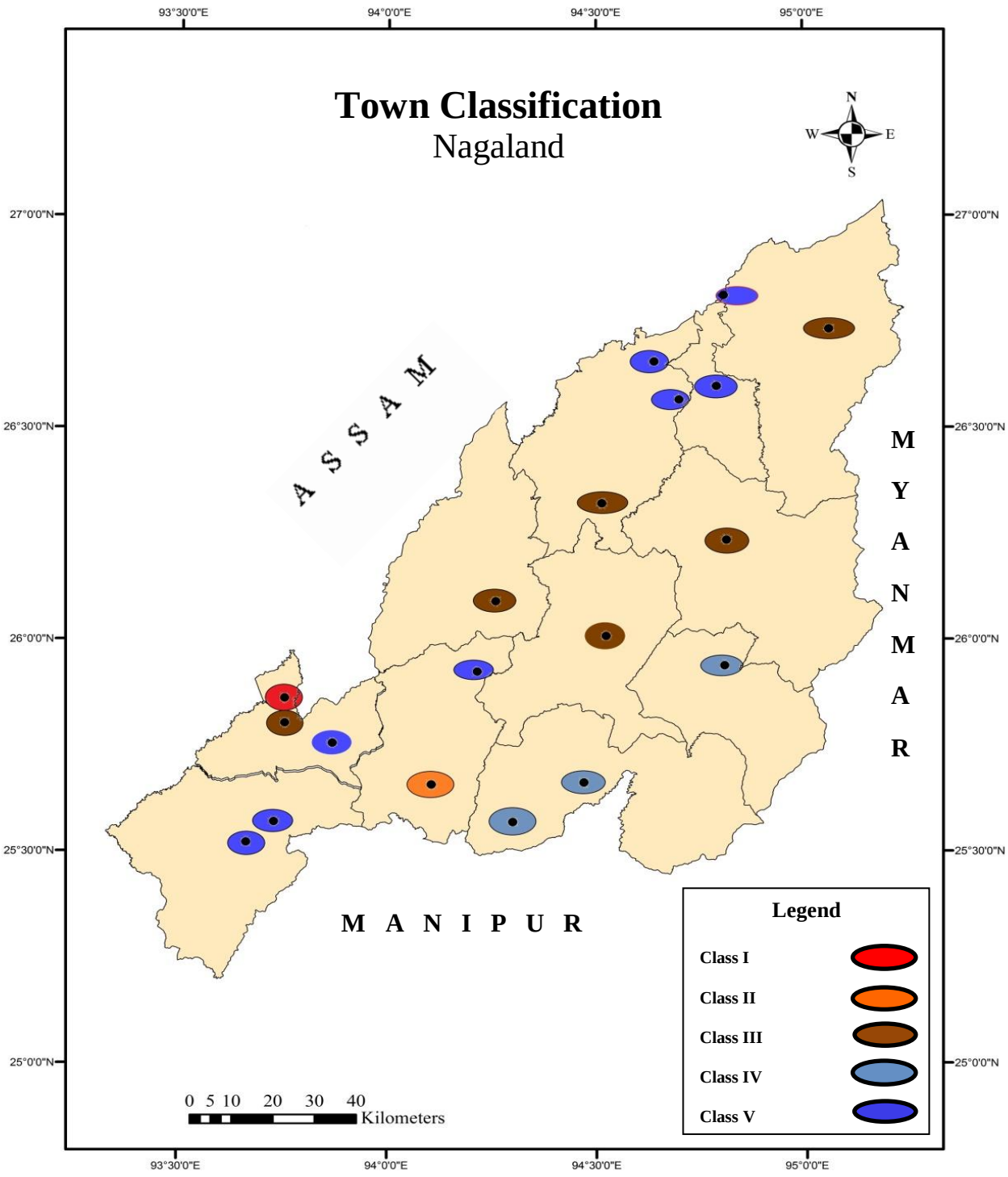
Geographic Information System (GIS) too forms a major part of the technique in mapping and presentation of accurate data on the recent urban environmental change.

Map 2.1



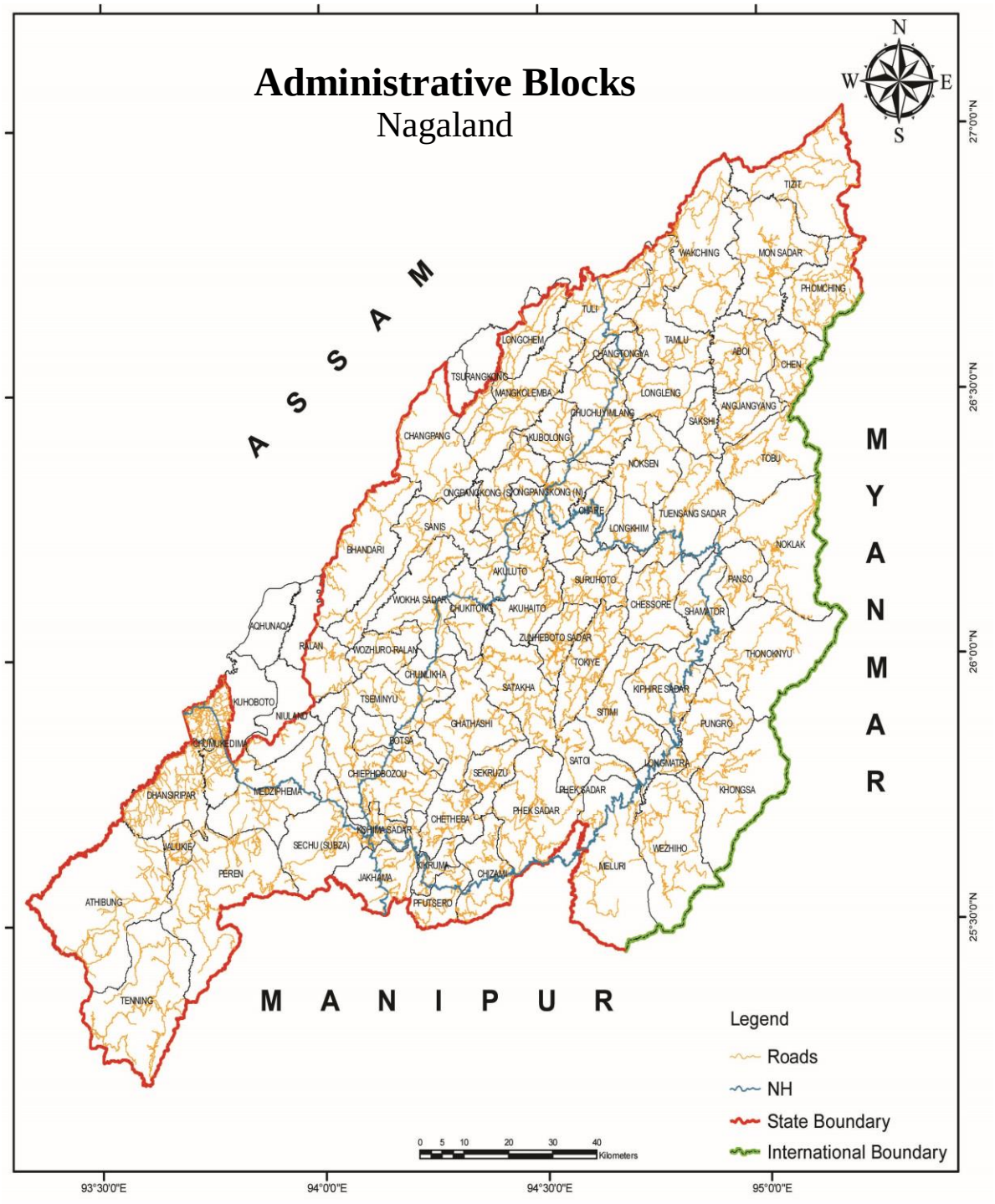
Source: Extracted from GIS

Map 2.2



Source: Extracted from GIS

Map 2.3



Source: Nagaland GIS and Remote Sensing Centre.

Nestled among the ranges of Northeast India, Nagaland has always aroused an awe-inspiring mysticism, primarily because of its remote geographical location. Spread over an area of 16,579 sq.km. Nagaland is a gorgeous state with striking hills and beautiful mountain ranges. Geographically, it is located between 25º 6′ N and 27º 4′ N latitude and between the longitudinal lines 93º 20′ E and 95º 15′ E. Bounded by the states of Arunachal Pradesh in the North, Manipur in the South, Assam in the West, and sharing an international border with Myanmar on the East, Nagaland is physically and conceptually at the very extremity of the subcontinent.

The State is blessed with great valleys, meandering streams, high mountains, deep gorges and a rich valley of flora and fauna. Geologically, the region is composed of "pretertiary rocks overlaid by tertiary strata."[4] The State's highest peak is Saramati (3840 metres), where the Naga Hills merge with the Patkai Range in Myanmar. Japfu (3048 metres), Zanubou (2750 metres) and Kupamedzu (2620 metres) are some of the other important high peaks of the State. The main rivers that flow through Nagaland are Dhansiri, Doyang, Dikhu, Milak, Tizu and Zungki, of which Doyang is the largest and the longest. Some of the other important rivers are Tsumok, Menung, Diphu, Manglu, Langlong, Langye and Dzuza.

Nagaland has a pleasant sub-alpine type of climate, which is generally cool in winter and pleasantly warm in summer especially in the interior places and higher hills. The temperature does not rise beyond 32º C and average summer temperature is 22º C to 27º C. In winter, the night temperature comes down between 4º C and 1º C in December,

[4] Joshi, H. (2001), *Nagaland: Past and Present*, Akansha Publishing House, New Delhi, p.5.

January and February which are the coldest months in the year.[5] Nagaland has a largely monsoon climate with high humidity levels. The monsoon lasts for five months from May to September with June, July and May, being the wettest months. The average annual rainfall varies from 100 cm to over 300 cm. Dry season begins from November and continues till April.

Nagaland with a total population of 19,78,502 persons (Census, 2011), is predominantly a rural and an agricultural region. It has 11 administrative districts, namely, Kohima, Mokokchung, Phek, Tuensang, Mon, Wokha, Zunheboto, Dimapur , Kiphire, Longleng and Peren. The State has a density of 120 persons per sq. km. The distinct tribes and a number of sub-tribes inhabiting the State are Angami, Ao, Chakesang, Lotha, Zeliang, Rengma, Sema, Phom, Chang, Sangtam, Konyak, Pochury,Yimchunger, Kuki, and Khiamniungan.

The most important economy of the land is Agriculture with nearly 70% of the population dependent on it and forms the main source of livelihood of the people. The two methods of cultivation among the Naga tribes are *Jhumming* and *Terrace* cultivation. The major crops are rice, corn, millets, pulses, tobacco, oilseeds, sugarcane, potatoes and fibres. Rice is the dominant crop and also the staple diet of the people. Coffee, cardamom and tea are also grown as plantation crops. Cash crops like sugarcane and potato are also becoming popular. The Government is encouraging to improve the agriculture and has undertaken a number of irrigation projects by supplying pumping set to farmers, starting community development projects and setting up seed farms and establishing agricultural research

[5] *Nagaland: For Class 9 & 10*, (2007), Nagaland Board of School Education, Kohima, Nagaland, p.19.

centers. As a result of these measures, there has already been a sustained increase in the tonnage of rice produced.

Along with agriculture, the small scale and medium scale industries are also growing, giving a great boost to the economical status of the state. Cottage industries such as weaving, woodwork and pottery are important sources of revenue. Besides agriculture, the other important assets of the State are forests and minerals. The forests are very rich in forest products such as timber, cane and bamboo, flora and fauna, etc. while marble, coal, limestone, petroleum, natural gas and oil are some of the largely found minerals of the State. Tourism is also important, but largely limited owing to the State's geographic isolation and political instability in recent years.

2.1. Urbanization in Nagaland: A Historical Perspective

In Nagaland, the British occupation of the Naga Hills in the late nineteenth century is tentatively accepted as the period of the onset of the process of urbanization. With the expansion of administrative settlements in Kohima and Wokha in 1878, Mokokchung in 1888 and Wakching in 1913, new townships were established. Emergence of these urban centres was particularly significant due to market and trade; and commerce offered several pull factors for internal immigrants. However, it was only after the introduction of national policy for tribal development that significant urbanization started in Nagaland (GOI-UNDP, 2011).

Since the formation of the State in 1963, the small administrative blocks and headquarters have been steadily growing in population. More and more people migrate from the surrounding villages in search of jobs, education, health care and various other lifestyles

that are not available in the villages. Subsequently, the small townships and hamlets have been expanding and growing in complexity to accommodate the growing population.

As per 2011 Census, Nagaland has a total of 11 districts, namely, Kohima, Dimapur, Kiphre, Longleng, Mokokchung, Mon, Peren, Phek, Tuensang, Wokha and Zunheboto, 114 sub-districts, 26 towns (19 statutory and 7 census towns) and 1,428 villages. And the total population of the State stands at 19,78,502 persons out of which the rural population is 14, 07,536 (71.14%) and the urban population 5,70,966 (28.86%) persons. Dimapur district has the highest urban population (1,97,869) while the district of Mon has the largest rural population (2,15,816) in the State. The lowest rural population i.e. 42,871 and urban population of just 7,613 are both recorded in Longleng district, accounting for 3.04% of the total rural population and 1.33% of the total urban population.

The process of urbanization in Nagaland has taken remarkable strides since the last few decades. This is evident from the fact that during the last two consecutive Census of India 2001 and 2011, Nagaland recorded the highest urban growth rate of 69%, far above the national level of 21%. In 1981, it was just 1.2 lakhs, which increased to 3.5 lakhs in 2001 and 5.7 lakhs in 2011. Judging by the number of people living in rural areas constituting 71.14% of Nagaland's population in 2011, as against 90% in 1971, such distribution of the rural-urban population is an indication of the migration that is taking place in the State from rural to urban areas. Greater impetus was added to the growth trend after the grant of statehood to Nagaland in 1963. Since then, spread of literacy and the proliferation of new occupations have led to a remarkable increase in the rate of urbanization.

Figure 2.1. Decadal Population Change (2001-2011): Nagaland

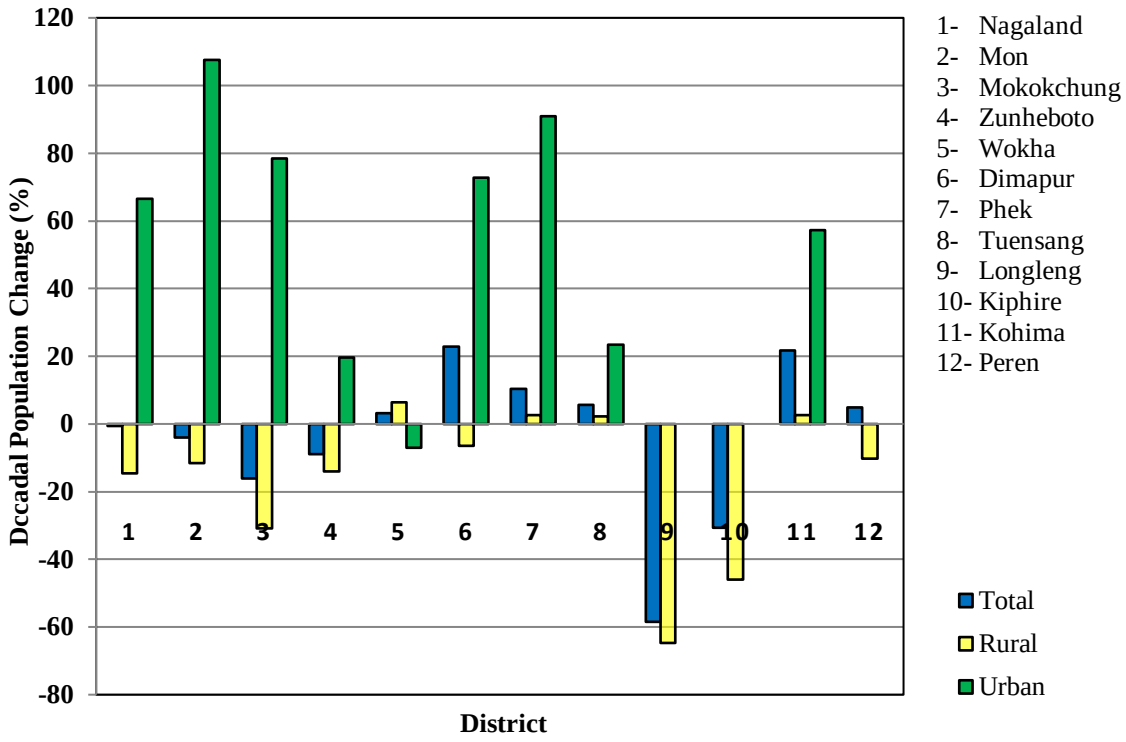


Figure 2.2. District wise Comparative Decadal Growth of Urban Population Nagaland

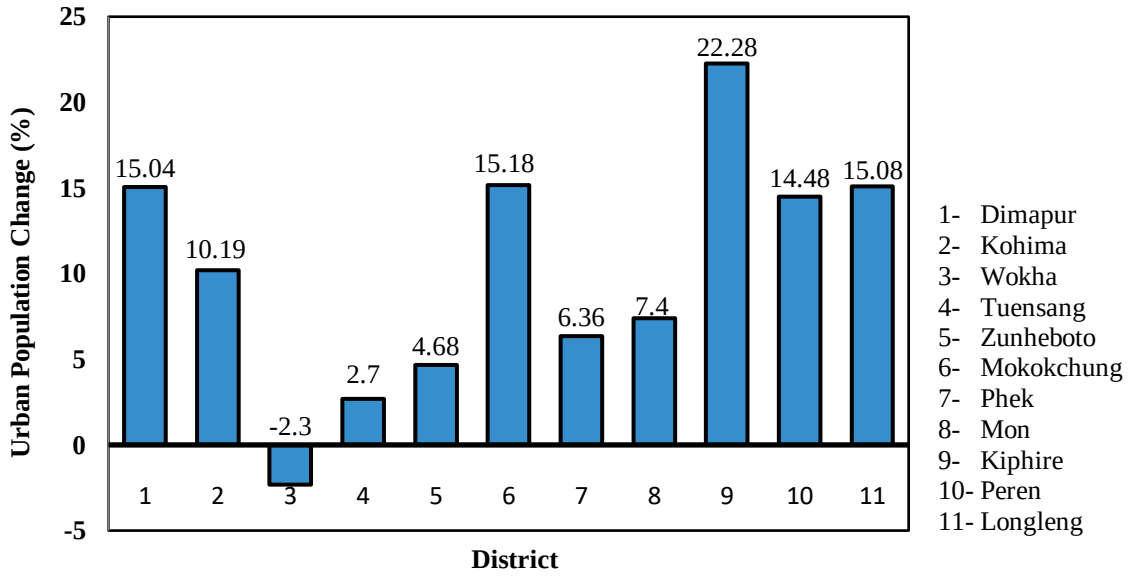


Table 2.1. Decadal Population Change (2001-2011): Nagaland

Sl. No	State / District	Population 2011			Percentage Decadal Change 2001-2011		
		Total	Rural	Urban	Total	Rural	Urban
1	Nagaland	19,78,502	14,07,536	5,70,966	- 0.6	- 14.6	66.6
2	Mon	2,50,260	2,15,816	34,444	- 4.0	- 11.6	107.6
3	Mokokchung	1,94,622	1,38,897	55725	- 16.1	- 30.9	78.5
4	Zunheboto	1,40,757	1,13,160	27597	- 9.0	- 14.0	19.6
5	Wokha	1,66,343	1,31,339	35,004	3.2	6.3	- 7.0
6	Dimapur	3,78,811	1,80,942	1,97,869	22.9	- 6.5	72.7
7	Phek	1,63,418	1,38,843	24,575	10.3	2.6	91.0
8	Tuensang	1,96,596	1,59,822	36,774	5.7	2.3	23.5
9	Longleng	50,484	42,871	7,613	- 58.5	- 64.7	0.0
10	Kiphire	74,004	57,517	16,487	- 30.6	- 46.0	0.0
11	Kohima	2,67,988	1,46,900	1,21,088	21.7	2.6	57.2
12	Peren	95,219	81,429	13,790	4.9	- 10.3	00

Source: Census 2011, Nagaland.

Table 2.2. District wise Comparative Decadal Growth of Urban Population:Nagaland

Districts	2001 Census (In %age)		2011 Census (In %age)		Increase/decrease in Urban Population in the last decade
	Urban	Rural	Urban	Rural	(In % age)
Dimapur	37.19	62.81	52.23	47.77	15.04
Kohima	34.99	65.01	45.18	54.82	10.19
Wokha	23.34	76.66	21.04	78.96	-2.30
Tuensang	16.01	83.99	18.71	81.29	2.70
Zunheboto	14.93	85.07	19.61	80.39	4.68
Mokokchung	13.45	86.55	28.63	71.37	15.18
Phek	8.68	91.32	15.04	84.96	6.36
Mon	6.36	93.64	13.76	86.24	7.40
Kiphire	0.00	100.00	22.28	77.72	22.28
Peren	0.00	100.00	14.48	85.52	14.48
Longleng	0.00	100.00	15.08	84.92	15.08

Source: Census 2001 and 2011, Nagaland.

As given in the tables above, the total population of the State has decreased by -0.6% between 2001 and 2011. While the rural population has decreased by -14.6%, the urban

population has increased by 66.6%. This may be attributed to the pull factor that urban centres possess with their wide range of employment and better livelihood opportunities compared to the rural areas. With the exception of Wokha (-7%), all the other districts saw an increase in the urban population in the last decade with Mon district showing the highest increase in urban population by 107.6%. Dimapur district is with the highest growth of population with 70,637 persons, an increase of 22.9% while the highest negative growth by -71097 persons, a decrease of -58.5% is observed in Longleng district.

The State is experiencing fast rate of growth in the urban centers. In the absence of urban development plans this momentum of growth has created problems. Kohima and Dimapur, being the growth centers in the State have witnessed higher growth rates as compared to the other urban centers. Better urban infrastructures and employment opportunities coupled with sustained economic growth and higher urban wages have led to in-migration of people to these urban centers from the rural areas as well as smaller urban centers in the State. This trend of in-migration as well as influx of illegal immigrants have created serious impact in these urban centers and has caused strain on the limited urban services and infrastructure and increase in urban poverty and unemployment levels. As a result, the State is today struggling to cope with haphazard growth of main urban centers, traffic and congestion, pollution, inadequacy of water and sanitation facilities, sewerage systems, drainage and solid waste management.

Therefore, in order to deal with all the shortcomings associated with the expansion of urbanization and its related issues, the Urban Development Department of Nagaland has initiated the process of preparation of an Infrastructure Investment Strategy and Capital Investment Plans for secondary towns in Nagaland in the priority urban infrastructure

sectors, with the objective of achieving 100% coverage of urban basic services in the towns. The investment plans in the priority infrastructure sectors shall enable the Government of Nagaland to prioritize the urban infrastructure needs and also enable the State to identify and explore funding options from various sources for investment in the urban sector.

The Census of India, 2011 has classified towns into six categories on the basis of their population i.e. Class I towns with more than 1,00,000 population, Class II with 50,000 to 99,999 population, Class III towns with 20,000 to 49,999 population, Class IV towns with 10,000 to 19,000 population, Class V towns with 5,000 to 9,999 population and Class VI towns with less than 5,000 population.[6] According to this criterion, Dimapur and Kohima are the only towns that fall under Class I and Class II respectively. Mokokchung, Tuensang, Zunheboto, Wokha, Mon and Chumukedima fall under Class III, Phek, Kiphire and Pfutsero falls under Class IV and, Peren, Longleng, Medziphema, Jalukie, tuli, Changtongya, Naginimora and Tseminyu falls under Class V category of towns. (Map 2.2)

2.2. Process of Urbanization: Kohima

Kohima, popularly known for the Battle of Kohima where the Japanese met their Waterloo in the Second World War, was the first seat of modern administration as the headquarters of Naga Hills District under the Britishers. Now it is the capital of the State. The district named after it i.e. Kohima district, is the headquarters of Kohima district. The name Kohima was adopted by the British from Kewhimia which means the 'people of whio'. According to local legend, the Angami Naga village formerly named Kewhira was

[6] http://planningtank.com/planning-techniques/classification-of-towns

chosen for settlement by a man called Whio.[7] The district of Kohima was established in 1881 as a sub-division of formerly Naga Hills district within Assam. In order to prevent frequent Naga raids into the British territory of Assam, the British authorities established an outpost at Samagutting in 1866 followed by the establishment of a chief administrative centre for the area at Kohima in 1878. It became the headquarters of the Naga Hills District in 1891, and began to attract a few in-migrants. However, it remained a small town, even as late as 1951, when it was a police and administrative outpost with an area of 4 sq.km and a population of only 4,125 persons. In 1963 it was made the capital of Nagaland, and began to grow more rapidly.[8]

Kohima district is located between 25° 31′ 07″ N to 26° 01′ 29″ N latitudes and 93° 53′ 41″ E to 94º 17′ 55″ E longitudes.[9] It is bounded by Wokha in the North, Phek in the East, Manipur State in the South and Dimapur in the West (Map 2.1). The indegenous inhabitants of the district are the Angamis and the Rengmas. However, the district is very cosmopolitan in nature with the presence of a large number of other communities from within the State as well as outside.

As per Census 2011, Kohima district has a total population of 2,67,988 persons, out of which 45.18% or 1,21,088 belong to urban and the rest 54.82% i.e. 1,46,900 belong to the rural population. The urban population of the district is inclusive of the two statutory towns of Kohima and Tseminyu. As can be seen (Table 2.3) the population of the district has been declining since 1991-2011 from 3,87,581 to 3,10,084 in 2001 and to 2,67,988 in

[7] Sanyu, V., 2008, A History of Nagas and Nagaland: Dynamics of Oral Tradition in Village Formation, Commonwealth Publishers, New Delhi.

[8] City Development Plan- Kohima (2006), Urban Development Department, Nagaland, p.2-1

[9] Source: Nagaland GIS and Remote Sensing Centre.

Figure.2.3. Rural and Urban Population Growth (1991-2011): Kohima

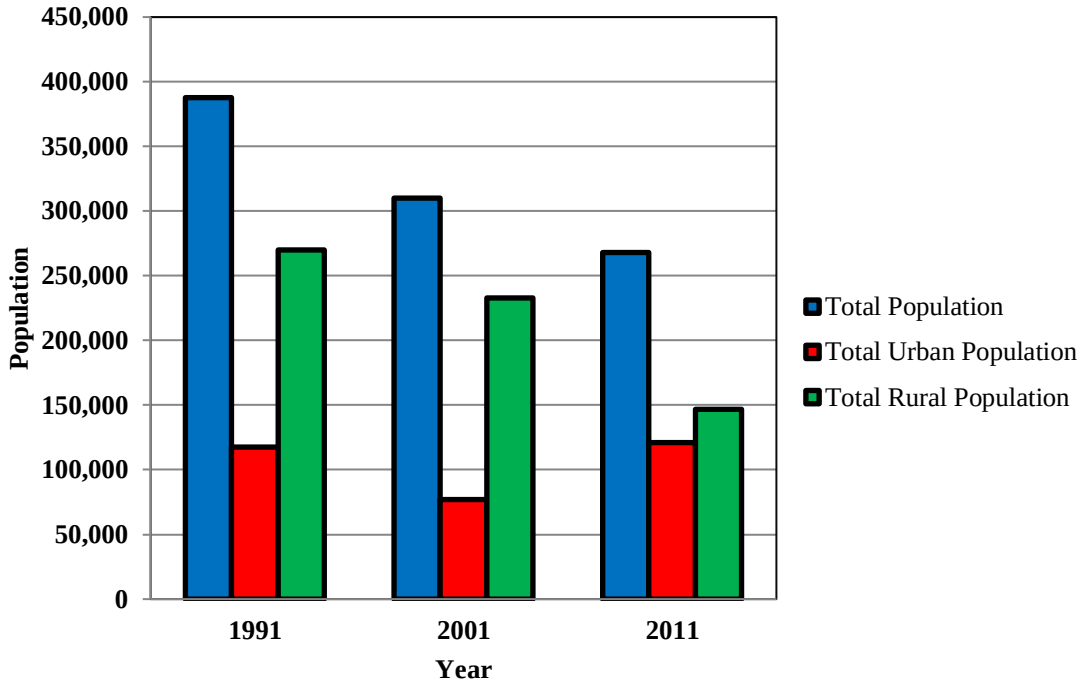
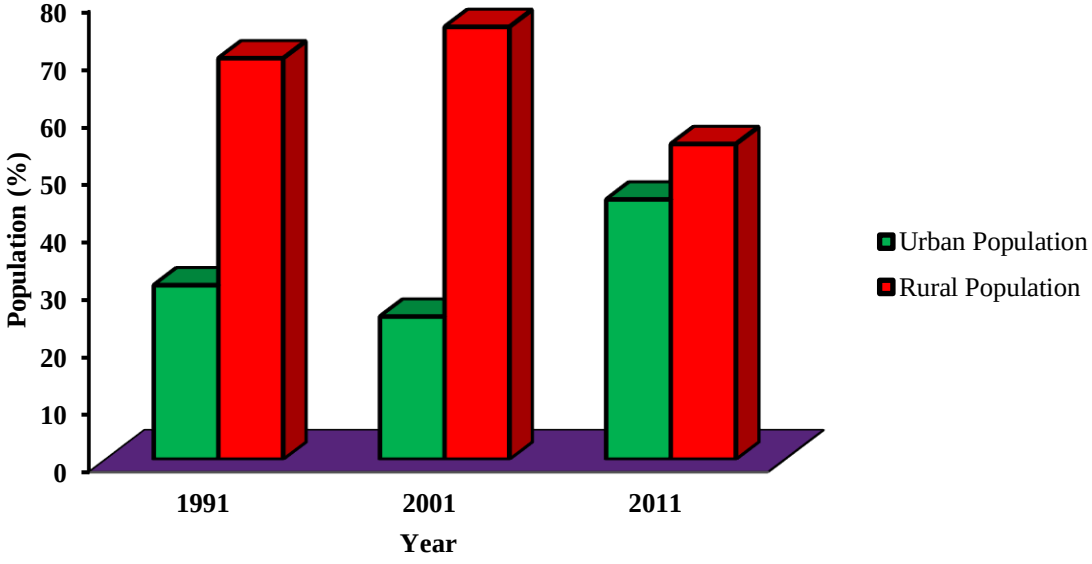


Figure 2.4. Rural and Urban Growth (1991-2011): Kohima



2011. Though the rural and urban population recorded a negative growth rate of -13.74% and -34.38% in 2001 respectively, in 2011, the urban population increased by 57.20% i.e.44058 persons while the rural population declined further to -36.97% which is equal to -86154 persons.

Table 2.3. Urban and Rural Population Growth (1991-2011): Kohima district

Kohima	1991	2001	2011
Total Population	3,87,581	3,10,084	2,67,988
Total Urban Population	1,17,396	77,030	1,21,088
Total Rural Population	2,70,185	2,33,054	1,46,900
Urban Population (in %)	30.29	24.84	45.18
Rural Population (in %)	69.71	75.16	54.82

Source: Census 1991, 2001 and 2011, Nagaland.

Kohima town, the State Capital and the administrative headquarters of the district is the habitation of the Angami Nagas. The town lies between 25º 28′ 20″ N to 25º 31′ 51″ N latitudes and 94º 05′ 11″ E to 94 º 07′ 12″ E longitudes. It is situated on the Dimapur to Imphal National Highway 39. Kohima village called ‘Bara Basti’or ‘large village’, which is the largest village in Asia, forms the northeastern part of Kohima urban area.

The town is situated on a ridge with a number of small hillocks and valleys. Its altitude varies from about 1200 to 1650 metres. Several areas are so steep with cliff formation that they are unsuitable for habitation and are located in one of the most seismically active areas. The Urban Development Department is presently trying to develop the city in the northern direction, but the land is owned by the L-Khel clan of Kohima Village who are reluctant to sell it. Within the KMC (Kohima Municipal Council) area, the villages of Kohima, Ceisama, Mereima and Thizama Villages own most of the land.

The demographic profile of Kohima suggests a steady and consistent rate of decadal urban population growth. Its growth from 1901 till 1961 was at a very slow pace with a total population of 3,093 (in 1901) and 7,246 (in 1961), hardly doubling the population in 60 years. However, the urban population surged from 7,246 to 21,545 in 1961-1971 at a decadal percentage variation of 197.34% which could be justified by the fact that the district became the State Capital soon after Nagaland statehood in 1963. Then from 1981 to 2001, the decadal population growth rate began to develop at a much steady rate between 49%-59%.

The population trend suggests a consistent growth trend reflecting the pull factor of the city due to its administrative importance, trade and commerce. So far, it has developed mainly as an administrative and service centre and as such the economy of this urban centre like many of the administrative towns shows the predominance of service sectors over other sectors of employment. Therefore, in order to sustain the service population, activities like trade and commerce, transportation, etc. have been developed resulting into the upsurge of urban population. Besides that, people from outside as well as other districts migrate into the capital for employment and greater livelihood opportunities thereby causing an impetus in the steady growth of urban population.

2.3. Process of Urbanization: Dimapur

Dimapur, the largest town in Nagaland which is also the only town located in the plains is the district headquarters of Dimapur district. The district is located between 25° 38′ 24″ N to 25° 58′ 8″ N latitudes and 93° 31′ 48″ E to 94° 00′ 8″ E longitudes [10] covering a total geographical area of 927 sq.kms. Dimapur town is the district headquarters with an area of

[10] Source: Nagaland GIS and Remote Sensing Centre

18.13 sq.kms. The district is bounded by Kohima in the east, Peren in the south, Karbi Anglong district of Assam in the west and Golaghat district of Assam in the North (Map 2.1). Except for Dimapur district which is situated on the plains with 34.66% of the State urban population, the entire state of Nagaland is covered with difficult hilly terrain. The district has a heterogeneous population with majority comprising Naga tribes from all over Nagaland.

Dimapur, the name of the town is said to have been derived from a character in the Mahabharata named *'Hidimba'*, which later began to be known as Dimapur. More reliable account in respect of the name of Dimapur is the one that has a link with a Kachari word *"Dimasa"*, the name of a river which flows through it. Dimapur is said to have been constructed by a Kachari King to protect the city from the raids of Angami warriors. During the 14th century Dimapur was a flourishing city where industries such as textiles, cotton ginning and pottery sprang, and the manufactured products were sent to Golaghat and Rangpur, the Ahom's capital.

During the period of expansion and consolidation of their territory in the north eastern region of India the British rulers had a vision to foresee the unique location of Dimapur both from strategic and commercial point of views especially with reference to the two hilly regions namely Naga Hills and Manipur bordering Burma.[11] In fact, the foundation stone of 'Dimapur' was laid by the construction of Indo-Burma road in 1870 as well as the passing railway line through Dimapur in 1890. Today, Dimapur occupies a position of central importance in the North-Eastern region of India. It is considered the gateway to both the states of Nagaland and Manipur and it is one of the fastest developing townships

[11] Census of India 1981, Part XB, Series 15, Nagaland Town Survey Report, Dimapur.

of the North-East. And Dimapur is also the only city in Nagaland which is connected with all the urban centres of the North-Eastern region by rail and air routes.

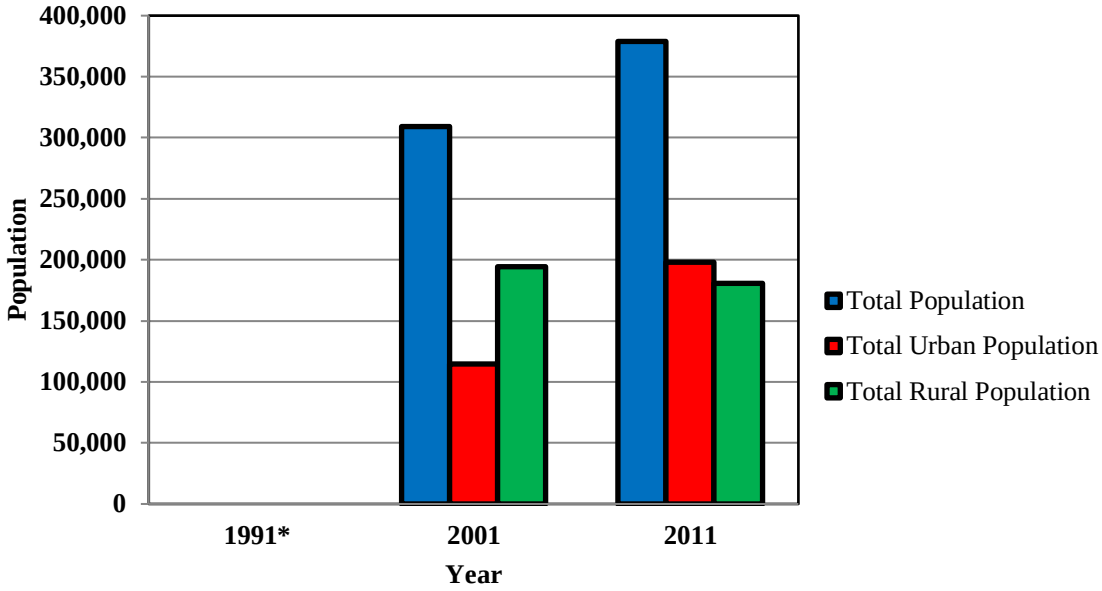
While analyzing the population composition of the town one can notice that population of Dimapur is mainly composed of people who have migrated from different places of Nagaland as well as from other states of the country. Since 1961 Census, events have occurred which have had a powerful influence not only on its growth, but also on its general situation within the structure of the regional urban centres. In 1961, the town had a population of 5,753 which increased to 12,426 in 1971 and got more doubled in 1981 to 32,878 persons. The town experienced remarkable growth of population during 1961-71 and 1971-81 with a percentage decennial growth of 115.99 and 164.59 respectively. Not only did the town experience a spurt in population growth but simultaneously increased its area as well which was mainly due to the floating population constituted by people coming from within the State and from other states as well.[12]

In 1991, the town had a total population of 73,020 which increased to 98,096 in 2001[13] and to 1,22,834 in 2011. According to Census 2011, Dimapur district recorded a total population of 3,78,811 out of which the rural population stood at 1,80,942 and the urban population at 1,97,869 (Table 2.4). Hence, at present Dimapur district with 52.23% urban population has the highest proportion of urban population among the districts in the State. It also has the highest urban population of 1,97,869 which is 34.66% of the total urban

[12]A.K Biswas. (1988), *Census of India 1981, Part X-B Series 15, Nagaland Town Survey Report, Dimapur*, The Controller of Publications, Delhi. p.2

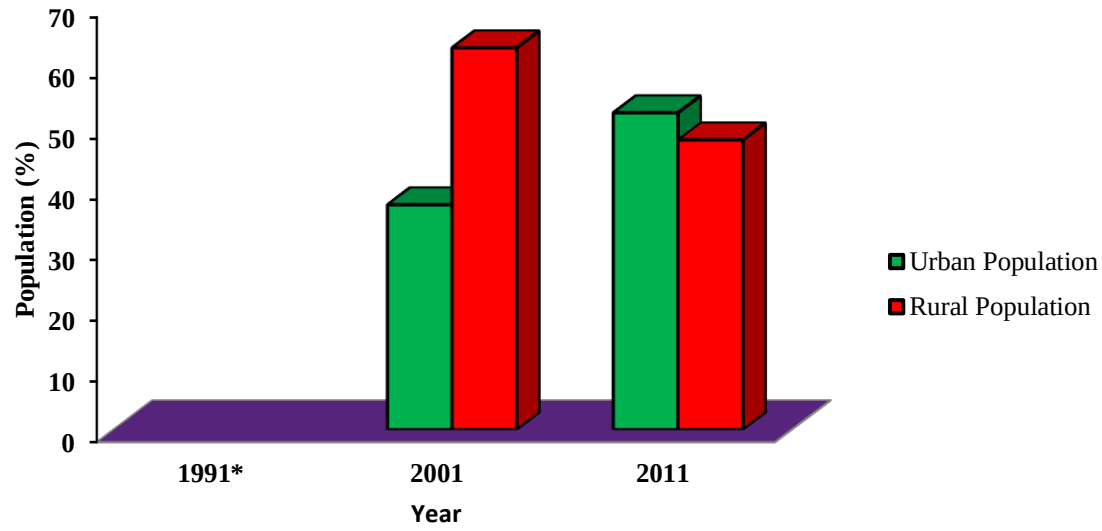
[13] *Draft Final Report, Dimapur Town* (2009), Urban Development Department, Government of Nagaland, LEA Associates South Asia Pvt. Ltd., New Delhi. p.3-3

Figure 2.5. Rural and Urban Population Growth (1991-2011): Dimapur



*Part of Kohima district

Figure 2.6. Rural and Urban Growth (1991-2011): Dimapur



*Part of Kohima district

population of the State.[14] The total urban population of the district is inclusive of the three statutory towns of Dimapur, Chumukedima and Medziphema, and four census towns of Kuda, Rangapahar, Purana Bazar 'A' and Diphupar 'A'. The following is a table which can help understand better about the trend of urban population growth of Dimapur district in the past three decades from 1991-2011.

Table 2.4. Urban and Rural Population Growth (1991-2011): Dimapur district

Dimapur	1991*	2001	2011
Total Population		3,09,024	3,78,811
Total Urban Population		1,14,600	1,97,869
Total Rural Population		1,94,424	1,80,942
Urban Population (in %)		37.08	52.23
Rural Population (in %)		62.92	47.77

*Part of Kohima district.
Source: Census 1991, 2001 and 2011, Nagaland.

The attainment of statehood of Nagaland in 1963 and subsequent accelerated developmental activities throughout the State brought Dimapur town suddenly in the limelight in the North-Eastern region of India. It became the most important place for business and commerce which provided materials for the entire State. During the last two decades of urbanization, the town has gained much momentum in progress with respect to good transport communications with important centres of the region, increase in modern amenities and services, and the centrality which it enjoys within the North-Eastern region has certainly placed it in a better position. Its strategic location on the railway and road

[14] Nagaland State Climate Action Plan 2012, *Sector Paper: Urban Development and Planning*. p. 4-5

routes has also given Dimapur a growing importance as indicated by the commercial and industrial prosperity during the last decade.

2.4. Process of Urbanization: Mokokchung

Mokokchung, the third most important urban hub in Nagaland and one of the statutory towns under Mokokchung district is also known as the intellectual and cultural capital of Nagaland. Mokokchung, the principal town from which Mokokchung district takes its name is the headquarters of Mokokchung district. The district, situated in the North-Western portion of the State is located between 26° 10′ 43″ N to 26° 46′ 18″ N latitudes and 94° 17′ 27″ E to 94° 45′ 23″ E longitudes covering an area of 1,615 sq.kms. It was created as an administrative Sub-Division in 1889 which was upgraded to a district in 1957 with Wokha and Zunheboto as its sub-division. Later in 1973 Wokha and Zunheboto were made separate districts. Mokokchung district which came into existence since Nagaland's attainment of statehood on 1st December, 1963 is predominantly inhabited by people belonging to Ao tribe who constitute more than nine-tenth of the total population in the district. The district is bounded by the state of Assam to its north, Wokha district to its west, Tuensang and Longleng district to its east, and Zunheboto district to its south (Map 2.1).

The area which is known as the D.C.Hill at Mokokchung was first occupied by military in 1887. The historical map of this area for 1889-90 shows a predominance of defense activities apart from a few shops and residential settlements of Dobhashis and those of Nepalis in an area known as Phaltuline. The map (1940) shows the development of the administrative complex beside the defense land. Some commercial activities and some educational and religious facilities also sprung up along with police and postal services.

The map (1962) shows a fully developed administrative complex with further expansion in the residential and other sections. The various services and urban facilities of health, education, etc. was increasing and people came and settled here because of job opportunities in the administrative, commercial and service sectors.[15] After this, there has been very rapid development of this town in all aspects triggered by the advancement and progress of administrative and education sectors and an increased role of the urban area in its hinterland in trade and commercial activities.

This urban centre performs a nodal function in terms of connectivity in the northern part of the State. Major roads radiating from it are: Tuli-Amguri Road, the Changki-Mariani Road, the Wokha-Kohima Road and the Tuensang Road. Thus, it is well connected to the various important and prospective settlements of Nagaland and also to the rail-heads of Assam. The nodality, thus gives Mokokchung an advantage over other settlements which has made it one of the most commercially important towns in Nagaland. The district has six ranges namely Ongpangkong, Langpangkong, Asetkong, Changkikong, Japukong and Tsurangkong, comprising of altogether 82 numbers of villages and with some semi-urban/compound/township.

As per 1971 Census, Mokokchung district had a total population of 1,68,242 of which 17,423 belonged to the urban areas and 1,50,819 to the rural. The decadal growth of Mokokchung had remained low or at bar with the rate of India until 1961, after which the growth rate registered a rapid decade variation of 33.51% during 1961-71. In 1981, however, Mokokchung experienced retarded growth with a total population of 1,04,193

[15] Development Plan of Mokokchung Sub-Division and Mokokchung Urban Area 1971-1991. p.54-55

Figure 2.7. Rural and Urban Population Growth (1991-2011): Mokokchung

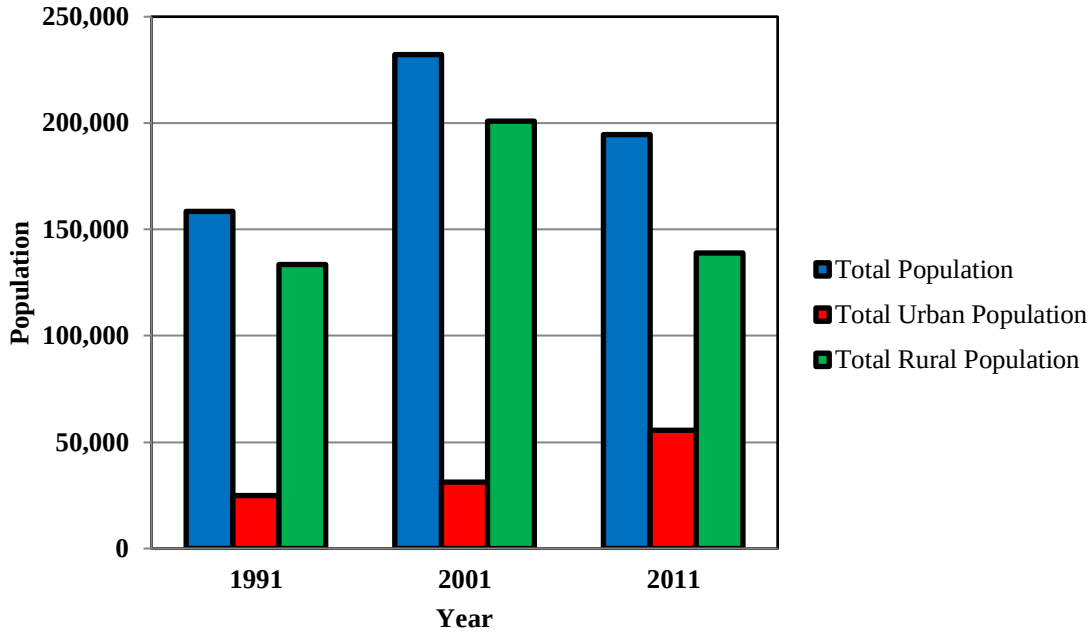
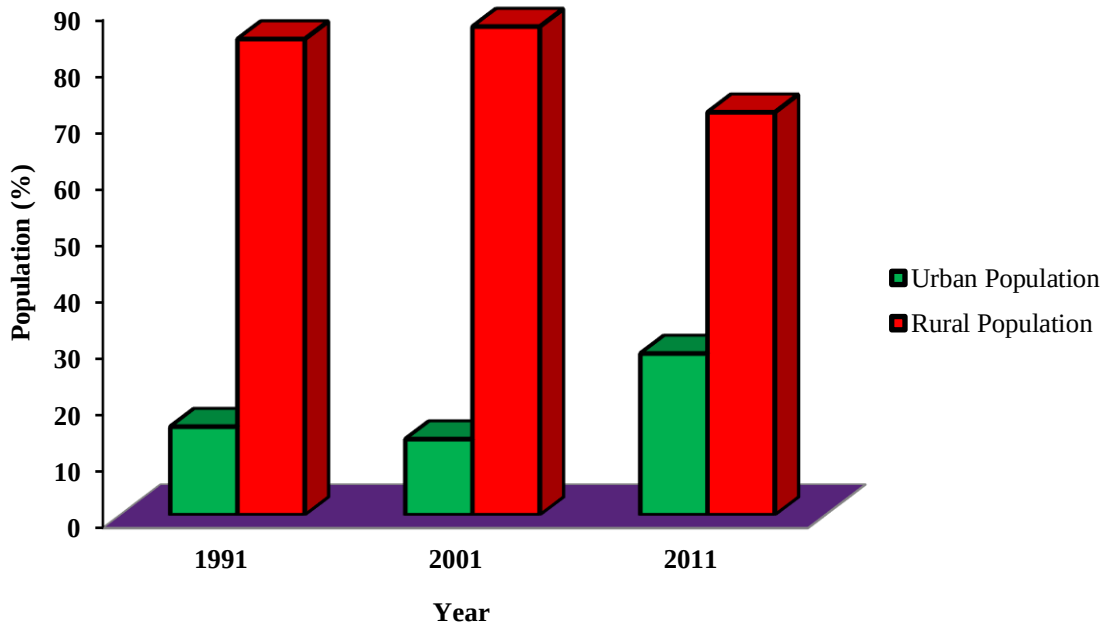


Figure 2.8. Rural and Urban Growth (1991-2011): Mokokchung



and with only 18,423 urban population registered the lowest urban population growth rate (5.74%) during 1971-81.[16]

According to 2001 Census, the urban population of the district was 31,214 which was again a decrease of 25.84% or -6411 persons in the decadal growth of urban population which is indicative of migration of urban population to other towns possibly for access to better urban amenities and entrepreneurial opportunities.[17] The population of the district according to 2011 Census is 1,94,622 out of which 55,725 (28.63%) lives in the urban regions of the district which includes three statutory towns of Mokokchung, Tuli and Changtongya, and one census town of Tzudikong. This shows an increase of 78.52% in the urban population of Mokokchung district in the last decade i.e. from 2001-2011.

Table 2.5. Urban and Rural Population Growth (1991-2011): Mokokchung district

Mokokchung	1991	2001	2011
Total Population	1,58,374	2,32,085	1,94,622
Total Urban Population	24,803	31,214	55,725
Total Rural Population	1,33,571	2,00,871	1,38,897
Urban Population (in %)	15.66	13.45	28.63
Rural Population (in %)	84.34	86.55	71.37

Source: Census 1991, 2001 and 2011, Nagaland.

The trend of sub urbanization in Mokokchung (which had started in Western countries in the sixties) started in the eighties with the mushrooming of satellite towns like Yimyu and Marepkong. At present there are 15 wards in Mokokchung town namely, Alempang, Alongmen, Aongza, Arkong, Dilong, Kichutip, Kumlong, Majakong, Mongsenbai, Penli,

[16] Yadav, C.S. (1986), *Comparative Urbanization: City Growth and Change*, Concept Publishing Company, New Delhi.

[17] Patra, S.C. and Vachhani, Ashish. (2012), *Socio-Economic Profile of Rural India, Series II,* Concept Publishing company Pvt. Ltd., New Delhi. p.108

Salangtem, Sangtemla, Sungkomen, Tongdentsuyong and Yimyu. Today, the urban settlement has spilled outside the historical boundary of Mokokchung town. This trend has speeded up (since the late nineties) so much so that the erstwhile satellite town of Yimyu boomed and spread towards Mokokchung and became conjoined with it. Today it has become a ward of Mokokchung. As a result of this "flight to the suburbs", population growth in Mokokchung town (the area under the municipality comprising the fifteen wards) has slowed down while the satellite towns are booming. People are now living miles away from the main town in smaller suburbs as well as villages, who drive to work daily to the main town. This phenomenon is in sharp contrast to other towns in Nagaland like Kohima, Wokha and Zunheboto where an overwhelming majority of the population tends to be concentrated in the main town (i.e. the area under the municipality).

2.5. Process of Urbanization: Tuensang

Tuensang, the only statutory urban centre in the whole of Tuensang distict is also the district headquarters of Tuensang district. The district, lying along the eastern fringe of the State is located between 25° 53′ 11″ N to 26° 27′ 26″ N latitudes and 94° 33′ 22″ E to 95° 11′ 20″ E longitudes.[18] It is bounded by Mon and Longleng district in the north and north-east respectively, Mokokchung in the north-west, Zunheboto district in the south-west and Kiphire district in the south. The international boundary with Myanmar is located on the eastern side which runs upto 180 kms (Map 2.1). Tuensang is one of the first three districts, along with Mokokchung and Kohima formed at the time when Nagaland as a State was created. However, over the decades, the district has gradually diminished in size with the carving out of Mon, Longleng and Kiphire districts from it.

[18] Source: Nagaland GIS and Remote Sensing Centre.

Nevertheless, Tuensang district is still the largest district in the State covering an area of 2,536 sq.kms. with a population density of 78 persons per sq.km. (Census 2011). The Chang, Sangtam, Khiamniungan and Yimchunger are the indigenous tribes that inhabit the district, each with its own rich culture, tradition and language.

The topography of the district is characterized by high hills, deep gorges and narrow valleys comprising the *Helipong Range, Yakur Range, Longtokur Range* and *Takhaya Range*. The altitudes range from 800 to 3500m above mean sea level. The major rivers meandering through this rugged terrain are *Tizu, Zunki, Dikhu* and *Chite*. The climate of Tuensang is moderately pleasant which varies from sub-tropical to sub-temperate type with an average annual rainfall of 300 cm and a minimum and maximum temperature of 5°C and 30°C respectively. The district is also very rich in biodiversity, and, the presence of thick evergreen forests favour the presence of highly valuable species of flora and fauna. Thus, Tuensang district is the home of Fakim Wildlife Sanctuary which was established in 1984 having an area of 6.4 sq.kms.

Tuensang was part of North East Frontier Agency (NEFA) till December 1957, when it was separated from it and joined the Naga Hills to form the Naga Hills Tuensang Area (NHTA). After the attainment of statehood, the entire administrative area of Nagaland was divided into 3 districts, namely, Kohima, Mokokchung and Tuensang. Till 1971 Census, Tuensang district included the present Mon, Longleng and Kiphire districts as a whole. Later, Mon district in 1973 and Longleng and Kiphire districts in 2004 were carved out to form separate respective districts.

Figure 2.9. Rural and Urban Population Growth (1991-2011): Tuensang

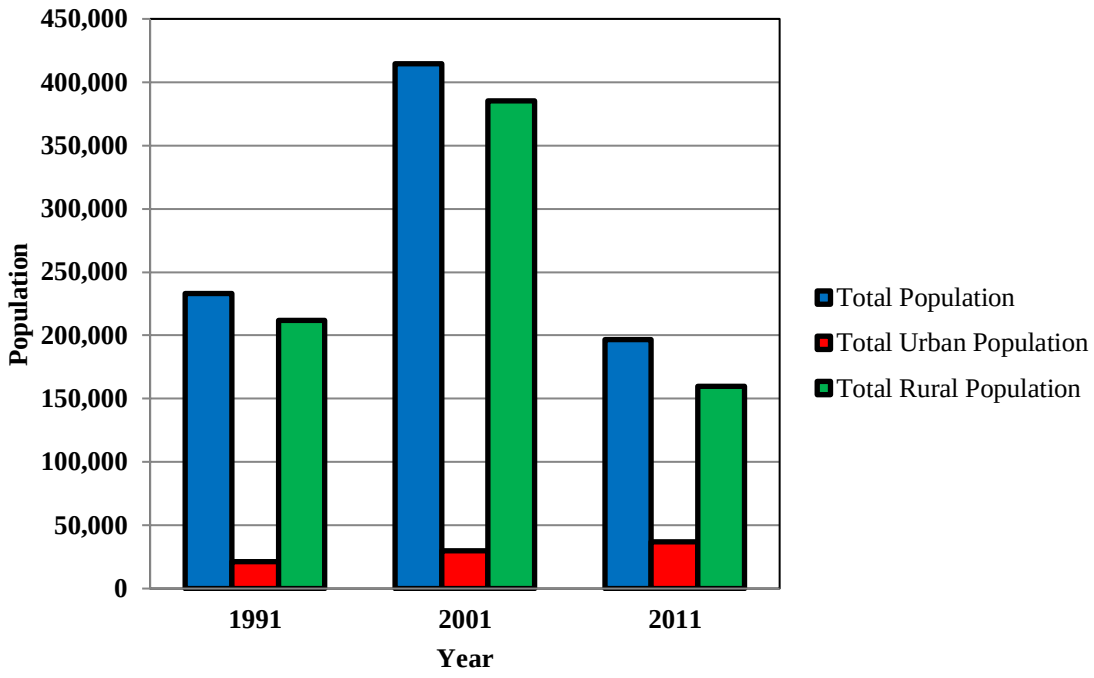
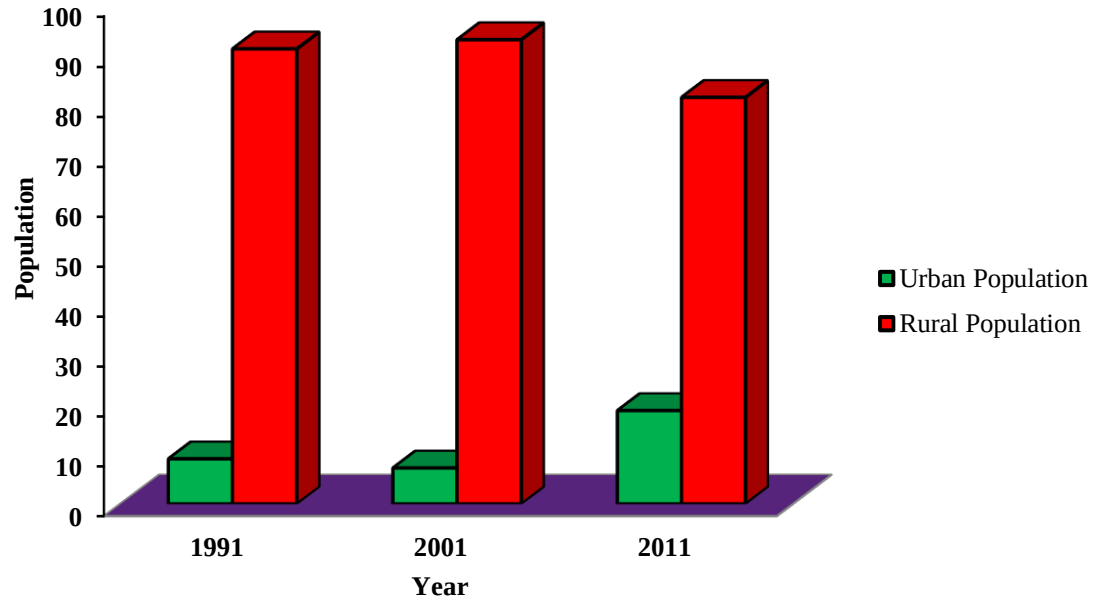


Figure 2.10. Rural and Urban Growth (1991-2011): Tuensang



As of Census 2011, Tuensang district has a total population of 1,96,596 persons out of which 18.71% i.e. 36,774 persons belong to urban population which includes one statutory town under Tuensang Town Council, while the rest of the population of 1,59,822 persons belong to the rural. The population of the district has recorded a decadal growth rate of 5.70% which is equal to 10,593 persons from 2001-2011. The trend of urban population growth of Tuensang district in the past three decades from 1991-2011 can be better understood with the help of the Table 2.6.

Table 2.6. Urban and Rural Population Growth (1991-2011): Tuensang district

Tuensang	1991	2001	2011
Total Population	2,32,906	4,14,818	1,96,596
Total Urban Population	21,018	29,772	36,774
Total Rural Population	2,11,888	3,85,046	1,59,822
Urban Population (in %)	9.02	7.18	18.71
Rural Population (in %)	90.98	92.82	81.29

Source: Census 1991, 2001 and 2011, Nagaland.

The above table clearly shows the unstable growth trend of the district over the past three decades. While the total population of the district increased from 2,32,906 in 1991 to 4,14,818 in 2001 at a growth rate of 78.11%, in 2011 it decreased to just 1,96,596 persons, recording a negative growth rate of -52.61%. The rural population too increased from 2,11,888 in 1991 to 3,85,046 in 2001 at a growth rate of 81.72% which came down to a low of -58.49% in 2011. The urban population, however, recorded a steady increase from 1991-2001at a growth rate of 41.65% and from 2001-2011 at 23.51%.

The geographical area of the Tuensang town, the lone urban centre of the district is 7.8 sq.kms. which is located at an altitude of 1,372 meters above mean sea level. The town is

filled with hills, high ridges, deep gorges and narrow valleys. The population of the town was just 21,018 in 1991 which increased to 29,772 in 2001. According to 2011 Census, the population of the town stands at 36,774 persons which is an increase of 23.5% from 29,772 persons in 2001. The distance of the district headquarter is 267 kms. from Kohima, the State capital via Mokokchung. The nearest railway station is at Mariani in Assam which is 195 km. to the west of the town.

2.6. Process of Urbanization: Wokha

Wokha town, the district headquarters of Wokha district is itself located just below the Wokha Mountain, also known as Mount Tiyi, the highest peak in the district. The district, situated in the mid-western part of Nagaland State, is the home of the Lotha Nagas, who commonly call themselves *Kyong*. The word *Wokha* is derived from the Lotha language for census. The district is located between 25° 55′ 44″ N to 26° 33′ 36″ N latitudes and 93° 56′ 57″ E to 94° 23′ 33″ E longitudes[19] covering an area of 1,628 sq. kms. It is bounded by Mokokchung district in the north, Kohima district in the south, Zunheboto district in the east and the state of the Assam in the west (Map 2.1).

The topography of Wokha district is more or less similar with that of other districts in the State, having ranges and ridges dissected by seasonal streams having an altitude range from 304 - 1,313 meters above sea level. Doyang, the largest river in Nagaland flows through the middle of the district. The district is divided topographically into three ranges; the Wokha Range or Upper Range, which falls in the upper north-eastern parts of the district consisting of Chukidong, Englan and Phiro circles; the Sanis Range or Middle Range with Sungro, Aitepyong, Sanis and Lotsu circles covering the middle part of the

[19] Source: Nagaland GIS and Remote Sensing Centre

district; and the Bhandari Range or Lower Range with Baghty, Bhandari, Changpang and Ralan circles which extends from the Japukong range of Mokokchung district gradually down the slopes of Assam plains in the north western side.[20] Mount Tiyi, the highest mountain peak in the district stands at an altitude of 1,970 metres above mean sea level. The annual rainfall varies from 200 to 250 cms approximately.

According to the traditional story of Lotha migration, the ancestors of Lotha people came to their present place somewhere from Khezakenoma across the Angami and Rengma areas and at last they assembled at Wokha, a place which was then not yet named as Wokha, but was named so later, 'Wo' or 'Owe' in Lotha meaning number of 'people', and 'Kha' meaning 'counting'. Thus, Wokha means "counting the number of people". So, the place in which the Lotha ancestors had assembled and counted themselves of their numbers was named as Wokha.[21]

During the British-India era, in 1876, Wokha was occupied as the district headquarters of the Naga Hills under Assam. However, in 1878 the district headquarter was shifted to Kohima, and Wokha remained a sub-division. But in 1889, the sub-division was shifted to Mokokchung. Since then, Wokha remained below the status of a sub-division. In 1957 when Naga Hills Tuensang Area (NHTA) was formed and Mokokchung district was created, Wokha became a sub-division again. Finally, on the 19th December, 1973 Wokha was raised to the status of a separate District by transferring 6 circles from Mokokchung district.

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[20] Lanunungsang, A. and Ovung, A. (2012), *Nagaland-The Land of Festivals*, Heritage Publishing House, Dimapur, Nagaland, India. p.66

[21] Census of India (1991), *Nagaland, Series 18, Part XII-A & B, District Census Handbook, Wokha District,* S.R.Luhadia, Director of Census Operations, Nagaland. p.6

Figure 2.11. Rural and Urban Population Growth (1991-2011): Wokha

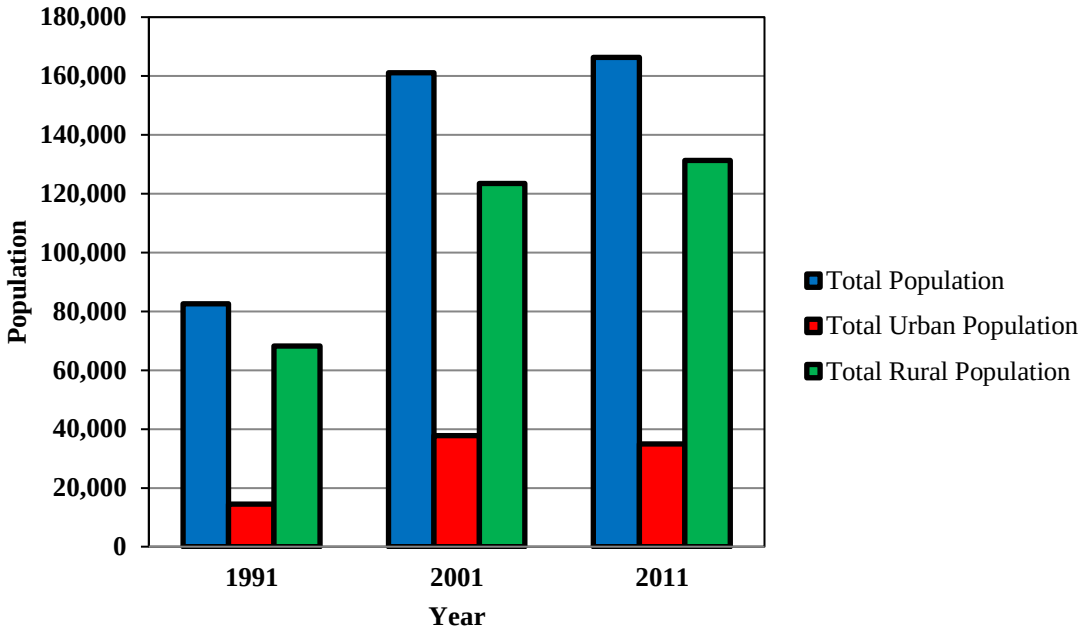
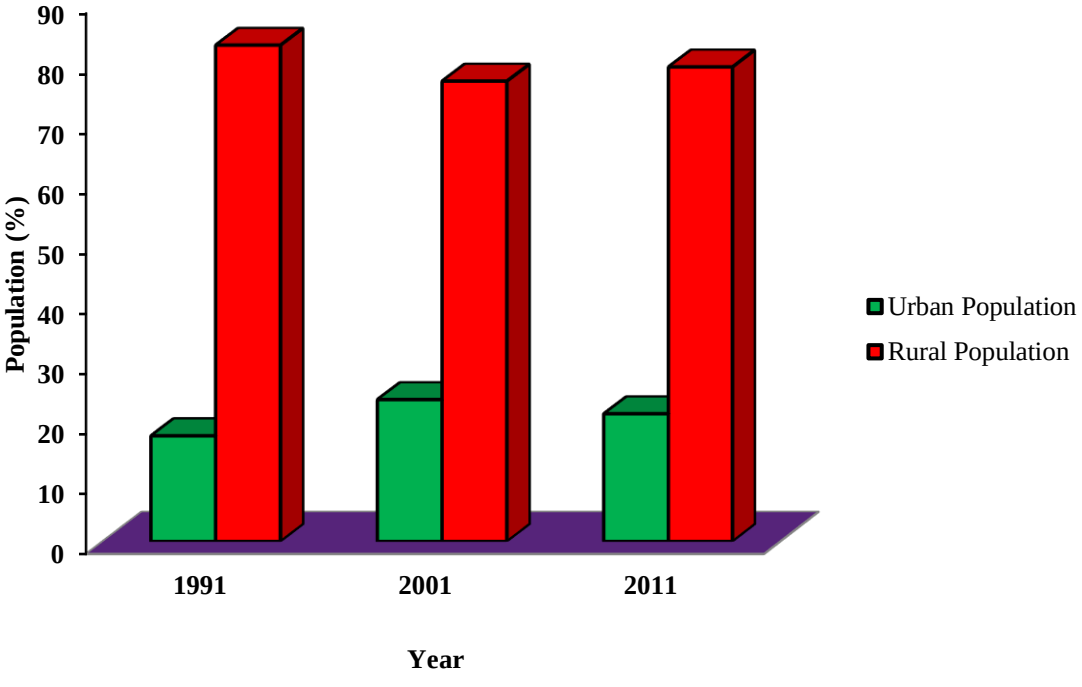


Figure 2.12. Rural and Urban Growth (1991-2011): Wokha



According to the Census 2011, Wokha district has only one statutory town i.e. the area under Wokha Town Council. The district has a population of 1,66,343 persons out of which the rural population consists of 1,31,339 persons and urban population of 35,004 persons. This shows that the urban population of the district is just 21.04% of the total population, which indicates a negative growth of urban population from 2001-2011, which is the highest in Nagaland.[22]

Table 2.7. Urban and Rural Population Growth (1991-2011): Wokha district

Wokha	1991	2001	2011
Total Population	82,612	1,61,098	1,66,343
Total Urban Population	14,377	37,696	35,004
Total Rural Population	68,235	1,23,402	1,31,339
Urban Population (in %)	17.40	23.40	21.04
Rural Population (in %)	82.60	76.60	78.96

Source: Census 1991, 2001 and 2011, Nagaland.

The above table clearly shows that while the total population of the district continuously increased each decade from 82,612 in 1991 to 1,61,098 in 2001 and to 1,66,343 in 2011, the growth of urban population in the district increased from 14,377 in 1991 to 37,696 in 2001 except for 2011 which indicated a negative growth of 35,004 (i.e. -7%). Apart from the above statistics, Wokha district has a population density of 102 persons sq.km, sex ratio of 968, and a literacy rate of 87.7% (2011 Census).

The district headquarters, namely, Wokha falls under Wokha Sadar administrative circle. Wokha, which is the only statutory town in the whole of the district is located at an altitude of 1,314 meters above sea level. It covers a total area of 9.5 sq.kms. As per 2011

[22] Census of India, 2011, *Nagaland, Series 14, Part XII-B, District Census Handbook, Wokha,* Directorate of Census Operations, Nagaland. p.22

Census, Wokha town has a total population of 35,004 persons which is a decrease of -7% from 37,636 persons in 2001. It is connected by bus route at a distance of 80 kms from Kohima as well as from Mokokchung. The nearest railhead is Furkating Railway Station in Golaghat, Assam and the nearest airport is Dimapur Airport from where helicopter service is also available. The town is also well connected with private taxi services as it lies along National Highway 61 between Kohima and Mokokchung.

2.7. Process of Urbanization: Zunheboto

Zunheboto town, the lone statutory urban centre and the district headquarters of Zunheboto district is the traditional home of the Sumi Nagas, the warrior tribe of Nagaland. Zunheboto district, situated in the heart of Nagaland is bounded by Mokokchung district in the north, Tuensang district in the east, Phek district in the south and Wokha district in the west (Map 2.1). The district is located between 25º 44′ 15″ N to 26º 17′ 37″ N latitudes and 94º 12′ 23″ E to 94º 43′ 14″ E longitudes.[23] It covers a total geographical area of 1,255 sq.kms. with a population density of 112 persons per sq.km. The topography of the district is composed of high hills and valleys with altitudes ranging from 450 to 2500 metres above mean sea level. Owing to the high altitude, it enjoys a monsoon climate almost throughout the year with very cold winters and moderately warm summers and an average rainfall of about 200 cms. Tizu, Doyang and Tsutha are the three major rivers which are the main source of water for people practicing terrace cultivation.

The name, 'Zunheboto' is derived from two sets of words *"Zunhebo"* and *"to"* in Sumi dialect. *"Zunhebo"* is the name of a flower shrub with white leaves which bear sponge like ears containing sweet juice and *"to"* means the top of a hill. Hence, Zunheboto was

[23] Source: Nagaland GIS and Remote Sensing Centre.

named after the flower found on the top of the hill. Among the Sumis, the role of Gaonbura (G.B.) is very significant who controls the entire village land. By nature, Sumis are said to be a migratory community who move from one place to another in search of better settlement. The person who lead the band of families normally become the village head, the chief who also become the able owner of the land.

It is interesting to note that Zunheboto district was never known by a single nomenclature before. The area was inhabited by the Sumi people and so it was either called as Sumi country or Sumi land without any common name. During the Second World War, with the spread of Christianity the Christian missionaries made a tremendous impact on the Naga people which consequently awakened them to demand for school education. This led to the establishment of primary and middle schools all over the Naga Hills including one at the place which is now called Zunheboto town. When the need to give a name to the new school arose, in order to avoid any favoritism to any particular village or clan they decided to name it after the tree *"Zunhebo"* which grew in the area abundantly. Hence, the name *"Zunheboto"* which literally means a hill range of "*Zunhebo"* trees.

Till 1971 Census, Zunheboto was a sub-division of Mokokchung district. The district came into existence in 1973 by transferring 10 circles out of Mokokchung district. During its first Census in 1981 as a separate district it had 9 administrative circles and 1 town. Later on during 1981-91 Poghuboto circle with 8 villages and Ghathashi circle with 13 villages were transferred from Kohima district and added to Zunheboto district taking the total to 11 circles in 1991 Census. Two new circles were formed after 2001 Census, namely, Akuhaito and Saptiqa, carved out from Atoizu and Satakha circles respectively.

Figure 2.13. Rural and Urban Population Growth (1991-2011): Zunheboto

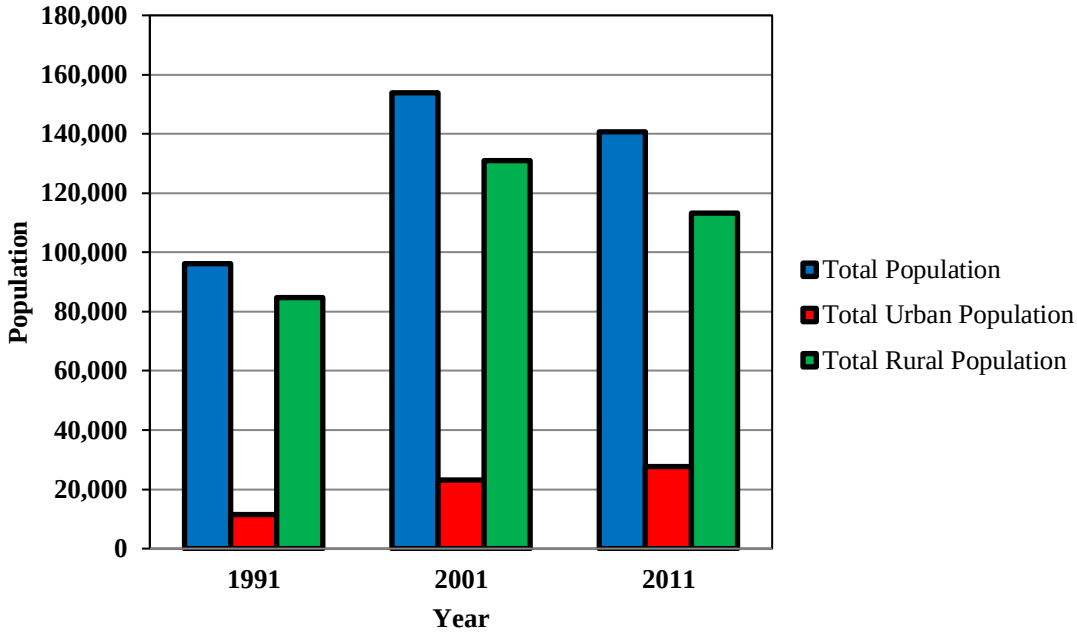
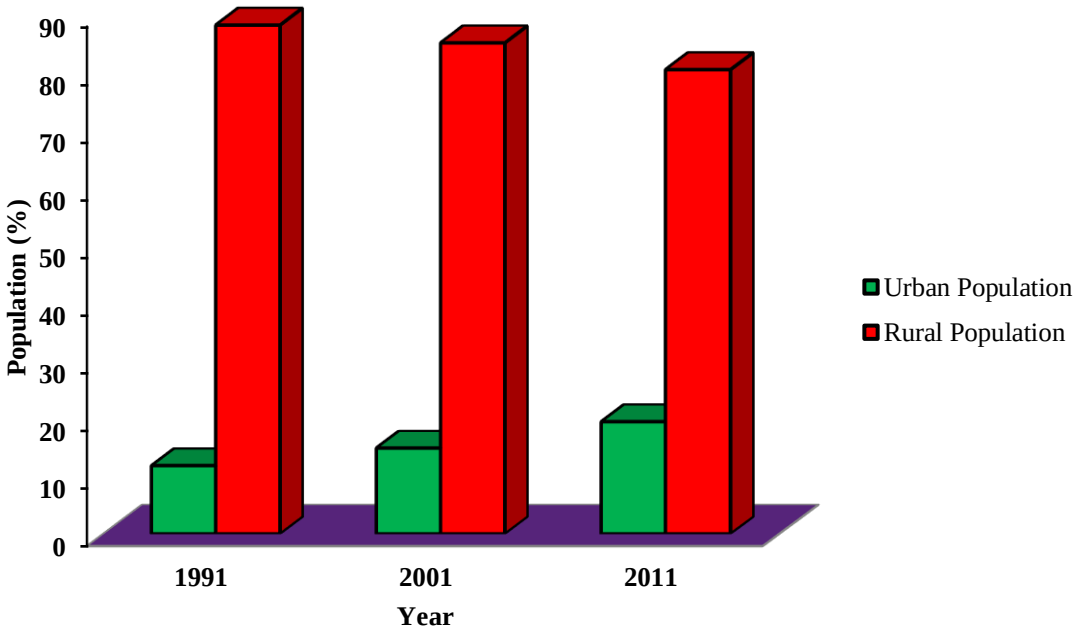


Figure 2.14. Rural and Urban Growth (1991-2011): Zunheboto



Meanwhile, Lithsami village which was till 2001 Census enumerated under Tuensang district was transferred and placed under Suruhuto circle of Zunheboto.

According to Census 2011, Zunheboto district has a total population of 1,40,757 persons out of which 19.61% i.e. 27,597 belong to the urban population which includes the statutory town under Zunheboto Town Council and one census town of Satakha Hq. and the remaining 80.39% i.e. 1,13,160 persons make up the rural population. Comprising 4.83% of the total urban population of the State, the district is ranked at 7th position among the 11 districts.

Table 2.8. Urban and Rural Population Growth (1991-2011): Zunheboto district

Zunheboto	1991	2001	2011
Total Population	96,218	1,53,955	1,40,757
Total Urban Population	11,473	23,081	27,597
Total Rural Population	84,745	1,30,874	1,13,160
Urban Population (in %)	11.92	14.99	19.61
Rural Population (in %)	88.08	85.01	80.39

Source: Census 1991, 2001 and 2011, Nagaland.

From the above table, we can see that the total population of the district rose drastically from 96,218 in 1991 to 1,53,955 which is an increase of 60.01% . However, in 2011 the district suffered a negative growth rate of -8.57% that is equal to -13,198 persons. The urban population shows an overall steady growth rate of 140.54% from 96,218 in 1991 to 1,40,757 in 2011. The rural population suffered a decline of 13.54% i.e. -17,714 persons in 2011 though it is clear from the figures that rural population still dominates the rural-urban composition of population in the district.

The district headquarters, namely, Zunheboto is situated in Zunheboto town under Zunheboto Sadar administrative circle. With an area of 7 sq.kms., it is the sixth largest urban center in Nagaland next to Dimapur-Chumukedima, Kohima, Mokokchung, Wokha and Tuensang. It has a total population of 22,633 persons which is a decrease of -2.7% from 23,081 persons in 2001. The town is located at a distance of 150 kms from Kohima, the State capital, and, the nearest urban centre is Mokokchung located at a distance of 70 kms.

2.8. Process of Urbanization: Mon

Mon town, the major commercial hub and the only statutory urban centre under Mon district is also the district headquarters of Mon district, the Land of the Konyak Nagas. The district is situated in the north-eastern part of Nagaland surrounded by the plains of Sibsagar district of Assam in the west, Myanmar in the east, Tirap Frontier of Arunachal Pradesh in the north and the Tuensang district of Nagaland in the south (Map 2.1). Located between 26° 17′ 02″ N to 27° 02′ 29″ N latitudes and 94° 46′ 45″ E to 95° 14′ 46″ E longitudes,[24] the district covers an area of 1,786 sq.km. representing 10.77% of the total area of the State with a density of 140 persons per sq.km.(2011 Census). In terms of area, the district occupies the third place among the eleven districts of the State.

The origin of Konyaks cannot be traced out as there are no written historical documents available and as such, it is only through myth and legend that one can speculate their origin. As per the records written by some authors like A. Yanang Konyak, A. Peihwang Wangsa and L. Metjen Konyak, tradition reports that Konyaks came into existence from a

[24] Source: Nagaland GIS and Remote Sensing Centre.

stone namely *Longphang Phinyu* or *Longphanghong*. *Longphang* means under the rock and *Phinyu* means wide-open. *Longphang* means under the stone hill. It is therefore, believed that they came out from a stone cave. Another tradition says that the Konyaks came out of a mountain called *Yenynyudang* which is situated in the south of the present Konyak land. Both traditions, however, agree with the crossing of a historic gate known as *Alamkaphen* before their final and permanent settlement at Chinglong Wangdonghong and Suwa Chinglang. *Alam* means sun and *Kaphen* means gate. This historic gate is thereby interpreted as the gate of the sun, which makes valuable sense that the Konyaks have come from the East which is the gateway of the rising sun.[25] The term 'Konyak' is believed to have been derived from the words '*Khao*' meaning 'head' and '*Nyak*' meaning 'black' translating to 'men with black hair'. Like most Naga tribes, the Konyaks strategically live on mountaintops. A variety of rituals used to be observed before choosing a village site.[26]

Mon district, with the exception of the foothills, is hilly with steep slopes. The altitude of Mon is 897.64 meters above mean sea level. Low-lying areas with undulating hills characterize the foothills. The district can be divided into two regions topographically, namely, the Upper Region comprising Longching, Chen, Mopong and Tobu areas and the Lower Region comprises Mon, Tizit and Naginimora area which lie adjacent to the plains of Assam. The hill ranges extend from the foothills to the slopes of Naga Hills and Patkai Range in the Eastern side of the district.[27] Shawot, the highest peak in the district has an

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[25] Lanunungsang, A. and Ovung, A. (2012), *Nagaland-The Land of Festivals*, Heritage Publishing House, Dimapur, Nagaland, India. p.58-59

[26] *District Human Development Report, Mon, Nagaland (2009),* Department of Planning and Coordination, Government of Nagaland. p.6

[27] *Draft Final Report, Mon Town.,* 2009, Urban Development Department, Government of Nagaland, LEA Associates South Asia Pvt. Ltd., New Delhi.p.3-2

altitude of 2,414 meters above sea level. The Dikhu is the most important river in the district. It flows through the Mon district, flows past Naginimora and later joins the Brahmaputra River in Assam.

The area, which is now known as Mon district was not brought under the Civil Administration till 1948. Even in the beginning of the 19th Century, a vast tract of land lying between the administered areas of Assam and Myanmar (Burma) was not brought under the Civil Administration by the British. By the year 1914, the Foreign and Political Department of the Government of India, by a Notification, extended the Assam Frontier Tract Regulation of 1880 to the Hills, which were either inhabited or frequented by Abors, Mishmis, Singphos, Nagas, Khamptis, Bhutias, Akas and Daflas. It is by this extension of the aforesaid Regulation, the Government of India brought the area under some administration in 1914 and the area was named as the North East Frontier Tract. In 1951, the plains portion of Balipara Frontier Tract, Tirap Frontier Tract, Abor Hills District and Mishmi Hills were transferred to the administrative jurisdiction of the Government of Assam. Thereafter, the remaining areas of the said North East Frontier together with the Naga Tribal Area of Tuensang including the present Mon (District) were re-named as the North East Frontier Agency. Later, the district was carved out of the Tuensang district (Nagaland) on 21st December 1973.

As of Census 2011, the district has a total population of 2,50,260 persons which is the 3rd largest among the districts of Nagaland. Out of this total population, urban population comprise of 34,444 persons (13.76%), an increase of 17,854 persons (107.62%) from Census 2001 which is also the highest increase in urban population in the State.

Figure 2.15. Rural and Urban Population Growth (1991-2011): Mon

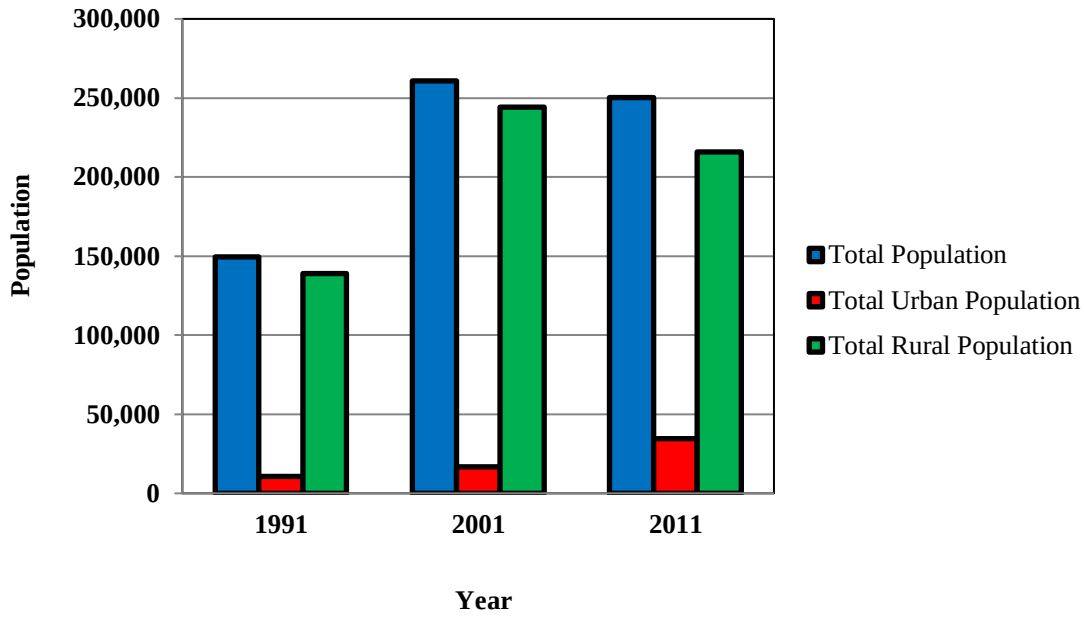


Figure 2.16. Rural and Urban Growth (1991-2011): Mon

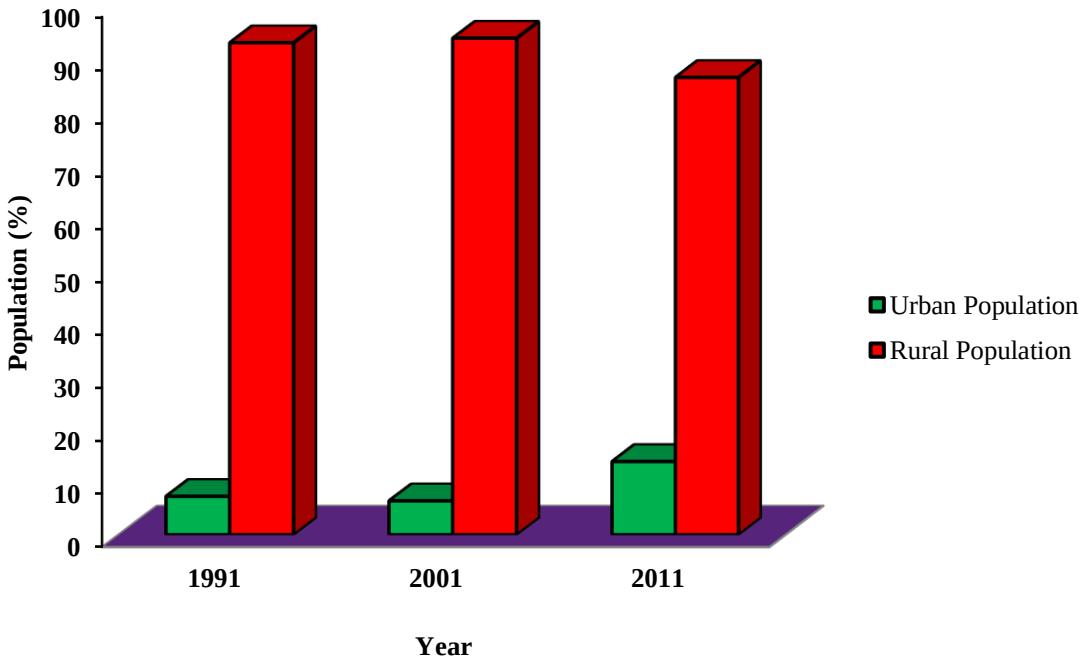


Table 2.9. Urban and Rural Population Growth (1991-2011): Mon district

Mon	1991	2001	2011
Total Population	1,49,699	2,60,652	2,50,260
Total Urban Population	10,790	16,590	34,444
Total Rural Population	1,38,909	2,44,062	2,15,816
Urban Population (in %)	7.21	6.36	13.76
Rural Population (in %)	92.79	93.64	86.24

Source: Census 1991, 2001 and 2011, Nagaland

Table 2.9 shows an increasing trend in the total population from 1991-2001 at a rate of 74.12% which in 2011 records a negative growth rate of -3.99% i.e. -10,392 persons. The urban population shows an increasing trend with a growth rate of 53.75% in 2001 and a drastic increase of 107.62% in 2011. The rural population had a steady growth from 1991-2001 with a growth rate of 75.70% which, however, decreased to -11.57% in 2011 i.e. -28,246 persons. The figures in the table are indicative of the fact that rural population is still very dominant in rural-urban population composition of the district.

Mon district has two statutory towns, namely, Mon town and Naginimora town. Mon town came into existence during the time of 1981 Census while Naginimora town came up only after 2001 Census. Mon town which is the district headquarters spreads over a total geographical area of 6.5 sq.kms. and is located at an altitude of 897.64 meters above mean sea level.[28] The town is the major commercial hub and also the main resource centre for the district. According to Census 2011, it has population of 26,328 persons which is an increase of 9,738 persons (58.70%) from 16,590 persons in 2001. The town is at a distance of 354 kms. from Kohima, the State capital. Mon is predominantly populated by Konyak

[28] Source: Area Coverage of Urban Local Bodies (2011), Urban Development Department, Government of Nagaland.

Nagas with a sprinkling of others who are mostly engaged in government service and business.

2.9. Process of Urbanization: Phek

Phek is the district headquarters of Phek district, the home of the Chakhesang and Pochury Naga tribes. The district is located in the southeastern part of Nagaland, bounded by Myanmar in the east, Zunheboto district in the north, Manipur state in the south and Kohima district in the west (Map 2.1). It lies between 25º 27′ 09″ N to 25º 50′ 58″ N latitudes and 94º 11′ 13″ E to 94º 54′ 08″ E longitudes [29] covering an area of 2, 026 sq.km. In terms of area, the district occupies the second place among the eleven districts of Nagaland.

The name Phek is derived from the word *"Phekrekedze"* meaning watch tower. Till 1946, the Chakhesang people, the inhabitants of Phek district, were known as the eastern Angami and it was only after August 1946 that they came to be known by a separate name called 'Chakhesang' denoting a separate tribe. The name 'Chakhesang' is an acronym of the three allied sub-clause, 'cha' from the name 'Chokri', 'khe' from 'Khuza' and 'Sang' from 'Sangtam (Pochury)'. Though it is certain that the people of this district came to this place from outside, probably from different parts of Indo-China and south-east Asia and through Burma the exact time of their arrival to the present settlement is not known.[30]

Like any other parts of Nagaland, Phek district is a mountainous region rich in flora and fauna where about 70% of the land is covered with thick evergreen forest. The hilly tract is characterized by a succession of steep mountain ridges divided from each other by

[29] Source: Nagaland GIS and Remote Sensing Centre.

[30] Census of India (2011), *Nagaland, Series 14, Part XII-B, District Census Handbook, Phek,* Directorate of Census Operations, Nagaland. p.9

Figure 2.17. Rural and Urban Population Growth (1991-2011): Phek

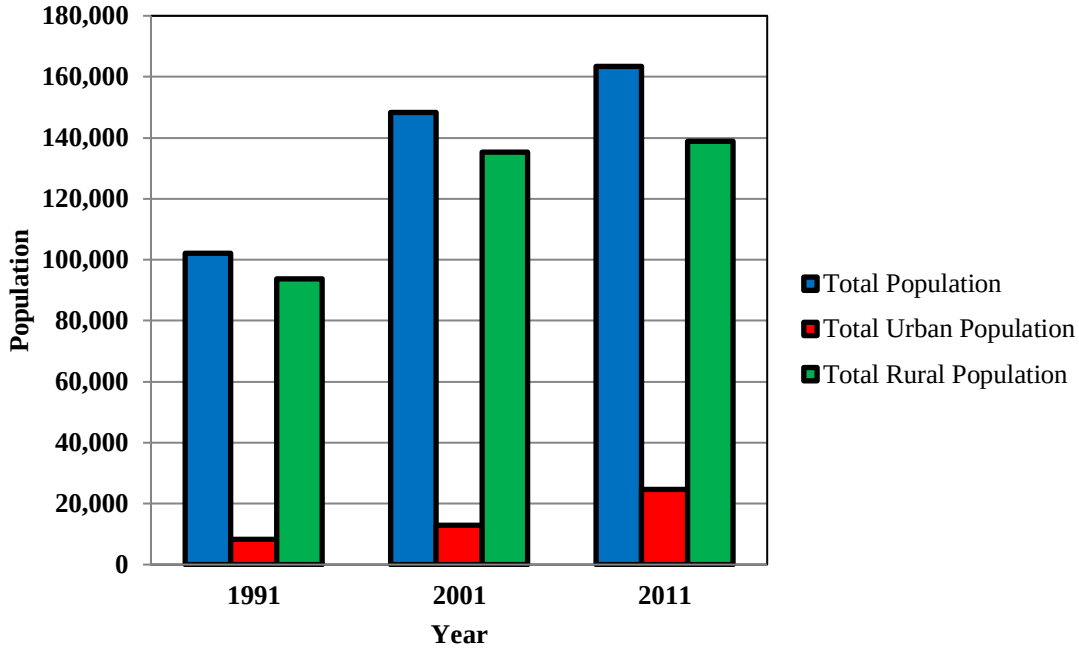
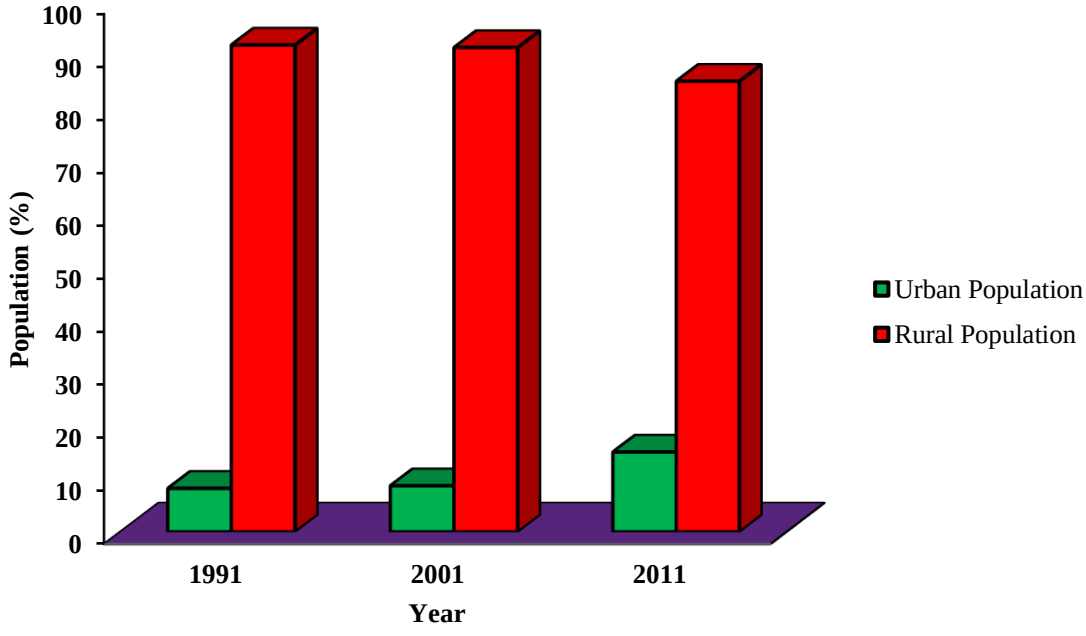


Figure 2.18. Rural and Urban Growth (1991-2011): Phek



deep valleys. There are three important rivers namely Tizu, Lanye, and Sedzu and three important lakes called Shilloi, Chida and Dzudu. Agriculture is the main occupation with Terrace Rice Cultivation (TRC) as the most predominant. Besides agriculture people also engage in salt making (Meluri area), weaving, bamboo and wood carving, and in making fruit juice.

Prior to 1973, Phek was one of the sub-divisions under Kohima district. It was on 19th December, 1973 that the government of Nagaland approved Phek to be a separate and fully fledged district. As of 2011 Census, the district has two statutory towns, namely, Phek town and Pfutsero town. Phek town came into existence during the time of 1981 Census while Pfutsero town came up only after 2001 Census. Pfutsero town has the distinction of being the highest altitude town (2,133m) and also the coldest inhabited place in Nagaland. The following table shows the rural-urban population growth of the district in the past three decades from 1991-2011.

Table 2.10. Urban and Rural Population Growth (1991-2011): Phek district

Phek	1991	2001	2011
Total Population	1,02,156	1,48,195	1,63,418
Total Urban Population	8,366	12,864	24,575
Total Rural Population	93,790	1,35,331	1,38,843
Urban Population (in %)	8.19	8.68	15.04
Rural Population (in %)	91.81	91.32	84.96

Source: Census of India, 1991, 2001 and 2011.

According to the 2011 Census, Phek district has a population of 1,63,418 persons and a density of 81 persons per sq.km (Table 2.18). With a literacy rate of 78.05%, it is ranked at 6th position among the districts of the State. Out of the total population of 1,63,418, about 15.04 % i.e. 24,575 persons comprise the urban population. The trend reflected in

the table clearly visualizes the fact that there is a gradual increase in the urban population with the increase in the general population of the district through 1991-2001. In 2011, the urban population almost doubled by 91.03% from 12,864 in 2001 to 24,575 in 2011. This may be attributed to the fact that the two urban centres in the district, namely, Phek and Pfutsero has played a major role in supporting the influx of people from the rural areas into them perhaps in search of better amenities and livelihood. However, it is very much evident from the figures that rural population still dominates the population with 91.81%, 91.32% and 84.96% during 1991, 2001 and 2011 over urban population of 8.19%, 8.68% and 15.04% during the same years.

The district headquarters, namely, Phek is situated in Phek town under Phek Sadar. Located at an altitude of 1,524 meters above sea level and covered by evergreen forests and surrounded by small streams and rivers, the town has a total geographical area of 4.85 sq.kms. According to Census 2011, Phek town has a population of 14,204 persons which is an increase of 10.42% from 12,864 persons in 2001. The distance of the State capital, Kohima is 145 kms. and the nearest railway station and airport at Dimapur is 215 kms. from the town.

2.10. Process of Urbanization: Kiphire

Kiphire is the easternmost statutory urban centre and is the headquarters of Kiphire district. The district is bounded by Tuensang district on the north, Phek district on the south, Myanmar on the east and Zunheboto district in the west (Map 2.1). It is located between 25° 35′ 16″ N to 26° 02′ 19″ N latitudes and 94° 34′ 07″ E to 95° 02′ 56″ E longitudes[31] and covers an area of 1130 sq.kms. with a population density of 65 persons

[31] Source: Nagaland GIS and Remote Sensing Centre

per sq.km. The district is located in one of the most geo-morphologically interesting zones of the state. Mount Saramati, the highest peak in the State at 3,840m is located in the Pungro sub-division of the district. The major rivers are Zunki, and Tizu which flows into the Chindwin in Myanmar.

Kiphire is multi-ethnic in terms of its indigenous population. There are officially three recognized tribes - Sangtam, Yimchungru and Sumi, and several other sub-tribes speaking various languages. Though there are variations in the details of the various cultural practices and customs among the tribes of the district, on the whole, their society is organized along similar structures owing to the many generations of co-habitation. All the three tribal communities have close social and cultural affinity with their counterparts in the districts of Zunheboto and Tuensang. The Sangtam and the Yimchungru tribes of Kiphire and Tuensang district have a shared history and culture. Similarly, the Sumis of Kiphire district also shares similar socio-cultural ties with the Sumis of Zunheboto district.

The areas under Kiphire district was part of the 'North Eastern Frontier Agency" (NEFA) as part of the Tuensang area. Though it was included within the category of Naga tribal areas under Assam and placed under political control, practically, there was neither sign of either political control nor any administration till the transfer of power in 1947. In the wake of expansion of civil administrative out-posts, survey for opening of administrative headquarters was done in 1951. Accordingly, an administrative headquarter was established at Kiphire on 16th June 1952 from which the present Kiphire town took its shape. Kiphire remained under Tuensang district as an administrative sub-division till it was bifurcated from Tuensang district and was inaugurated as the 11th district of Nagaland

on 24th January, 2004 by transferring 7 administrative circles from Tuensang district. [32] Thereafter, a new administrative circle namely, Khongsa was carved out of Pungro taking the total to 8 circles during 2011 Census.

According to Census 2011, Kiphire district has a population of 74,004 persons where 22.28% of the population i.e. 16,487 persons reside in urban areas while the rest 57,517 belong to rural population. At present, the district has 96 villages out of which 6 villages are uninhabited, 8 administrative circles and 3 rural development blocks.

Table 2.11. Number of Villages, Circles and R.D. Blocks in Kiphire District

Sl. No	Name of Circle	Number of Villages	Sl. No	Name of R.D. Block	Name of Circles in the R.D. Block	No. of Constituent Village	Total No. of Villages
1	Seyochung	15	**1**	Sitimi	Sitimi	13	40
2	Amahator	12			Seyochung	15	
3	Kiphire Sadar	9			Longmatra	12	
4	Kiusam	8	**2**	Kiphire	Amahator	12	29
5	Sitimi	13			Kiphire	9	
6	Longmatra	12			Kiusam	8	
7	Pungro	19	**3**	Pungro	Pungro	19	27
8	Khongsa	8			Khongsa	8	
	Total	**96***		**Total**			**96***

*Including 6 uninhabited villages.
Source: District Census Handbook, Kiphire, Nagaland, 2011.

Wedged between Saramati (3840 m), the highest mountain in the State and the Jingkhu mountains, Kiphire town, the district headquarters, is located at an elevation of 896 meters above mean sea level covering a total geographical area of 11 sq.kms. As per 2011 Census, Kiphire town has a population of 16,487 persons which is an increase of 29.32%

[32] *District Human Development Report, Kiphire, Nagaland* (2013), Department of Planning and Coordination, Government of Nagaland. p.7.

from 12,749 persons in 2001. It is also well connected by road with Kohima, the State capital via Meluri in Phek district; Zunheboto and Tuensang at a distance of 254 kms. and by weekly chopper service to Dimapur.

As stated earlier, Kiphire is multi-ethnic in terms of its indigenous population. There are officially three recognized tribes – Sangtam, Yimchungru and Sumi, out of which Sangtam tribe is in majority. It's functionality as a town, though in figures, is not so spectacular compared to other towns like Dimapur, Kohima and Mokokchung, the increase in population is mostly on account of the migration from the surrounding rural areas. Despite its locational imperative, away from the mainland India it has the potential to develop into a hustling trade centre with the adoption of Look East Policy by the Government of India. This can grow into the country's gateway to the further east towards Myanmar and other southeast Asian countries.

2.11. Process of Urbanization: Longleng

Longleng, the only urban centre in the district of Longleng is a growing township. Longleng district wherein Longleng is located is a strip of mountainous territory having no plains and is situated in the northern part Nagaland. It is bounded by Tuensang and Mon district in the east, Assam in the north, Mokokchung in the west and the southern boundary is shared between Tuensang and Mokokchung districts of Nagaland (Map 2.1). Longleng district is located between 26° 22′ 35″ N to 26° 47′ 43″ N latitudes and 94° 39′ 18″ E to 94° 55′ 23″ E longitudes[33] and covers an area of 562 sq.kms. which is the smallest district in the State area wise. The altitude of the Longleng district varies from

[33] Source: Nagaland GIS and Remote Sensing Centre.

150-2000 meters above sea level and the principle rivers that flow through the district includes Dikhu and Yongmon.

Some say that the name i.e. Longleng is derived from a beautiful lady named *'Bhumla'* which means 'the lady of the clouds'. Legend says that she and her husband had many offsprings and their descendants were called 'Phom'. Some say that the name was given by the Britishers (English) after the word '*Bhum'* which means 'cloud'. They gave this name because the 'Phom' area was mostly covered by clouds especially during winter. Yet some claim that the name 'Phom' came from the word '*Bham*' which means rubber tree or Banyan tree. While Britishers visited the Phom area they found the Banyan tree in every main entrance of the Phom villages. When asked about the name of the tree, the natives replied that it was called 'Bham'. Henceforth, the name 'Phom' came into existence. Thus, it is difficult to give a definite meaning to the word 'Phom' nor is it possible to accurately say to which tradition it actually belongs but the Phoms accept the name and keep the name 'Phom' as theirs.[34]

The present administrative headquarter for Phom tribe was established in 1950 at Longleng followed by creating of one Rural Development Block at Longleng in 1960. They were formerly a sub-tribe of the Konyaks but they got their own new separate identity as "Phoms" in 1942 during the British period and also carved out of Tuensang in early 2004.[35] Till 2001, Census was conducted in Longleng district as a rural area of Tuensang district which was later upgraded to statutory status. 2011 Census was the first

[34] Census of India (2011), *Nagaland, Series 14, Part XII-B, District Census Handbook, Longleng,* Directorate of Census Operations, Nagaland. p.9-10.

[35] Lanunungsang, A. and Ovung, A. (2012), *Nagaland-The Land of Festivals*, Heritage Publishing House, Dimapur, Nagaland, India. p.74

separate Census in Longleng after becoming a fully fledged district. During 2011 Census Longleng district had 49 villages, 5 administrative circles, 2 rural development blocks and one statutory town.[36]

Table 2.12. Number of Villages, Circles and R.D. Blocks: Longleng District

Sl. No	Name of Circle	Number of Villages	Sl. No	Name of R.D. Block	Name of Circles in the R.D. Block	No. of Constituent Village	Total No. of Villages
1	Tamlu	5	**1**	Longleng	Longleng	14	24
2	Namsang	9			Sakshi	10	
3	Yongnyah	11	**2**	Tamlu	Tamlu	5	25
4	Longleng	14			Namsang	9	
5	Sakshi	10			Yongnyah	11	
	Total	**49**		**Total**			**49**

Source: District Census Handbook, Longleng, Nagaland, 2011.

According to Census 2011, Longleng district has a population of 50,484 persons which makes it the least populated district in Nagaland with a population density of 90 persons per sq.km. Out of the total population, urban population comprise of 7,613 persons or 15.08%, while the rest of 42,871 persons belong to the rural population. The district headquarters, namely, Longleng town is located at an altitude of 1,067 meters above sea level, spread over an area of 5 sq.kms. As of 2011 Census, it has a total population of 7,613 persons which is an increase of 0.52% from 7,573 persons in 2001.The distance of the district headquarter is 232 kms. from Kohima (via Mokokchung), the State capital.

2.12. Process of Urbanization: Peren

Peren; the district headquarters of Peren district is one of the statutory urban areas in the district recently carved out from Kohima district. Peren district is a strip of mountainous

[36] Census of India (2011), *Nagaland, Series 14, Part XII-B, District Census Handbook, Longleng,* Directorate of Census Operations, Nagaland. p.9

territory having fertile foothill valley plains situated at the south-western end of Nagaland State inhabited by the Zeliang and Kuki tribes. It is bounded by Dimapur district in the north, Kohima in the east, parts of North Cachar Hills district of Assam in the south and the extensive terrain of lofty mountain chains in the southwest by Senapati district of Manipur (Map 2.1). The district is located between 25° 11′ 55″ N to 25° 41′ 57″ N latitudes and 93° 19′ 28″ E to 93° 56′ 38″ E longitudes[37] covering an area of about 2,300 sq.kms. and a population density of 58 persons per sq.km.(Census 2011) making it the 4th largest district in the State.

The district is blessed with natural beauty with the valleys and the hill ranges surrounding it. The rich vegetation consists of sub-tropical mixed forest where cane and bamboo trees form most of the forest cover along with pine, eucalyptus and different varieties of wild orchid. It experiences a monsoon and temperate climate due to its high elevation and rich vegetation. The climatic conditions and the soil make it one of the most fertile districts in Nagaland. The district is also rich in mineral resources though these have not been explored on a large scale. The principle rivers that flow through Peren district includes Tepuiki, Mbeiki (Barak), Ntanki, Mungleu, Tesanki, Nguiki, Nkwareu, Techauki, Ngungreu,Tahaiki and Duilumreu (Tributary of Tepuiki). The highest mountain peak in the district is Mt. Paona which stands at 2,500 metres above mean sea level and which is also the third highest mountain peak in Nagaland.

The history of the origin and migration of the Zeliang Nagas are shrouded in the absence of written documents or chronicles, even though legendary stories have been passed on from generation to generation. The word Zeliang is derived from the combination of the

[37] Source: Nagaland GIS and Remote Sensing Centre

two different groups of people who are known as *"Zemes"* and *"Liangmeis"*. The *Zeme* and *Liangmai* have a single ethno-cultural entity with their common legends of origin and migration. However, there is also a traditional belief that they originated from their land itself. The Kukis, on the other hand, are indigenous people of *Zale'n-gam*, 'Land of Freedom', who are present in all the states of Northeast India except Arunachal Pradesh.[38]

The present day Peren district originated from Nkuilwangdi, located now in Senapati district of Manipur. After consolidating British rule in Kohima and surrounding villages by 1879, the British Imperialist turned its attention towards Barail ranges south of the Angami Country inhabited by the Zeliangs (Known to the Britishers as Kacha Nagas) and succeeded in establishing their authority over the Zeliangs within the following years. Soon after, the British Government realized the importance of proper communication to carry out colonial administration and extension of political administrative control. Accordingly, link roads were constructed linking Kohima with all the outlying posts. One such link road constructed was the bridle path through Khonoma via Benreu Pedi, Peletkie, Peren, Tesen to Tening outpost in 1885 which proved effective in quelling the freedom movement led by Rani Gaidinliu between 1931 -1940 and her subsequent capture from Poilwa village. Since Nagaland's attainment of statehood Peren was considered as a sub-division of Kohima district. It was only on 24th October 2004 that Peren became a full-fledged district making it the 11th and so far the newest district of Nagaland.

According to Census 2011, Peren district has a population of 95,219 persons, out of which 13,790 comprise the urban population and the rest 81,429 persons belong to the rural

[38] Lanunungsang, A. and Ovung, A. (2012), *Nagaland-The Land of Festivals*, Heritage Publishing House, Dimapur, Nagaland, India. p.62 & 102.

population, which indicates that only 14.48% of the population of the district is urban. It has a total of 112 villages (10 uninhabited), 7 administrative circles and 3 rural development blocks.

Table 2.13. Number of Villages, Circles and R.D. Blocks: Peren District

Sl. No	Name of Circle	Number of Villages	Sl. No	Name of R.D. Block	Name of Circles in the R.D. Block	No. of Constituent Village	Total No. of Villages
1	Pedi (Ngwalwa)	14	**1**	Jalukie	Ahthibung	20	41
2	Jalukie	22			Kebai Khelma	13	
3	Ahthibung Kebai	25			Jalukie	8	
4	Khelma	13	**2**	Tening	Nsong	8	27
5	Nsong	8			Tening	19	
6	Tening	20	**3**	Peren	Pedi (Ngwalwa)	12	34
7	Peren	10			Peren	10	
					Jalukie	12	
	Total	**102***		**Total**			**102***

*Excluding 10 uninhabited villages.
Source: District Census Handbook, Peren, Nagaland, 2011.

The district has two statutory towns, namely, Peren town and Jalukie town. The process of Peren town formation started as early as 1947 and Peren village was later recognized as Peren town in 1948, while Jalukie town came into existence only during the period 2001-2011. The district headquarters, namely, Peren is situated in Peren town under Peren Sadar administrative Circle. The town is located at an altitude of 1,445 meters above mean sea level covering an area of 4 sq.kms. As per 2011 Census, Peren town has a population of 5,084 persons which is an increase of 2.19% from 4,975 persons in 2001. The distance of the town is 139 kms. from Kohima, the State capital. The location of the nearest airport and railway station is in Dimapur at 84 kms. away from the town.

From a total of only 11 towns in 2001, the State now has a total of 26 towns or urban centres (19 Statutory towns and 6 Census towns) including the 11 district headquarters. As per 2011 Census, Dimapur district has the highest number of urban residents with a total of 1,97,869 persons. This is followed by Kohima with a total of 1,21,088 persons and Mokokchung with a total figure of 55,725. All the other districts have an urban population of less than 40,000 persons. Also, Dimapur district has the highest percentage of urban population with 51.95%, followed by Kohima with 45.60% while Mon district with 13.85% has the lowest percentage of urban population.

Though the natural growth of population is not to be ruled out, the growth of urban population is attributed largely to migrant population as well. The growing concentration of population in urban centres is generally attributed to a number of socio-economic and lifestyle conditions, such as the higher capacity of the urban institutions to absorb more workers, avenues for a non-agricultural means of livelihood and higher income generation opportunities. Another notable feature of urbanization in Nagaland is that, among the metropolitan areas people seem to flock into Dimapur from all over the State making it the most populated as well as the most urbanized district comprising 34.66% of the total urban population of the State. This may be attributed to the fact that it is the major commercial centre in the State having important retail and marketing activities besides the fact that it is the only town in Nagaland having both air and rail connectivity with the rest of the country. Other attributes such as geographical location and topography, better urban amenities, increased physical and social infrastructural facilities, industries, public and educational institutions etc. makes it not only the most important commercial hub of Nagaland but also in the entire Northeast of India. The reasons for such an upsurge in

urban population may also be due to the overwhelming growth of migrants from the mainland of India and from the neighboring states and countries who mostly engage themselves in various income generating economic activities. Further, the influx of people from outside can be ascribed to the non-imposition of ILP (Inner-Line Permit) System in this area. For, in all the other places the system is upheld so as to check the free entry of outsiders.

Apart from Dimapur, Kohima being the second largest urban centre and the capital city of Nagaland is also facing the weight of over population in recent years. The reason is obvious as all the State administrative offices and important private organizations are located there. Nonetheless, the impact of migration- both from within the State as well as outside- is a major contributor towards the rapid urban growth. The booming market and business opportunities aided by improving transportation networks attract people from the nearby fringes and villages for permanent settlement as well as daily commutation which results in the rapid growth of population. Another reason for such a surge in urban growth may also be due to its strategic location along the National Highway 39 which not only links the State of Manipur from the rest of India but also provides a corridor for India with the rest of south-east Asia. The third largest urban centre in terms of urban growth and population is Mokokchung. Over the years, Mokokchung has made significant strides with the expansion of urban infrastructure and socio-economic growth. The influx of migrants from within the State and outside for official as well as business purposes has largely aided in its growth. Amongst many other factors, the vehicular traffic which was just minimum and manageable has increased manifold in the past 4-5 years alone causing constant traffic jams on a daily basis now. No doubt, this may be due to various reasons

such as economic growth and better livelihood but the role of migration and population growth cannot be at all ignored for creating such a situation.

As against the three major urban centres viz. Dimapur, Kohima and Mokokchung just discussed, the rest of the centres especially those located in the eastern parts of the State experience a slower urban growth. Although Phek, Zunheboto, and a few other centres are making remarkable progress, those located further away from the major urban centres such as Kiphire, Longleng, Peren, etc. don't experience such a growth. Apparently, this may be due to the geographical remoteness of the regions compounded by the lack of proper transportation and communication networks, weak or inefficient governing authorities and the absence of primary urban infrastructure such as schools, hospitals, etc. and other basic amenities for the people. As such, instead of people flocking into such centres, they migrate to the bigger urban centres in search of better livelihood opportunities and comfortable living. This has not only handicapped the developmental process of the urban centres but also the decay of urban growth and most importantly it has deprived the people of trust and faith in the governmental machinery towards the upliftment and socio-economic development of the society.

Though in the present scenario the rural population dominates the population composition with 71.14%, urban population of the State has risen from 2,08,223 persons in 1991 to 5,70,966 in 2011 i.e. by 174.21% in just two decades. At this rate, the urban population is poised to overtake the rural population in the future. This is also evident from the fact that the rural areas have recorded a negative growth rate of -14.6% while the urban population recorded a positive growth rate of 66.6% during the Census 2011.

As such, there is an urgent need to address the growing infrastructural and social needs of the increasing urban population, problems relating to land acquisition, issues of public safety and environmental protection in the fast emerging urban centres. These are crucial areas requiring judicious urban planning and development such as providing urban amenities in the rural areas so that rural based activities would take place in the urban areas and the urban oriented activities would also take place in the rural settlements. The recognition of such rural-urban interface should be taken into perspective for the all-round development of the State. However, the matter is more complicated in a State like Nagaland where the land within even urban Municipal areas is legally owned by the tribal community and within the given community also, the particular village or villages on whose traditional lands the urban centres were established continue to have a hold on infrastructural development of the towns as they own the land.

There has been a considerable amount of research on urbanization in the developing world concerning the socio-economic and technical changes taking place in the urban centres. Though some attention has been given to the environmental degradation and quality of life, these investigations have been few and inadequate. The general problem is that the human conditions in the urban habitat throughout the world have degraded and have become less livable and less attractive to the urban residents. The basic facilities provided to the urban residents and the social processes like population characteristics and organization and the distribution of goods and services both physical and social determine the quality of urban living.

Public amenities are understood to mean specific urban facilities that contribute to the urban living experience of residents which are linked to the daily life needs of residents in a neighbourhood. They are the resources, conveniences, facilities or benefits continuously offered to the general public for their use and/or enjoyment, with or without charge. These amenities are the most important factor that determine the quality of urban living in any place providing a sense of livability for the residents. As Mulligan and Carruthers identify that "amenities are key to understanding quality of life because they are precisely what make some places attractive for living and working, especially relative to other places that do not have them and/or are burdened with their opposites, disamenities".[39] In other words, amenities are the basic goods and services that enter the utility functions of the public directly for the ultimate satisfaction of needs and wants and enhance the standard and quality of living.

[39] Mulligan, G. and Carruthers, J. (2011), *Amenities, Quality of Life, and Regional Development*. In *Investigating Quality Urban Life, Theory Methods and Empirical Research*, Springer, Netherlands. p.107

Both Mathur and Stein[40] and McNulty *et al*.[41] refer to urban amenities as "quality of life factors" and Howie *et al*.,[42] confirm that "urban amenities are generally accepted as being important to a household's sense of place". There are both public sector amenities provided by councils, such as parks, public squares and recreational facilities, as well as private sector amenities such as cafes, restaurants, retail and other goods or service providers. As such, we can safely conclude that urban amenities attract economic activity to a town or city which in turn helps in the development of that area. Both the terms 'public amenities' and 'quality of life' are almost inseparable when it comes to determining the standard of living and the measurement of level of urbanization of a particular place or region. Thus, public amenities help in the promotion of economic development of a place and further contribute to the quality of urban life experiences of the people. In other words, urban or public amenities are an essential element in providing a livable community for the residents of the town or city.

In any urban setting, amenities such as water supply, electricity, sanitation, etc are determined largely by the macro level planning and policy of the State to meet the infrastructural requirements of the urban areas. Considering the rapid population growth and urbanization the State has undergone in the recent decades, emerging infrastructural issues with regard to provision of basic amenities such as supply of drinking water, electricity, transportation network and connectivity, educational institutes, medical and health facilities, solid waste management etc. have become a matter of great concern.

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[40] Mathur, V. and Stein, S. (2005), *Do amenities matter in attracting knowledge workers for regional economic development?* Pap. Reg. Sci., p.252

[41] McNulty, R.J.D. and Penne, L. (1985), *The Economics of Amenity: Community Futures and Quality of Life*, Partners for Livable Places: Washington, DC, USA. p.13

[42] Howie, P., Murphy, S. and Wicks, J. (2010), *An Application of a Stated Preference Method to Value Urban Amenities*, Urban Stud. p.235

In most of the towns of Nagaland, urban services are commonly inadequate to meet even the basic needs of the inhabitants. Natural population growth and a steady stream of rural migrants only add to the already existing problems. Even the carrying capacity of the hill towns for urban expansion and development is arguably lower than the low lands. Except for Dimapur which is in the plains, the urban settlements in the rest of the State are either situated on hill tops or hill slopes which face problems of space. Associated with it are issues of infrastructural developments to meet the needs of the growing urban population. Further, data on this aspect is not available or whatever is available is not sufficient. Given such limitations, an attempt is made to evaluate some aspects of urban infrastructures and basic amenities in the State which in turn would determine the quality of urban living in the State.

3.1. Literacy and Educational Institutions

The growth of literacy in Nagaland over the last 50 years (1961-2011) has been fast and spectacular. Among the 28 States and 7 Union Territories of India, Nagaland ranked 15th highest literate state in the country. The overall literacy rate of the State has seen an upward trend from 17.9% in 1961 to 27.4% in 1971, 42.6% in 1981 to 61.65% in 1991 and from 66.6% in 2001 to 79.6 in 2011. The literacy rate in rural areas stood at 75.3% while the figure for urban areas was 89.6%. Out of this, the overall male literacy rate was 82.8% and the female literacy rate was 76.1%. Among the districts, Mokokchung with 91.6% had the highest literacy rate while Mon recorded 57% making it the least literate district of Nagaland. The following is a district-wise table in order to give us a clearer picture of the status of literacy in the State (Table 3.1).

Table 3.1. State/District wise literates and literacy rate: Nagaland (2011)

Sl. No	State/ District	Literates 2011			Literacy Rate 2011		
		Total	Rural	Urban	Total	Rural	Urban
1	**Nagaland**	13,42,434	8,96,663	4,45,771	79.6	75.3	89.6
2	**Mon**	1,19,625	94,931	24,695	57.0	52.5	84.5
3	**Mokokchung**	1,59,494	1,12,611	46,883	91.6	90.8	93.6
4	**Zunheboto**	1.02.881	80,149	22,732	85.3	83.0	94.5
5	**Wokha**	1,28,208	98,221	29,987	87.7	85.5	95.8
6	**Dimapur**	2,78,037	1,26,822	1,51,215	84.8	81.9	87.4
7	**Phek**	1,05,893	87,233	18,660	78.1	76.2	88.3
8	**Tuensang**	1,17,511	88,952	28,559	73.1	68.6	92.0
9	**Longleng**	29,859	24,018	5,841	72.2	68.6	91.5
10	**Kiphire**	41,232	29,387	11,845	69.5	64.3	87.3
11	**Kohima**	1,97,489	1,01,984	95,505	85.2	81.1	90.1
12	**Peren**	62,204	52,355	9,849	77.9	76.7	85.6

Source: Census of India, 2011.

Educational institutions and its related variables are an important factor in determining the overall quality of living of the people. It is an ingredient of infrastructure that has got fundamental economic importance and without which the human advancement in the society is paralyzed. In the past, the economists thought of economic development in terms of creation of wealth. However, recently there has been a shift of thought among the economists that the problem is not the creation of wealth but rather the capacity to create wealth. And this capacity creation solely lies in the quality of the people and their brain power which can be developed through education. Education also plays a distinctive role in the development of backward society by finding out new techniques of production methods and creating skills of supervision and administration. Literacy is a person's first step in learning and knowledge building and, therefore, literacy indicators are essential for any measurement of human development.

Figure 3.1. District Wise Literates (2011)

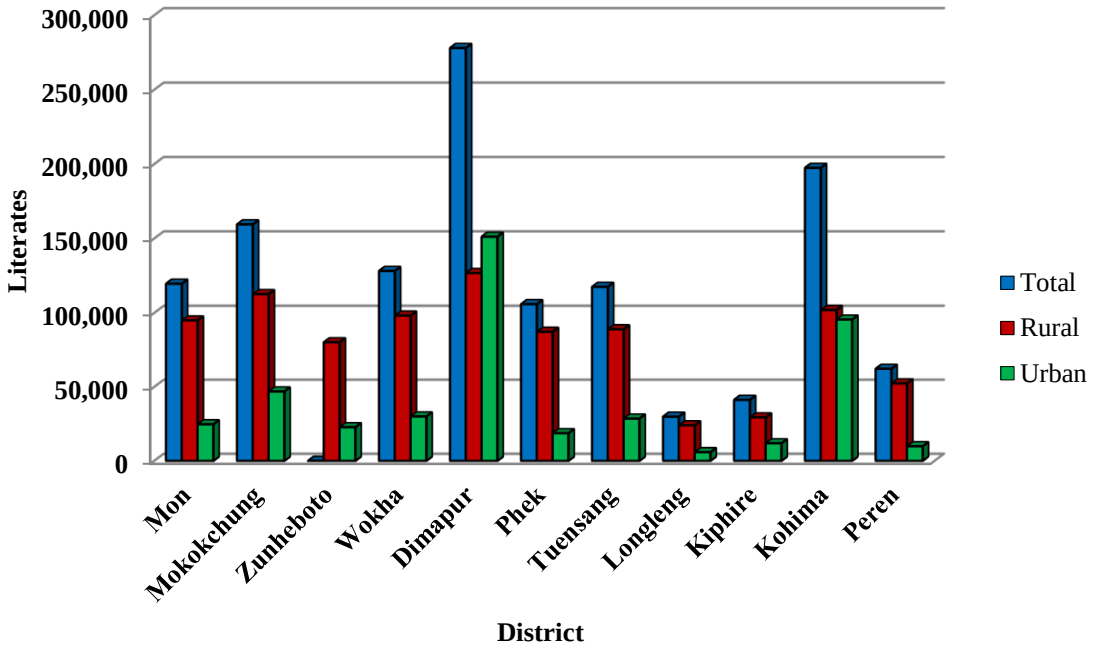
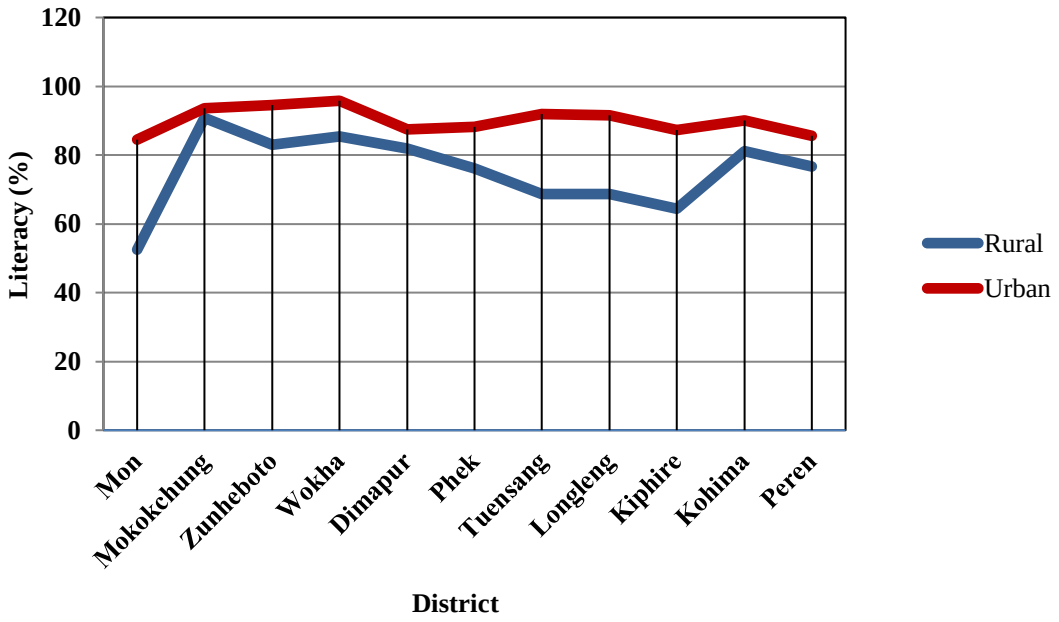


Figure 3.2. District Wise Rural-Urban Literacy Rate (2011)



Prior to the Statehood of Nagaland, the literacy rate of the total population was only 17.9%. There was no university in the State and only a handful educational institutions existed with one college for general studies, 13 high schools, 61 middle schools, 138 primary schools and one college for professional education. However, as per the latest data provided by the Department of Economics and Statistics the number of educational institutions in the State has increased manifold since the past 50 years or so. (Table 3.2)

Table 3.2. Number of Educational Institutions of School Level: Nagaland

Sl. No	Types of Institution	2007-2008			
		Central	State	Private	Total
1	**Higher Secondary**	3	16	50	69
2	**High School**	10	109	218	337
3	**Middle School**	-	287	178	465
4	**Primary School**	-	1442	220	1662
5	**Professional Institutions**				
	i) Nursing School	-	3	-	3
	ii) Teacher's Training Institute	-	1	5	6
	iii) ITI	-	3	-	3
	iv) Hindi Training Institute	-	1	5	6
	v) School of Music	-	-	1	1
	Total	13	1862	677	2552

Source: Statistical Handbook of Nagaland, 2013.

The number of educational institutions both at the school and higher levels has increased significantly over the years. Not only that, but the educational institutions have also been given due importance in terms of infrastructural facilities and the incorporation of study courses and technical support from both national and international institutions for a wider perspective in learning. However, despite the laudable achievements made in the field of education in terms of infrastructure and improvement in literacy rate, the quality of education being made available is not up to the mark. Besides that, opportunities and

facilities for vocational training and entrepreneurial skill building still lack behind in the State.

Table 3.3. Number of Educational Institutes in the Higher Level: Nagaland

Sl. No	Types of Institution	2007-08	2008-09	2010-11
1	**University**	1	1	1
2	**College of General Education**			
	a) Government	12	13	13
	b) Private	31	33	32
3	**Higher Professional Education**			
	I. Nagaland College of Teacher's Education			
	a) Government	1	1	1
	b) Private	2	2	2
	II. Agricultural College	1	1	1
	III. Theology	19	22	24
4	**Law College**	3	3	3
5	**Management**	-	-	1

Source: Statistical Handbook of Nagaland, 2013.

The above table indicates a dismal picture of the number of educational institutions in the State, especially technical and vocational institutes. There is an urgent need for at least one medical and engineering college each which would play a very significant role in furthering the quest towards revitalizing the educational system and diversifying the choice of courses for the students. At the school level, the Government of Nagaland passed an Act in 2002 through which the elementary school education in the State has been communitized. It means that the management and development of elementary school has been transferred to the community in order to let the community participate in not only ensuring universalization of education but also in yielding quality results. However, so far the various initiatives that have been undertaken are yet to yield any promising results.

Among the urban centres, Dimapur being the lone city and the commercial hub of Nagaland has the highest number of schools and colleges too. Dimapur Government College, the premier degree college of the city was established in 1966. Patkai Christian College, the only autonomous college in the entire Northeast India is also located here. National Institute of Technology Nagaland and a temporary campus of Nagaland University (Engineering and Management Studies) are also located in Dimapur.

While most of the urban centres have none or very few colleges, there are countless schools and colleges both private and government in the case of Dimapur and Kohima. Lack of proper transportation and communication in the other urban centres compared to Dimapur and Kohima can be cited as the main reason for such underdevelopment. Moreover, youths prefer pursuing their higher studies in more renowned and prestigious schools and colleges in the major centres. As such, this leaves very little scope for the educational institutions in the smaller towns which are already crippled due to the lack of proper infrastructure and adequate facilities. This has greatly affected the literacy rate and quality of education of the smaller urban centres as only those who are well to do or those who can afford to send their children to the bigger centres get proper education while the rest are forced to be content with whatever they got or just dropout in many cases. Such a scenario of imbalanced growth and development of the educational sector is something that the government needs to look into so that the future of the State in general and the quality of living of the people in particular is not compromised.

3.2. Medical and Health Facilities

The quality of life is largely dependent upon the wellness of an individual which can be assessed to a great extent by the accessibility of medical health care and its related

services. The World Health Organization (WHO) defines health as “a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity”. It is a basic human right that every individual of all societies deserve. The recognition of ‘right to health’ is the first essential step in ensuring availability and accessibility of quality health services to all sections of the community. While understanding that the public health initiatives over the years have contributed to improvement of these health indicators, disparities in health still continue to persist between communities and populations. Therefore, essential healthcare facilities should be made available and easily accessible to all sections of the community while emphasizing on strengthening efforts towards development of reliable Health Information Systems (HIMs) and the qualities and disparities that exist.

While health of the people and the delivery of optimum health services are the most important contributing factor towards Human development, the Department of Health and Family Welfare in the State is facing several challenges in attaining this goal due to insufficient resources, weak infrastructure, absence of reliable database, shortage of manpower and lack of systematic monitoring systems. Nevertheless, while understanding the importance of health in the process of economic and social development and improving the quality of life of its citizens, the Department is focusing on providing basic healthcare down to the grassroots level especially to the rural areas and vulnerable sections of the people.

At the time of Statehood in 1963 the Department inherited a rudimentary infrastructure of 27 hospitals and 33 Primary Health Centres with a total of 689 hospital beds including a handful of doctors and nurses. Over the years since then the Department has steadily

strived to restructure the health delivery mechanism to provide universal access to equitable, affordable and quality healthcare amenities responsive to peoples' need. Today the public health infrastructure has increased to 11 District Hospitals, 2 TB and Chest Disease Hospitals, 1 State Mental Health Institute, 21 Community Health Centres, 126 Primary Health Centres, 409 Sub-Centres, 3 Dispensaries and 1 Subsidiary Health Centre.

Table 3.4. District wise distribution of health units: Nagaland (2014-15)

Sl No	District	Health Units								
		District Hospital	T.B. Hospital	Mental Hospital	CHC	PHC	SHC	SC	BD	Total
1	**Kohima**	1	1	1	3	14	-	41	-	61
2	**Dimapur**	1	-	-	2	8	-	48	1	60
3	**Mokokchung**	1	1	-	3	14	-	52	2	73
4	**Tuensang**	1	-	-	2	12	1	39	-	55
5	**Zunheboto**	1	-	-	2	13	-	49	-	65
6	**Wokha**	1	-	-	2	12	-	38	-	53
7	**Phek**	1	-	-	3	23	-	45	-	72
8	**Mon**	1	-	-	2	15	-	51	-	69
9	**Peren**	1	-	-	1	8	-	17	-	27
10	**Longleng**	1	-	-	-	3	-	8	-	12
11	**Kiphire**	1	-	-	1	4	-	21	-	27
	Total	**12**	**2**	**1**	**21**	**126**	**1**	**409**	**3**	574

Source: Department of Health and Family Welfare.
Note: CHC= Community Health Centre; PHC=Primary Health Centre.
SHC= Subsidiary Health Centre; BD= Big Dispensary; SC= Sub-Centre.

As is evident from the above table Mokokchung with a total of 73 various types of health units is the highest in the State, while Longleng district with just 12 health units is ranked lowest in terms of healthcare infrastructure and facilities. Not only this, excepting the major towns of Kohima and Dimapur, Mokokchung also has a good number of private hospitals, clinics and pharmacies catering to the basic healthcare needs of the people. Furthermore, it can also be said that almost all the districts still lack behind in terms of

number of health units and the quality of healthcare services and delivery especially to the people living in the rural areas.

Overall, in the mortality and morbidity profiles, the State's performance is better in comparison to the National level. As observed in case of Infant Mortality Rate (IMR) the health indicators have been steadily improving over the years from 26 per 1000 live births in 2009 to 18 in 2014. However, institutional delivery in the State was among the lowest in the country with a figure of 12 percent as per the National Family and Health Survey (NFHS-3, 2007). Another factor that is affecting the health indicators in the State is population inflation which in turn affects the performance indicators of health workers. This has resulted in the projection of health workers as poor performers which has been a demotivating factor for the health workers.

In recent years, the State Government's initiatives in the health sector have contributed significantly to improvement of health indices. The process of communitization in 2002, the support through National Rural Health Mission (NRHM) in 2006 and other centrally sponsored schemes and programmes has given the impetus for the development of equitable and easily accessible medical and healthcare facilities in the State. Under such programmes positive initiatives such as Village Health and Nutrition Day (VHND) are implemented where basic health care services are provided at the grassroots level. Adolescent Clubs especially meant for educating the adolescents about their reproductive and sexual health are also formed in all the 11 districts of Nagaland. Besides that, Health Melas are organized in the districts with an aim to provide multispecialty services to the people and to sensitize and make the people aware of the activities done under RCH

(Reproductive child Health), NHM (National Health Mission) and its vertical programmes.

The National Urban Health Mission (NUHM) under the umbrella of National Health Mission (NHM) was launched in Nagaland on 24th February 2014. It aims at improving health services in urban towns and cities having more than 50,000 population. Under this programme four districts have been selected, namely, Kohima, Dimapur, Mokokchung and Tuensang for the implementation of activities. So far, two Urban Primary Health Centres (UPHC) have been set up, one at Seikhazou, Kohima and the other at Burma Camp in Dimapur. Besides that, various activities such as monthly Urban Health Nutrition Day (UHND), Revised National Tuberculosis Control Programme (RNTTCP), Universal Immunization Programme (UIP), National Leprosy Eradication Programme (NLEP) and a myriad of other national healthcare schemes are being implemented throughout the districts under the Department of Health and Family Welfare in the State.

Though the number of health centres in the State is much above the norms as per Indian Public Health System (IPHS) norms, it is found that many of them are not positioned strategically so as to deliver health services efficiently as expected. Most health centres are not accessible due to poor road conditions, lack of basic communication services and lack of information. Not only is that, the infrastructure of most of the health centres are in deplorable conditions and lack infrastructure which are the cited reasons for absence of medical personnel at their place of posting. There is also an acute shortage of specialist doctors and staff to man the health units as per IPHS norms which is adversely affecting the delivery of quality health services. Therefore, there is a need for upgradation of

capacities and skills of all levels of health workers to equip them with multiple skills to meet the demands and to deliver the desired services at the grassroots level.

From the foregoing, some measures that can be taken into account for reviving the present sorry state of affairs would be to formulate State health policy and integrate them with the National health programmes. There should be decentralization of planning, decision making and implementation so as to function more efficiently. Networks of primary healthcare services should be established so as to ensure efficiency in the delivery of services down to the village level and remote areas. In order to ensure access to quality health care, housing facility for health professionals should be constructed near health centres so that they may be available at all times. This would also help foster trust among the people towards the healthcare services and the medical practitioners in particular which would aid in achieving the goals and objectives of improving the quality of life of the citizens. Since traditional healthcare practices are a common phenomenon in Nagaland it would also be good if there is some sort of a mechanism to synchronize healthcare practices with modern technology for holistic healing. Lastly, in order to remove the disparities in healthcare and improve the quality of service, the State should facilitate community based participatory research and focused planning based on needs and strategic location of health care units in terms of population, distance, disease prevalence and lack of facilities.

3.3. Transportation Network and Connectivity

Transportation and connectivity is one of the primary services required for propelling economic activity in any state. Economic and physical developments of rural areas depend on good transportation and communication facilities. Trade and commercial activities

cannot grow unless there are good transportation and communication facilities. The transportation sector serves as a crucial link for connecting production centres with processing centres and markets. Therefore, good road connectivity is a basic requirement for any development to take place. Apart from the economic activities, good roads and communication facilities ensure social well being and health of the population.

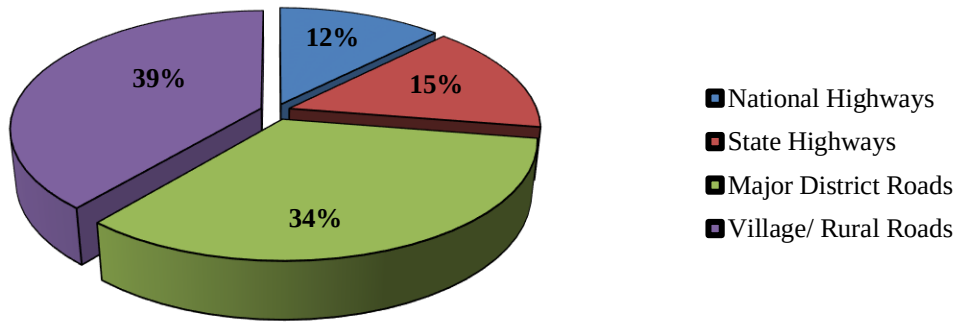
In Nagaland, roads are the only means of transportation since settlements are located on hill tops at higher elevations. Other types of transportation and communication networks such as rail, air and inland waterways are not feasible due to the hilly and undulating topography of the State. Consequently, roads are the predominant infrastructure for transportation. Considering the importance of this sector, the State has taken up development of roads in a major way under the Department of Roads and Bridges.

Table 3.5. Types of Road: Nagaland

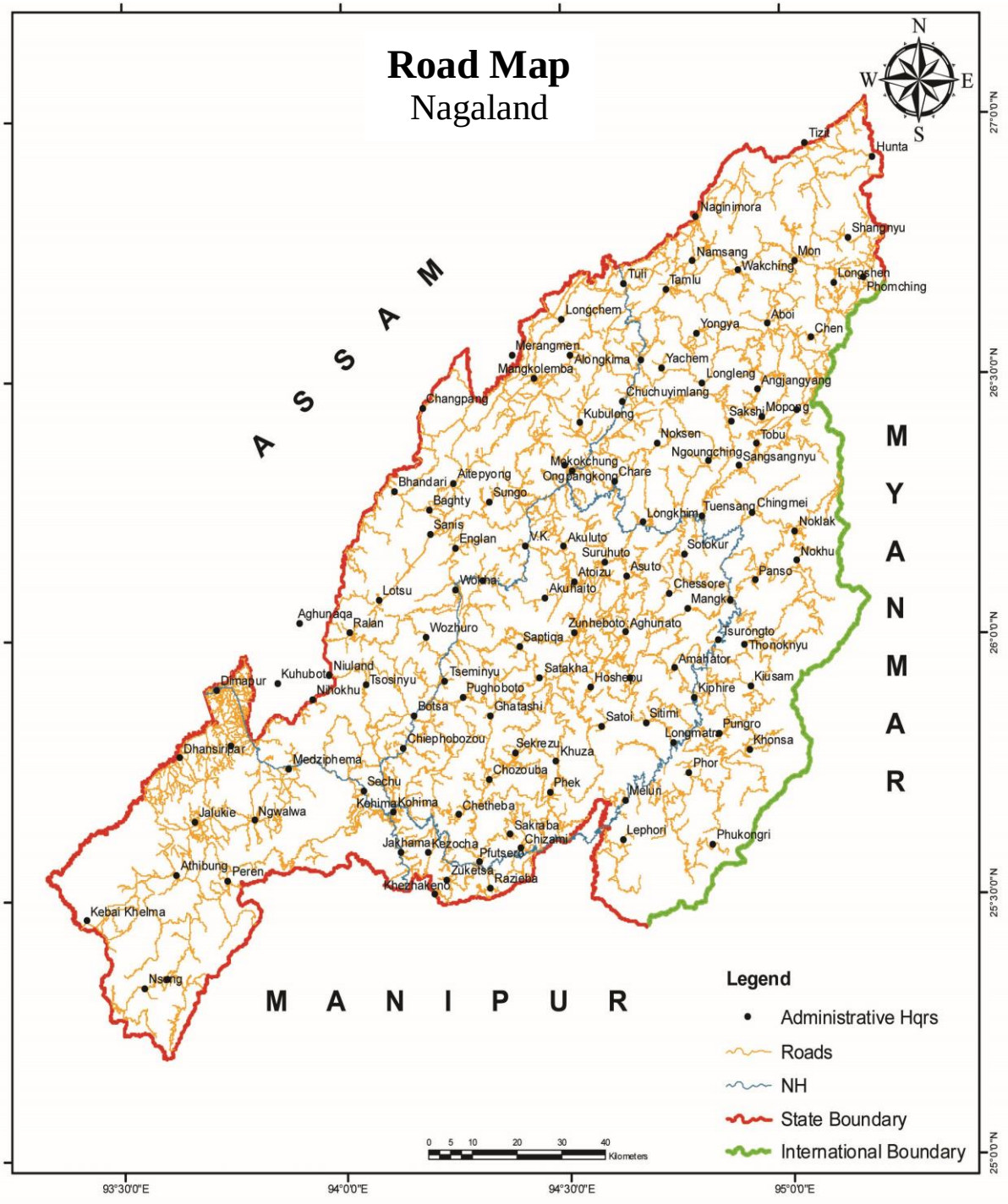
Sl.No	TYPE OF ROADS	LENGTH IN KMS	PERCENTAGE
1	**National Highways**	828.74	12.46
2	**State Highways**	1001.24	15.06
3	**Major District Roads**	2233.90	33.60
4	**Village/ Rural Roads**	2585.05	38.88

Source: Annual Administrative Report 2012-13, Public Works Department, Nagaland.

Figure 3.3. Types of Road and Length



Map 3.1



Source: Nagaland GIS and Remote Sensing Centre

As the road network expands, the most important issue is maintenance. Lack of maintenance is evident from the pathetic road conditions in the towns as well as in the villages. Most of the village roads are non-motorable especially during the monsoons. In the urban areas the roads are slightly better, but here too roadside drains are used as public dumping grounds for commercial as well as domestic wastes. This is further aggravated by the problems of population density in the urban centres. The widths of the existing network of roads within the towns are also too narrow and inadequately maintained to accommodate the increased commuters, hence, resulting in the daily experiences of traffic congestions in the towns and urban centres. Except in the nearby villages surrounding the State capital and some bigger towns, it is observed that the roads have not been metalled even once and the metalled ones have not been maintained for decades in some villages. The following table shows the total length of road connectivity in Nagaland as of 2012-13.

Table 3.6. Total Length of Road: Nagaland PWD (R & B)

Sl. No	Districts	National Highway		State Highway		Major District Road		Rural Road		Total
		Surface	US	Surface	US	Surface	US	Surface	US	
1	**Kohima**	165	11	6	44	148.8	140.6	156	145	**816.4**
2	**Mokokchung**	68.1	-	37.5	-	94.1	52.9	50	80	**382.6**
3	**Tuensang**	139	-	137	11	102.5	196	84	95	**764.5**
4	**Mon**	112	-	98	-	-	261	20	141	**632**
5	**Phek**	-	-	30	70	74	100	2	101.6	**377.6**
6	**Wokha**	155	-	-	93	33	207	25	175	**688**
7	**Zunheboto**	53	-	61.5	-	-	60	3	73	**250.5**
8	**Dimapur**	-	-	214.2	-	6	-	37.5	128.5	**440.2**
9	**Peren**	-	-	120	20	32	40.5	20	118	**350.5**
10	**Longleng**	-	-	23	-	38	117	30	50	**258**
11	**Kiphire**	125	-	24	12	44	72	3.7	168	**448.7**
	Total	817.1	11	751.2	250	572.4	1247	431.2	1275.1	**5409**

Source: Statistical Handbook of Nagaland, 2013.
Note: The above numbers are given in kms.; US= Unsurface.

It is evident from the statistics (Table 3.6) that Kohima being the State capital is the most developed in terms of road connectivity as compared to the other districts. It also has the largest connection of National Highway, Major District Road and Rural Road in the State. On the other hand, Longleng has recorded as the district with the least road connectivity in the State. The lack of infrastructure and connectivity has been one of the main deterrents of economic and human development in the district. The district headquarters, namely, Longleng which is also the only urban centre in the district is located at a distance of 232 kms. from Kohima, and 266 kms. from Dimapur, the commercial hub of Nagaland. Despite this fact, the district has only 258 kms. of road connectivity with the rest of the State for its population of 50,484 persons consisting of 5 administrative circles and 49 villages. This definitely must be the reason why Longleng is one of the most backward districts in the State. Lack of connectivity also hampers the economic prosperity of the region due to exorbitant costs of all life sustaining commodities ultimately affecting the quality of living conditions the people.

3.3.1. Transport Infrastructure

The Nagaland State Transport (NST) came into being in 1965 as a utility service department to provide efficient, adequate and economic as well as coordinated transport facility to the people of Nagaland. Initially, NST buses were the only means of passenger transport in the State. The State of Nagaland being land-locked with hilly terrain, road transport is the only means of transport both for passenger and goods services. Therefore, socio-economic development of Nagaland entirely depends on roads and road transport, wherein the role of NST Department is paramount in the absence of alternative means of transport. While the private operators in the transport sector provide services only for

optimum profit generation with much higher rate of fares, the NST still plays the important role of providing the lowest fare in passenger services to the poor rural population. At present, the department operates 112 scheduled services throughout the State covering 21,300 scheduled kms. daily.

Besides the above mentioned mode of transport, there are also few other means of transport prevalent in the State which are, however, way below normal standards. Dimapur being an important commercial hub is the sole district of Nagaland that has railway network connectivity with almost all the major cities of the country. The total length of the railway network is, however, only 13 kms. The only airport in the State is also at Dimapur which is the gateway and the only civil airport in the northeast Indian states. It helps the region by providing connectivity with a number of important destinations in the country and is administered by the Airport Authority of India. There are also helicopter services from Dimapur to all the districts of the State run by Pawan Hans Limited.

Table 3.7. State Transport Service: Nagaland

Sl. No	Items	2008-09	2009-10	2010-11	2011-12
1	Number of Employees	1050	1050	1050	1050
2	Number of Vehicles	235	251	227	249
3	Length of Routes Covered by NST (km)	11043	10775	12677	12700
4	Average Number of Passengers Handled Daily	4487	4807	4807	4887
5	Average Luggage Handled Daily (Quintals)	10.00	12.80	13.50	13.85
6	Gross Capital Investment (in Lakhs)	8977.53	9619.53	1155.45	662.25
7	Revenue Earned (in Lakhs)	910	1062	1155	1302

Source: General Manager, Nagaland State Transport.

While the transport infrastructure in the major centres are doing satisfactorily in terms of availability, the state of transport infrastructure and connectivity in towns like Longleng, Kiphire, Peren and Tuensang are miserable. The only public transport services available for connecting with the major urban centres are but very limited. Since there are no public transports within the towns people have to walk from home to work or to the markets. The situation gets worsened during the monsoons when due to the absence of footpaths and culverts people have to wade through the flooded roads from the overflow of the drains. Such a sorry state of physical infrastructure affects the overall development of the centres and this not only cause immense hardships but handicaps the normal functioning of the day to day affairs of the urban population.

The rapid urbanization in the State in recent years, marked by the corresponding population growth and spurt in economic activities has led to an ever increasing demand for urban transport, causing excessive pressure on the existing transport infrastructure especially in the bigger towns like Kohima and Dimapur. With the extension of road connectivity and infrastructure in the districts there has been a steep increase in the number of vehicles on the roads in recent years. This is indicated by the total number of vehicles that were registered in the State during 2009-10 and 2012-13 which was 2,54,483 and 3,10,799 vehicles respectively. Consequently, with increase in the vehicular traffic the existing road infrastructure particularly in the major urban centres of Kohima, Dimapur and Mokokchung has become inadequate and faces acute traffic management problems leading to air pollution, congestion and resultant loss of productivity. Therefore, with the gradient of the soil unsuitable for flyovers in the rest of the hilly districts excepting Dimapur, the solution for easing the vehicular congestion in the urban centres would be to

construct new road networks with emphasis on quality, enforce better traffic management systems and improve the public transportation system by building parking lots, sidewalks, extension of roads and increasing the number public transport systems.

3.3.2. Information Technology

The difficult rugged terrain of the State makes the development of telecommunication and Information Technology (IT) connectivity more crucial. Telecommunication services in the State is still inadequate and far from satisfactory. About 85 percent of the total telephone connections in the State is concentrated in Kohima, Dimapur and Mokokchung districts alone. Though mobile phone service providers have made significant progress in the provision of communication and network services both in urban and rural areas, in rural areas there is still a huge gap with almost 50 percent of the households having no access to telephone facilities. Hence, the development of Information Technology (IT) within the State is still in its nascent stage.

The National Informatics Centre (NIC) has set up centres in all district headquarters of the State from where internet connectivity is being provided by the Ministry of Information and Technology (MIT) through Community Information Centres (CICs) in all the 52 Rural Development Blocks of the State. Development of IT connectivity enables all sections of the society to be equipped with informative knowledge such as progress of monsoon, weather, prices, market trends, profitable outlets, new agricultural technology etc. The availability of these tools and its application not only enhances the livelihood quality of the people of the urban areas but such a knowledge bank would also enable the farmers in the rural areas to plan ahead and take better decisions for farming and other

related activities. However, though awareness about IT and internet usage is increasing, it is largely confined to Kohima, Dimapur and just a few other prominent towns of the State.

3.4. Status of Power Line

Energy in the form of electricity is versatile, essential for modern technologies and a vital component in determining the advancement or backwardness of a particular area or a region. Since the invention of electricity, people have seen this mysterious force as something modern and desirable. Such was the impact of this force that Lenin famously declared that Communism was Soviet power plus the electrification of the entire country. It has long been noted that per capita energy and electricity consumption are highly correlated with economic development and other indicators of modern lifestyle, with the presumption that the more energy that is consumed, especially in the form of electricity, the better life is.[43] It is due to this plain fact that industrialized nations surpass the third world on many desirable features of lifestyle and progressive governmental social policies.

The Department of Power, Nagaland is responsible for generation, transmission and distribution of power in the state. Power is a key input for bringing about socio-economic development in the State**.** However, the history of electricity in Nagaland is quite uninspiring plagued by consistent power shortages since its inception. The total peak hour power requirement of the State is 120 MW, out of which, about 80 percent of the requirement is purchased from neighbouring states. The energy requirement of the State during 2013-14 was around 680 MU but the availability was 640 MU. Bulk of this energy was purchased from the central sector with the lone State generating station, Likimro,

[43] Starr, C. 1972. *Energy, Power and Society,* Scientific American, Volume 225, Issue 3, Nature Publishing Group, New York.

accounting for only 104.12 MU. Though the Likimro hydro electricity project has the capacity to generate at least 150 MW of power which would solve much of the energy requirement of the State, at present it generates only 24 MW during the rainy season and 7 MW during the dry season. Furthermore, during 2012-13, the total expenditure incurred for purchase of power was Rs. 133.31 Crores while the total amount realized from consumers was only Rs.77.66 Crores.[44] As per the report of the Department of Power, the highest electricity consumption during 2012-13 was recorded from the domestic sector which was 232.53 MUs[45] while the least amount of electricity consumption was recorded by the agriculture sector which was a mere 0.04 MUs. During the same period, Dimapur being the most commercially urbanized and highly populated centre in the State recorded the highest amount of electricity consumption which was a total of 148.16 MUs while the least amount of consumption was recorded by Zunheboto district with only 8.68 MUs.

Table 3.8. District-wise number of electrified and non-electrified villages

Sl. No	District	2013			
		No. of Villages	Electrified	Non-Electrified	Percentage
1	**Kohima**	105	94	11	89.52
2	**Dimapur**	219	215	4	98.17
3	**Mokokchung**	107	102	5	95.32
4	**Wokha**	149	124	25	83.22
5	**Zunheboto**	191	178	13	93.19
6	**Phek**	117	104	13	88.88
7	**Tuensang**	138	122	16	88.40
8	**Mon**	131	107	24	81.67
9	**Peren**	102	86	16	84.31
10	**Kiphire**	90	90	0	100
11	**Longleng**	49	35	14	71.42
	Total	**1398**	**1257**	**141**	**89.91**

Source: Chief Engineer, Dept. of Power, Kohima, Nagaland.

[44] Department of Power, Kohima, Nagaland.

[45] Note: Mega Unit = 1 million units of electricity.

As the table shows, Dimapur recorded the maximum number of habitation being electrified in 2013. In terms of total electrification among the districts, however, Kiphire ranks first with absolute 100% of the villages being electrified while Longleng ranks the least electrified district with 71.42% in proportion to the number of villages each district has. Hence, only 89.91% of the total villages in Nagaland are electrified.

In the power sector, it is interesting to note that though domestic consumption of energy has increased, the industrial consumption has reduced over the years. Not only that, despite the rapid surge of population growth and advancement in technology, the number of households having electricity as the source of lighting is much less in the urban areas than the rural. This is contrary to the general assumption of urban areas as the main consumers of electricity. This is because the consumption of power depends not only on being connected to the power grid but more importantly on the regularity of power supply. As such, this only indicates the gravity of problems of power shortage in the urban areas of the State. Minimalistic implementation of the various power projects and the inability to expand and build on its current capacities can be cited as possible reasons for such anomalies in the power sector of the State.

With the increase in urbanization and economic growth accompanied by rising standards of living and full scale diffusion of the digital revolution, the demand for electricity will only grow higher and higher. It will only further deepen if effective policies are not put in place and implemented urgently to remove the detrimental factors plaguing the system. Therefore, hydroelectricity being the biggest source of electricity in Nagaland, more attention should be given to large hydro power plants which are more cost effective in generating electricity. Next to that, focus should be on to search for new and renewable

sources of energy such as solar, wind and bio energy etc. which are more reliable and plentiful in nature. Besides, some of the measures that can be adopted to ease the stress on the shortage of electricity generation in the State would be to upgrade the ageing infrastructure and improve maintenance and expand the existing hydro projects. Importance should also be given to ensure effective implementation of various projects by appointing monitoring committees so as to promote transparency and efficiency in the workings of the department. Lastly, while encouraging consumer participation in policy making process, awareness on various energy consuming machines and on energy savings should be imparted to the citizens so as to ensure a future that is secure, reliable and abundant in inexpensive electricity.

3.5. Drinking Water Facilities

Among the basic household amenities or services that affect human development are access to safe drinking water, sanitation and hygiene. Access to drinking water has implications not only for health status and human development parameters but also for livelihood opportunities depending on the opportunity cost of time. According to a Planning Commission 2003 report, between 4,00,000 and 5,00,000 children under the age of five die due to water borne diseases such as diarrhea, hepatitis and typhoid in India. According to the World Health Organization, 80 percent of diseases in India are water borne diseases, a result of poor sanitation and poor sewage disposal methods. Safe drinking water, therefore, plays a major role in the overall well being of the people. However, with rapid urbanization of the town and other nearby areas water supply continues to be a major challenge especially in the urban centres of Nagaland.

In Nagaland, Public Health Engineering Department (PHED) is the nodal agency for the supply of water and the implementation of water supply schemes and programmes. The main sources of water in Nagaland are the numerous perennial rivers, streams, springs and ground water reserves. However, the present water supply system in Nagaland is insufficient to meet the needs of the people in both rural as well as the urban sectors. This is because the flow of water varies from one season to another, leading to inadequacy in supply during certain seasons. Hence, the majority of the population, particularly the urban dwellers resort to digging up wells and using community springs. Except for the monsoon period from May to September, water is aplenty in Nagaland otherwise during the rest of the months there is hardly any rain, leading to acute water stress in the State, sometimes severe in nature. The Department has, therefore, been consistently striving to augment the existing water supply systems, regulate proper water distribution, manage water sources, implement roof-top rainwater harvesting, rejuvenate traditional wells in water scarce areas and providing material and financial assistance to Water and Sanitation Committees (WATSAN) managing rural water supply systems to further the objective of providing safe, adequate and sustainable drinking water.

As the general population of Nagaland is rural comprising 71.14% of the total population, it is important to know the state of water supply in the rural areas also. The various schemes for providing water supply to rural villages/ habitations are taken up under the National Rural Drinking Water Programme (NRDWP), Ministry of Drinking Water & Sanitation, Government of India, funded jointly by the Central (90%) and State (10%) Government. Its main objectives are to provide safe drinking water to all habitations/

households/population in rural India, including government schools and Anganwadis, public buildings etc.

Table 3.9. Status of rural water supply: Nagaland (2014)

Sl. No	District	No. of Village/ Habitation	Drinking Water Supply Coverage Status		
			Quality Affected	Partially Covered	Fully Covered
1	**Kohima**	115	2	53	60
2	**Dimapur**	252	29	95	128
3	**Peren**	114	0	91	23
4	**Phek**	124	0	51	73
5	**Kiphire**	106	0	92	14
6	**Mokokchung**	125	1	76	48
7	**Mon**	141	3	101	37
8	**Longleng**	52	0	39	13
9	**Tuensang**	137	0	97	40
10	**Wokha**	153	3	115	35
11	**Zunheboto**	211	0	179	32
	Total	**1530**	**38**	**989**	**503**

Source: Public Health Engineering Department, 2014.

In a recent new venture to identify water resources through ground water exploration, the Government of India, under Rajiv Gandhi National Drinking Water Mission (RGNDWM) Phase- IV project, aims to provide drinking water by means of identifying the ground water sources through scientific means especially for the non-covered and partially covered habitations, and make them sustainable by enhancing recharge conditions of the aquifer which is the source of ground water. Accordingly, Nagaland Ground Water Prospect maps (also called Hydro Geo-Morphology or HGM Maps) prepared by the Nagaland Science and Technology Council under the supervision of National Remote Sensing Centre (NRSC), Hyderabad under the initiative of the Ministry of Drinking

Water & Sanitation, Government of India, was officially handed over to the PHED on 30th January 2015.

Under the National Rural Drinking Water Programme (NRDWP) a total of 84 habitations in Tuensang and Mon districts were provided with water supply facility through water transmission pipelines and service reservoirs during 2014-15. In order to tackle excess iron contamination of water, prevailing in the low lying areas of Dimapur, Mokokchung, Mon & Wokha districts, 36 habitations were targeted during 2014-15 under NRDWP, out of which 26 have been completed as on 31st January 2015. In the urban areas too, the water supply schemes taken up by the Department are funded by various Central Government Ministries such as Urban Development and DoNER under 90:10 (Central and State) funding pattern. At present, a project to supply water to the State capital, Kohima is underway which is being taken up under 90:10 funding under the Ministry of Urban Development, Govt. of India. The project involves pumping of water from Zarü stream to a reservoir at Kigwema Village through two stages of pumping. From this reservoir, water will be conveyed to the State capital by gravity. The design capacity of the project is 3.80 million litres daily which is scheduled for completion by 2016. Besides this, various State funded schemes are underway for improvement and modernization of water supply distribution system in the districts so as to generate more revenue for the State by way of improving equitable water distribution.

The provision of safe drinking water and sanitation facilities is a basic necessity of life and a crucial input in achieving the goal of 'health for all'.[46] Therefore, in the light of increasing demand for water it is important to look for holistic and people centred

[46] *District Human Development Report, Phek, Nagaland.,* 2013, Department of Planning and Coordination, Government of Nagaland.. p. 84

methods of water management. Since it is too fundamental and serious an issue to be left at one institution alone, it needs the combined initiative and action of all. Over the past few years the State has witnessed an improvement in water supply with increase in coverage of areas and with a provision of large volume of financial resources. It has also laid greater emphasis on water quality monitoring and surveillance with specific allocation being made for these activities under central grants. However, low level of awareness, surveillance, monitoring and testing; non adaption of mitigation measures, non availability of alternate water sources etc. continue to remain roadblocks for development. As such, water quality monitoring and surveillance at the grassroots level by the community to identify problems and to take corrective measures would go a long way in achieving supply of quality drinking water to the local populace.

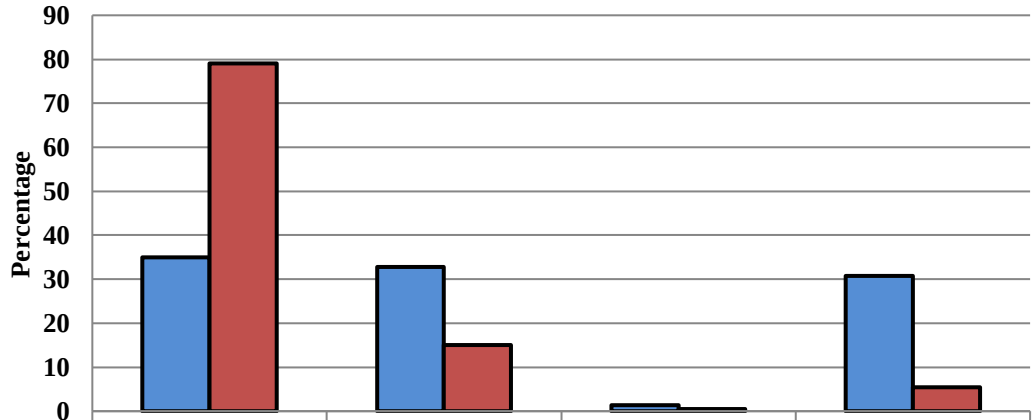
3.6. Sanitation and Solid Waste Management

Sanitation is another area of concern in the urban areas which is a basic requirement for ensuring better quality of life. It not only has a strong connection with human health but also dignity and development. Sanitation of an area is dependent upon a number of factors such as an effective sanitary disposal system of wastes, both solid and non-solid wastes proportionate to the population, proper management and timely maintenance. In view of the rapid urbanization and growing urban population in the State, the existing infrastructure is under strain to meet the growing needs of disposal systems for management of wastes.

As of now, none of the Urban Centres of Nagaland either has a proper sewerage system nor are there a systematic collection and a scientific system of addressing solid waste. As far as sanitation is concerned, there exists a combination of household septic tanks and

open defecation that persists and even in the case of septic tanks or pit latrines, soak pits are non-existent. Most towns do not have underground piped or sewerage system and even if they do exist, there is no proper cement (RCC) coverage for most drainage systems. Further, none of the towns in Nagaland has a functional sewerage treatment system. Therefore, the most general mode of disposal of human waste in the urban areas is the septic tank while the untreated waste water is allowed to flow into natural water systems such as river, rivulets, streams or springs and the waste water from kitchen is allowed into rain water storms, which in turn flows into the natural water system. While manual scavenging is not practiced in Nagaland, open defecation is not uncommon in rural areas. According to the Census of India 2011, about 77% of the households have some latrine facility within their premises while most of the rural areas lack any such facility. The following Figure 3.4 and Table 3.10 highlights more clearly on the status of availability and the type of latrine facility in Nagaland.

Figure 3.4. Type of Latrine Facility (2011)



	Water Closet	Pit Latrine	Other Latrine	No Latrine
Rural	35	32.8	1.4	30.8
Urban	79.1	15	0.5	5.4

Table 3.10. Availability and type of latrine facility: 2001-2011

State	Total Households		Percentage of Households having							
			Water Closet		Pit Latrine		Other Latrine		No Latrine	
Nagaland	**2001**	**2011**	**2001**	**2011**	**2001**	**2011**	**2001**	**2011**	**2001**	**2011**
Rural	265334	284911	5.9	35.0	47.3	32.8	11.5	1.4	35.4	30.8
Urban	66716	115054	19.9	79.1	40.5	15.0	33.8	0.5	5.9	5.4
Total	**332050**	**399965**	**8.7**	**47.7**	**45.9**	**27.7**	**15.9**	**1.1**	**29.4**	**23.5**

Source: Census of India, 2011.

Another emerging problem in the urban areas of the State is the disposal of garbage and its management where about 90% of the wastes are generated from residential, commercial and institutional sources. It is important to realize that clean and healthy environment is an outcome of proper disposal and management of waste. Unfortunately, in all the towns of Nagaland the drains that run through the town are completely clogged with plastic bags and all sorts of garbage which gets flooded during the monsoons making the roadside drains non-existent and overflowing with garbage. With no proper waste segregation system or house to house collection of waste prevalent in the State, the wastes from the towns are being dumped on empty sites along the highway corridors. According to the statistics provided by the Nagaland State Climate Action Plan, close to 80% of the drains in Nagaland towns on an average are open unlined drains. Therefore, though some of the towns of Nagaland do have drains, they are in bad shape with solid waste choking the drains and raw sewage flowing through it.

Waste management in the cities and towns has become a major problem defiling the whole surroundings. The departments relating to health, environment, agriculture, non-conventional energy, as well as urban development are gearing up to tackle the menace. The problem of urban waste management is notable not only for the large quantities

involved but also its spatial spread and the enormity and variety of problems faced by them in setting up and managing systems for collection, transportation, and disposal of waste. While transportation arrangements are generally inadequate due to the unavailability of the right kind of vehicles, and low productivity of the personnel, the major problem is that of indiscriminate disposal in open spaces, road margins, tank beds, etc. There have been studies of the public health impacts and pollution of surface and ground waters resulting from the liquid and solid waste disposal practices of the small and medium towns. However, Sanitary landfills designed and constructed so as to prevent contamination of ground water, creation of stench, and other forms of environmental hazards, are largely absent.

With a total urban population of 5,70,966 in Nagaland and with an average generation of 0.39 kg. per capita waste generation per day, the total waste generation in urban centres in Nagaland is approximately in the region of 223 tonnes every day or 81,395 tonnes every year.[47] When such wastes are dumped on open landfills and drains the concern of major health hazard arises and from a climate point of view, increase in temperatures lead to a faster breeding cycle of mosquitoes and the open landfills help to further increase the intensity of vector borne diseases.

The key concerns for the sector include lack of proper sanitation and sewerage system which is compounded by a lack of disposal and treatment of raw sewage in most towns of Nagaland. The open and unregulated landfills and rampant dumping of waste in open spaces often cause damage to road and landslides due to water clogging. And the lack of waste segregation system and lack of putting in place a recycle mechanism for recyclable

[47] Draft; Sector Paper: Urban Development and Planning, Nagaland State Climate Action Plan, 2012.

waste further raises the concern of environmental as well as human health. Hence, in order to strengthen the sanitation and solid waste management system in Nagaland awareness generation is the first step which can help in the capacity building of institutions and reaching out to uncovered areas. Recycling of plastic wastes should be promoted and the house to house waste collection with source segregation should be initiated.

The infrastructural picture of Nagaland as has been discussed is quite bleak and unstable. Besides the hindrance of rugged and undulating topography and many others, one of the major problems of urban infrastructural development in Nagaland is particularly related to land control and tenure. Since traditional ownership of land extends to the urban areas, the State has no absolute control over land even within the urban municipal areas. It is therefore, crucial to have a re-look at the present arrangement and take necessary policy decisions regarding land development in the urban areas.

In the educational sector, considering that better education facilities in the towns is one of the factors that attracts rural families to migrate, importance should be given to check the performance to improve the rural schools. The functioning of communitized primary schools and the functioning of the Village Education Committees should be evaluated to ascertain the loopholes and to suggest remedial measures. Possibility of upgrading the Middle Schools to High Schools and Higher Secondary Schools should be explored and stringent measures put in place to regulate the quality of education. This will not only boost the rural economy by creating the market for various institution related enterprises but consequently, the pressures of rural migration urban congestion would also be reduced.

With regard to the status of road and transport infrastructure, the poor status of the roads of the district as well as the villages adversely affects and limits the mobility of people and essential commodities especially during the monsoon seasons. Except Dimapur, which has rail and air connectivity with the rest of the country, all other districts are connected only through hill roads. Any economic activity to have a tangible impact requires networking with market forces. Hence, road and transport connectivity is a major step towards meeting targets. As such, there is a need to incorporate urban transportation as an important parameter at the urban planning stage rather than being a consequential requirement. The use of public transport should be encouraged so that traffic congestions as well as pollution can be checked and reduced. Well integrated and quality focused multi-modal public transport systems should be established in order to provide seamless travel across modes. Establishing institutional mechanisms for enhanced coordination in the planning and management of transport systems is the need of the hour.

Though the process of rural electrification bears impressive figures such as 89.91% of total villages electrified and 100% electrification in Kiphire district, yet the actual status of power availability in the villages and homes is different. Traveling in some of the smaller urban centres for a continuous period of more than 2-3 days was found problematic on account of the erratic power supply. It is quite commonplace to find that technical problems and breakdown are not attended to on time. Therefore, provision of the requisite infrastructure and maintenance of power lines and consistent supply of electricity should be provided so that people will not only serve the domestic purpose but also the small scale household industries in the rural areas will work.

Water supply and availability of safe drinking water is another major concern in all the towns. The gravity of water scarcity is indicated by the sight of women and children collecting water from roadside water ponds, nullahs and potholes which is used for washing purposes and sometimes even for cooking. The private cable water suppliers flourishing in Kohima need to be better organized and should take measures to supply safe drinking water. And most importantly documenting water resources all across Nagaland is crucial to solve the chronic water crisis in the State. For this, training of departmental personnel and communities to understand and document geo-hydrology of their respective localities in urban centres and the mapping of all springs, lakes and ponds is required. This is particularly important in the urban context, since bulk of the supply comes from springs and natural sources of water and most of them are privately owned.

In terms of amenities and the quality of living, there is disparity and variations among the different urban centres of Nagaland. For instance, Mokokchung has literacy rate of 91.6% while the literacy rate of Mon is just 57%. Such a difference can be due to many reasons both physical and social. The root cause of this disparity can be attributed to the historical fact in which education was introduced in Nagaland with the advent of Christianity simultaneously around early 1870s. And Mokokchung being the first district to accept Christianity is the reason why the education sector remarkably developed and expanded over the years. It was also the educated Aos who were the messengers of Christianity and education to most of the eastern regions of the State like Mon and Tuensang in the 1940s and 50s. A gap of around 60-70 years between the introduction of education in Mokokchung and Mon can be considered a primary reason for the huge educational disparity between Mokokchung and Mon and other districts.

Besides education, other sectors of urban development such as road transport and connectivity, health facilities, electricity, drinking water supply and other basic urban amenities are very poor in some urban centres. While the process of development and urban growth is noteworthy in most of the major urban centres like Dimapur, Kohima and Mokokchung, towns such as Mon, Tuensang, Kiphire, Longleng and Peren are least urbanized in terms of the above mentioned amenities and urban infrastructure. One can merely assume the actual reason for such a disparity in economic and urban development among the urban centres. However, in no way can the geographical factor can be brushed aside. Remoteness of the far flung towns such as Mon, Longleng, Kiphire, Tuensang Phek, etc. from the major urban centres is a major reason for the inability to catch up with progress and development of the rest of Nagaland. On top of that, the only roads that connect the distantly situated urban centres from the major urban centres are very poor due to lack of maintenance and recurrent landslides. Thus, especially during the rainy season many of these centres are cut-off completely for months due to landslides which ultimately hamper the economic prosperity of the region and the general quality of living conditions of the people.

Another important reason for the disparity of development in Nagaland is due to nepotism at various levels. As mentioned earlier, education was first spread among the Aos, Angamis, Lothas and Semas who inhabit the Western, Central and Southern part of Nagaland. As such, majority of the gazetted government posts and seats in politics were occupied by these so called forward tribes. Lopsided developmental activities took place giving importance to their areas and neglecting the so called backward tribes in the eastern part of the State. Hence, after years and years of exploitation of the people by successive

governments, the underdeveloped eastern Nagaland is still nursing the wounds inflicted by corruption and nepotism. Moreover, advancement in education leads to the overall development and mental growth of an individual which directs him/her towards achieving a better quality and higher standard of living. However, the eastern people having received education at a much later stage than the others, still lack behind in conforming to the modern system of advancement and development and in catching up with the rest of Nagaland. Thus, geographical remoteness, lack of education, corruption and the lackadaisical attitude on the part of the State government in undertaking developmental activities can be the major reasons for the current scenario of disparity in urban growth and urban development in Nagaland.

In today's world, the interaction between society and the environment is increasingly exposed to the process of urbanization which is assuming a global scale. The growth and development of cities and the spread of urban way of life are now producing a highly diverse and growing impact on the environment. All human activities have some impact on the environment in which they occur. Most of the impacts are of a short-term duration, and leave no lasting imprint. But some human activities are major determinants of environmental changes, both directly and indirectly. It is the indirect consequences, often unforeseen, that are frequently the most burdensome and difficult to correct, as with the formation of the Dust Bowl in the plains of the United States during the 1930s.[48]

The life support systems on this planet consist of air, water, land, flora and fauna. These are mutually interconnected and also interdependent. The activity of 'Man', constitute one single factor, disrupting the balance of the constituents of life support system. In his greed to urbanize and industrialize, man has not only destroyed plant cover built up of nature but also polluted the air, water and land. Development has become synonymous with deforestation and desertification and progress with pollution. Man's activities have altogether altered the composition and ecological system of the planet. As forests are cut down, land is degraded, soil is eroded and water becomes polluted and scarce. Water supply and sanitation, waste disposal, noise pollution, over-exploitation of land and soil resources, and urban air quality are the main environmental problems associated with urbanization.

[48] The Dust Bowl was the name given to the Great Plains region devastated by drought in 1930s depression-ridden America. The decade was full of extremes: blizzards, tornadoes, floods, droughts, and dirt storms. This occured mainly due to the aggressive exploitation of the land, driven by agricultural ethos of expansion by the ranchers and farmers of the 19th and early 20th century.

One of the major challenges for humanity in this century is the ever expanding human population and its need for habitation, services, and resources in an urban setting as more and more people conglomerate in larger and larger cities worldwide. This problem is highlighted by the proliferation of urban centers around the world. It is estimated that by the year 2025 more than two-thirds of the human population will live in cities, with the highest growth rates in Latin America and sub-Saharan Africa.[49] The process of urbanization is closely linked to the industrialization process. Both processes lead to major spatial changes in materials and energy flow, and changes in the exposure of the population and nature to environmental pollution. Urban activities produce great volumes of waste products, often at very high densities, and these may pollute different components of the environment, with possible consequences for human health. They even modify the climate of the areas in which they are sited.

It is indicated that 5 million chemical substances have been identified for the benefit of human society but they brought a new danger through the generation of hazardous waste in the process of manufacturing in urban centers. Until now many hazardous wastes were disposed off without proper evaluation of the environmental consequences such as fire, explosions, air and land pollution, contamination of food and drinking water, damage to people's health, harm to plants, animals, birds and fishes.[50] One of the worst incidents that occurred was that of the "Minamata Disease" in Japan and Indonesia (1950s) where the discharge of methyl-mercury to the sea caused the contamination of fish in Jakarta Bay, which caused high fever, mental disorders to 2000 people out of which 400 died.

[49] Fuchs, R.J. *et al* (eds) (1994), *Megacity Growth and the Future*, United Nations University Press, Tokyo.
[50] Environment Liasion Centre (1983) *The State of Environment*, World Environment Day Report, 5th June, Nairobi.

Similarly, in the U.S.A an area of about 65 square kilometers was contaminated with wastes from manufacturing of defoliants, pesticides and chemical warfare agents, causing crops to get dry and livestock drinking from the well to perish. Now, the same condition is prevailing in other developing countries where water bodies are so pulled by urban based factory waste and chemicals that they become sources of mass epidemic diseases.[51]

Last but not the least, sound pollution is also adding a new dimension to the environmental problems in the urban areas of which the most common sources are the roadways vehicles, railway engines and trains generating a high decibel of sound. The use of amplifiers for private and public purposes is growing alarmingly in all the towns and cities. Along with it, the sound generated from commercial activities and industrial plants add to the already high noise levels.

Most of us are very used to the sounds we hear in everyday life. Loud music, the television, people talking on their phone, the traffic and even pets barking in the middle of the night. All of these have become a part of the urban culture and rarely disturb us. However, when the sound of the television keeps you from sleeping all night or the traffic starts to give you a headache, it stops becoming just noise and start turning into noise pollution.

Apart from the various harmful effects that noise pollution has on human health, it also causes adverse effects on animals and even plants. Some of such examples include the implication of aircraft noise and sonic booms as a cause of lowered reproduction in a variety of animals, the deaths of possibly thousands of dolphins and whales due to military sonar, birds that rely on hearing to help locate prey are seriously disadvantaged by

[51] Mandal, R.B. (2000), *Urban Geography: A Textbook*, Concept Publishing Company, New Delhi. p.442

industrial noise and noise also has been shown to have a detrimental effect on the reproduction of some plants through interfering with pollinator or seed spreading activity.[52] Thus, noise pollution is also an important contributor to the degradation of environment in the urban areas affecting both the social and physical components of the environment.

4.1. Indian Scenario

Urbanization has become a powerful force in developing countries and as a development it has taken place quickly and comparatively recently in Asia, Africa and Latin America. Concomitantly, environmental related problems are propping out their heads putting humankind to hazards of various kinds. In fact, environmental issues in urban areas are becoming matters of growing concern for maintaining the environmental sanctity of our cities and towns as ecologically decent living places. Till the early decades of the 20th century, there was very little concern for the growing urban environmental problems as a result of land, air, water and sound pollution. However, the spontaneous influence of urban expansion and industrialization coupled with the upsurge of urban inhabitants has significantly impaired the various components of the natural environment with extremely disastrous effects sending an alarm among the people and garnering enough political attention. A World Bank study concluded that India's annual environmental damages conservatively amounted to $80 billion a year, nearly 6% of gross domestic product at 2013 values. The diagnostic report – the first to assess the economic impact of environmental damage for the whole of India and its 1.3 billion inhabitants – shows the biggest problems to be air pollution, the degradation of crop lands, pastures and forests and poor water supply and sanitation.

[52] Michael Bloch, Green Living Tips.com (http://www.greenlivingtips.com/articles/noise-pollution.html)

In recent years, India has liberalized its policies for agricultural, industrial, and infrastructure development to stimulate economic growth and social development. However, accelerated economic growth without proper infrastructure coupled with population growth particularly in urban areas has contributed enormously to the degeneration of environment and the degradation of the quality of life. Consequently, the most distinctive emerging urban environmental issues are deforestation, land degradation, loss of biodiversity, inefficient use of coastal resources and other critical ecosystems, water pollution and freshwater scarcity, air pollution, and poor management of toxic and hazardous substances. Furthermore, doubling and tripling of urban population practically in all major cities and towns and the consequent strain on the existing system has manifested in an environmental chaos. The following facts will illustrate the problem more clearly:

The three big metros in India- Delhi, Kolkata and Mumbai- are among the most polluted cities in the world. Other surveys show that India has the world's worst air pollution, and has 13 of the 20 most polluted cities among big economies. Six of India's largest cities, namely, Mumbai, Kolkata, Delhi, Ahmedabad, Kanpur and Nagpur experience very high levels of air pollution with annual average total suspended particulates that are atleast three times above the World Health Organization (WHO) standards. Reductions in the levels of suspended particulates to conform to the WHO standards would save an estimated 37,000 lives annually.[53] In India, the burning of biomass, wood and coal for domestic cooking/heating in urban slums is another contributory factor in air pollution

[53] Maiti, S. and Agrawal, P.K., 2005, *Environmental Degradation in the Context of Growing Urbanization: A Focus on the Metropolitan Cities of India*, International Institute for Population Sciences, Mumbai, India. p.278-286.

which is also another reason for greater prevalence of dense smog in winter. Next to burning of fuel, the combustion of petroleum and diesel by the automobiles and vehicles is the single largest contributor to the air pollution. Though some devices have been invented for checking the automobile exhaustion pollution, they are far from adequate. According to a recent report given by researchers from Concordia University, Canada, India contributes 7% to the total global warming which is quite serious if reduction measures are not given high priority in the coming years.[54]

In India, a severe depletion of water resources through increased consumption demand and pollution in and around major mega-cities has led to immense generation of wastes. Much of this has serious effects upon the environment not only within cities but across urban regions and ultimately the air we breathe and the soil and water we depend upon. Untreated sewage is the primary source of water pollution in the urban areas. Government agencies estimate that as much as 80% of India's surface water is contaminated and most of it comes from sewage. The Central Pollution Control Board in 2009 calculated that major cities and towns together generate more than 38 billion liters of sewage everyday, of which only 30% is collected. Less than 20% of this is treated because that's all the treatment capacity available. The rest is just emptied into rivers, lakes, seas and ponds. These grave figures were revealed at a meeting of experts on sewage and water issues organized by the Centre for Science and Environment (CSE) as part of the 'Anil Agarwal Dialogues' series in March 2013. Speaking at the conference, Vice-President Hamid Ansari said, "Indian cities produce nearly 40,000 million liters of sewage per day, enough to irrigate 9 million hectares and barely 20% of this is treated." He said the untreated

[54] UN-HABITAT, *Climate Change: Who's the biggest emitter of them all?*, http://www.urbangateway.org/content/news/climate-change-who%E2%80%99s-biggest-emitter-them-all

waste water was seeping into water sources, "thereby creating a ticking health bomb amongst our people".[55]

Solid waste (garbage) disposal remains another great problem generally in the metropolitan cities of India. As per estimates, urban India generates 188,500 tonnes per day (68.8 million tonnes per year) of municipal solid waste (MSW) at a per capita waste generation rate of 500 grams/person/day. The total waste generation figure is achieved by extrapolating the total tonnage of wastes documented for 366 cities (70% of India's urban population). The study also found that open burning of solid wastes and landfill fires emit nearly 22,000 tons per year of pollutants into the air in the city of Mumbai alone. These pollutants include Carbon Monoxide (CO), Hydrocarbons (HC), Particulate Matter (PM), Nitrogen Oxides (NOx) and Sulfur Dioxide (SO2). Since open burning happens at ground level, the resultant emissions enter the lower level breathing zone of the atmosphere, increasing direct exposure to humans. In the next decade, urban India will generate a total of 920 million tons of municipal solid waste that needs to be properly managed in order to avoid further deterioration of public health, air, water and land resources, and the quality of life in Indian cities.[56]

Sound pollution is another nuisance rampant in urban areas. Indian cities are noisy places where religious ceremonies, marriages and the blaring mikes add to the already high noise levels. Though the optimum accepted limit of sound intensity should be in between 52 to 62 decibels (dB), it is higher in most cases. In some areas of Calcutta the sound intensity is higher than 90 dB during the peak hours of the day. Delhi has also been experiencing a

[55] Annepu , R. K. (2012), *Sustainable Solid Waste Management in India*, Earth Engineering Center (EEC) and Waste-to Energy Research and Technology Council (WTERT), Columbia University, New York. p.24
[56] Op.cit. p.25-26

high level of sound pollution from a peak of about 83 dB to about 77 dB in the night when the noise mitigates. In spite of the laws restricting the use of loudspeakers and mikes within specific hours of the city, they are played continuously uninterrupted for 10-12 hours causing immense inconvenience to the local residents. The civic authorities, surprisingly enough, do not check this growing pollution by strict measures.[57] Hence, noise pollution poses another serious threat to the urban environment which needs to be checked and put under strict and effective regulations. Possibly no developed or developing country should allow this menace growing in such a dimension but it is a pity of the Indian condition.

4.2. Northeast Scenario

The level of urbanization and development in the Northeast region is quite low compared to the rest of India. Although it has vast natural resources and rich source of flora and fauna, backward economic and infrastructural facilities and other factors such as location, socio-economic and political barriers considerably limit the development process of the region. Studies have not only confirmed that the size of urban population has been expanding rapidly, and new towns are being developed but also that the urban population has been shifting from smaller to bigger towns. This has resulted in the swelling up of population in the major urban centres of the region. Guwahati city in Assam, for example, is one of the fastest growing cities in India and the largest in the region with a population of 9,62,334 persons (Census 2011). Some of the other major towns and cities of the region are Silchar, Jorhat, Tinsukia, Dibrugarh, Tezpur in Assam, Dimapur and Kohima in Nagaland, Aizawl in Mizoram, Itanagar in Arunachal Pradesh, Agartala and Dharmanagar

[57] Nag, Dr. P. *et al* (eds.) (1997), *Geography and Environment: Volume One (National Issues),* Concept Publishing Company, New Delhi. p.273-274

in Tripura, Shillong and Tura in Meghalaya, Imphal, Thoubal and Ukhrul in Manipur, and Gangtok and Namchi in Sikkim.

According to Census 2011, the total population of the Northeast stands at 4,55,87,982 persons. Such high growth of population has been putting tremendous pressure on the civic services like water supply, drainage, sanitation, power supply, health services housing, transport and communication etc. What is more damaging is the environmental degradation that has been resulting from such rapid growth of population in cities. Though the majority of the towns and cities of the Northeastern India have so far remained mere centres of trade and administration, the unplanned and haphazard development of the urban centres have resulted in the degradation of the urban environment and the quality of living of the people.

Guwahati is a case in point. With an area of 216 sq.km and population of 9,57,352, it is the fifth fastest growing city of India in terms of urbanization. Over the years, the city has witnessed tremendous changes like rapid increase in population, depletion of forest cover, hill slope destabilization due to construction of roads, buildings and encroachment of wetlands and low lying areas. In addition to that, required infrastructure and city amenities for the city dwellers have not been developed in order to accommodate the ever increasing population. As a result, a host of problems such as traffic congestion, water logging, dusty atmosphere, water borne and airborne diseases etc. have plagued the city. The rapid increase of population aided by continuous migration from the rural as well as other towns

of the region has surpassed the manageable capacity of the municipalities which has resulted in the manifold increase of slums in the last few years.[58]

Though generalization over just one city in the Northeast which is the largest and the most developed city in terms of urbanization is not good, we can presume that the state of urban scene in the region is quite bleak and dismal. In addition, throughout India as well as in this city the planners have adopted the western model of development which may not be suitable for our country and this model has created fresh problems rather than solving the existing ones. In Guwahati, a good number of high-rise buildings have come up during the last few decades with all sorts of modern internal facilities but without any space between two adjoining buildings which is dangerous from the security point of view, insufficient fire-fighting equipments and parking space nor proper planning for the drainage of used water which has been causing water-logging in a number of areas. All the cities and towns have a distinctive demographic structure and environmental pattern. Therefore, the western model of urban development or even an Indian model may not be quite relevant for formulating plans of development of urban centres in Northeast India.

4.3. Nagaland Scenario

Urban settlements came into existence in the last few decades to accommodate the increased industrial and urban populations. The emergence of urban centres has direct consequences of succession from forest and agricultural lands to commercial and industrial establishments. Shelter has a dominant impact on the built environment, which acts as an intermediary linkage between human and social organization. It may be a place of refuge, privacy, safeguards against climatic hazards besides reflecting the

[58] Ganguly, J.B., 1995, *Urbanization and Development in North-East India: Trends and Policy Implications,* Deep and Deep Publications, New Delhi. p.193-198

technological, economic and social conditions. On the other hand, the origin of urban settlements starts depleting natural resources while its metabolic processes pollute the land, air and water at the same time. Such a grouping of houses on a particular location certainly pollute the environment by noise, congestion of houses, movements of people, atmospheric and water pollution besides the degradation of social norms. Broadly speaking, urbanization and industrialization is a measure of a nation. But at the same time the big factories and mills send out fuel smoke and poisonous gases, which pollutes the environment and disfigures the beautiful face of nature.

Population and environment are closely related in a complex and dynamic manner and this relationship is mediated by number of socioeconomic, cultural, political, and developmental aspects whose role varies considerably from one context to other.[59] Thus, the rapid growth of human population is often identified as one of the main factors behind environmental degradation. The urban population of Nagaland in 2001 constituted 17.74% of the total population of the state, which rose to 28.86% as per the 2011 Census. A number of new towns have been added during the period. There has also been a steady movement of people from rural to urban areas in the past decade which might be the reason for the negative growth rate of -14.06% in the rural areas of Nagaland. This only puts an immense pressure on a whole host of issues concerning urban habitats, such as pressure on land, water, sanitation and sewerage infrastructure, administration and governance amongst others.

[59] Richards, J.F. *et.al.* (eds.) (1986), *World Environmental History and Economic Development in Sustainable Development of the Biosphere*, Cambridge University Press, Cambridge, U.K.

Population pressure on arable land contributes to the land degradation. The increasing population numbers and growing affluence have already resulted in the rapid consumption of energy and resources in Nagaland. The environmental effects like ground water and surface water contamination, air pollution and global warming are of growing concern owing to increasing consumption levels. The stupendous growth of urban population during the last few decades has had a detrimental impact on the environmental health and quality of life at a fast rate in the urban areas of the State. Increasing deforestation, air pollution, water pollution, noise pollution, natural hazards, solid waste management etc. are some of the threatening indicators obstructing the smooth existence of urban residents in Nagaland. With the overwhelming increase of population, the burden of the available residential houses, cultivable land, roads, railways and industries located in urban areas have surpassed all levels in terms of harnessing the resources and creating environmental hazards.

4.3.1. Air Pollution

Air pollution is one of the serious problems faced by the people in the urban areas. It mostly is due to rapid growth of population and the industrialization which is accompanied by growing number of vehicles. Studies show that disease rate rises when the air pollution level increases. Air pollutants are also harmful for water and environment, for example, by causing acid precipitation and acidity of waters. The interrelationship between urbanization and environmental degradation shows a high degree positive correlation between state of ambient air quality and population. This is so because growing industrialization with unplanned urbanization causes an increase in

vehicular pollution, industrial emissions, automobile exhaust and the burning of fossil fuels.

Most of the ambient air-pollution in urban areas comes from the burning of fossil fuels, motor vehicles and heating. In Nagaland, given the fact that the process of urbanization is still in its infant stage and most people still hold on to the rural ways of living, the main air polluter is the domestic heating. Many people use firewood, charcoal and other solid fuels (mainly agricultural residues and coal) for cooking as well as to heat their houses. This kind of heating method releases not only carbon monoxide, but also benzene, butadiene, formaldehyde, polyaromatic hydrocarbons and many other compounds posing serious health hazards. Going by the WHO report, Naga families are exposed to serious health threats since most homes still use firewood and coal for multiple purposes. “Since many of the kitchens are without proper chimneys, we inhale lots of smoke,” points out Dr. Sao Tunyi, Epidemiologist at Directorate of Health & Family Welfare, Nagaland. He underlines that proper chimney is very important “since our Naga society stays in the kitchen more than any other rooms.” Among the urban centres of the State, only Dimapur considerably has a lower percentage of people who use fuel wood and other traditional methods for heating and cooking purposes due to its warmer climatic conditions compared to other places. Higher altitude urban centres such as Zunheboto, Phek, Tuensang and Kohima have a higher percentage of people who resort to the traditional methods of heating and cooking purposes, though such methods are gradually being replaced with modern techniques of electric heating and cooking appliances.

There are only three medium-level industries under public sector in Nagaland, namely, the Nagaland Sugar Mill at Dimapur with an installed capacity of 1,000 tonnes of cane per

day, Nagaland Pulp and Paper Mill at Tuli and Plywood Factory at Tizit. Other industries include village and cottage industries such as handloom and handicrafts, weaving, pottery etc. They do not cause any pollution in their surroundings. Therefore, the contribution of industries to the amount of air pollution in Nagaland is almost negligible as compared to the other metropolitan cities in the country. As such, with the absence of major industries in Nagaland, the transport sector contributes a major share of environmental pollution in all the major urban centres of Nagaland.

The transport sector of Nagaland has seen a substantial growth in the last decade, particularly with an increase in personal transport. The average growth rate of the vehicle population of Nagaland has been in the region of 5-7% in the last decade. In terms of district and town wise vehicle population, the districts and towns of Dimapur and Kohima have the highest vehicle population, cutting across all class of vehicles. 35% of all vehicles registered in Nagaland are in Dimapur, with Kohima having 29% of the vehicles and Mokokchung coming third at 18%. All other towns/districts put together houses the balance of 18% of the total vehicle population. Traffic congestion and snarls are common features in both the towns of Dimapur and Kohima, and recently Mokokchung too has been experiencing a heavy flow of traffic and congestion. Some of the key junctions in Dimapur where traffic congestion has been recorded are the Golaghat junction, Nagarjan road junction, Dhobinalla junction, city tower junction amongst others. This explosive growth in the number of road vehicles in the State has increased the use of fossil fuels and consequently the increased greenhouse-gas emissions. However, due to lack of adequate technology in Nagaland it is very difficult to ascertain the intensity of air pollution impact on human health and the environment.

Nonetheless, it is indisputable that air pollution level in the state is increasing, particularly in Dimapur and Kohima. According to National Ambient Air Quality Standards 2009, the annual average concentrations of Respirable Suspended Particulate Matter (RSPM) should not exceed 60 micrograms per cubic metre (µg/m3); however, Dhobinullah recorded 158 and Bank Colony 111 in 2014, surpassing the 2013 record of 116 and 89 respectively. Meanwhile, in 2014, the annual average of Suspended Particulate Matter (SPM) concentrations at Bank colony was 186 and 295 at Dhobinullah, crossing the national limit of 140 µg/m3. The (SPM) concentrations in the two locations were 156 and 254 respectively in 2013. Apart from the emissions from motor vehicles, the non black topped roads itself is a pollutant. Pedestrians walking the dusty roads inhale the dusts to the great risk of their health, especially of the lungs. Such deplorable condition impels the medical department to be more assertive scientifically so as to gauge the dimension of ill-effects. We don't have much data to back up the effects, locally."[60]

4.3.2. Water Pollution

Water is a prime requirement for every organism and an important aspect of the ecosystem. It surpasses any other single commodity in general use by the mankind. It is also true that ancient civilizations, medieval townships and other developments, and all modern developments are related directly or indirectly to water. The main concern is that by using water, humans have influenced both its quantity and quality which ultimately has become a major problem of environmental degradation throughout the world. The term "water pollution" is referred to the contamination of water from any external source that makes it harmful to life. The major sources of water pollution are domestic effluents,

[60] Nagaland Action Plan on Climate Change 2012, Draft Copy, Government of Nagaland. p.58-59

agricultural effluents, sewage disposal, industrial wastes, radioactive wastes and oil leakages, etc.

In Nagaland, there is very little documentation on the state of rivers/ water bodies as monitoring is a very recent phenomenon, taken up on a very limited basis. In terms of quality, the surface water of the state is unprotected from untreated industrial effluents and wastewater, runoff pollution from chemical fertilizers and pesticides. Local water bodies are used as a dumping ground for untreated water from urban areas. No sewage treatment facilities exist in the State. The neglect of water sources has created a potential of all water bodies becoming polluted and toxic in the near future. The lack of sanitation and sewage treatment and the increasing pollution of water bodies constitute the biggest threat to public health.

A survey on the status of Drainage Water Quality in Dimapur City was carried out by the Nagaland Pollution Control Board (NPCB) to study the water quality of the drains and its polluting sources, and the impact of the drainage system on the environment and the threats it posed to the people. The survey was conducted on the different-interconnecting drains in Dimapur city during the month of April 2014. The NPCB had been monitoring the water quality of the river Dhansiri for some years and had observed that the level of pollution has increased. Significant drains were chosen and 15 water samples were collected from the various locations with town area being the main sampling sites.

According to the NPCB publication, the survey concluded that there was a large difference between the quality of the water in the main city and the water away from the city. The main reason for water quality deterioration was primarily due to the various human activities. The illegal dumping of wastes on the drainage system clogged the water

from flowing and as a result it became stagnant and a breeding site for mosquitoes which posed threat to the health of the people living around it. Many cases have been reported by people living around it taking medical aid due to various health issues such as allergy, malaria, fever, vomiting, diarrhoea, etc. It also added that since there are no major industries in Dimapur that could cause serious contamination, the pollution is solely due to domestic and municipal wastes that are dumped into the "nullahs."[61]

Groundwater quality in Dimapur was also assessed by NPCB at 3 stations i.e., Bank Colony, Duncan Basti and New Market during August 2000 and January 2002. In Duncan Basti, electrical conductivity of groundwater showed a relatively high value of up to 895 micromillihos per centimeter (μmhos/cm) indicating higher degree of mineralization. Iron concentration in the groundwater in Bank Colony and Duncan Basti was much higher than the national recommended limits. This is the reason why tube well and ring well owners in Dimapur use sand bed filters for removing the iron. As for the other parameters, all were within the permissible standards of the NPCB.

Till now no study has been done on the quality of water of rivers, streams, springs and wells in and around Kohima, nor in any other urban centres for that matter. The water quality of the rivers and springs with sources in the uphill areas is said to be good. However, the same rivers and streams on reaching the city are converted into carriers of solid waste and sewage making the water unfit for drinking or for any other domestic purposes. The major cause for pollution of underground water in Kohima is the lack of an underground sewerage system, and an efficient solid waste collection and management system. In the absence of these, the natural streams and drains are the recipients of wastes

[61] The Morung Express, *Water quality is deteriorating, reveals survey***,** Dimapur, June 23, 2015.

leading to degraded quality of life in most of the localities within the Capital city. Therefore, even though the quality of water from various spring sources is good enough to be used for drinking purposes, the water from dug wells is not fit for drinking due to the presence of pollutants from various sources.

While the two largest urban centres of the State, namely; Dimapur and Kohima face water pollution, the other districts/towns are plagued by acute problem of water scarcity and shortage rather than pollution. During the monsoon period from May to September, water is aplenty in Nagaland as about 1,800-2,250 mm of rain falls during this period. However, the lean season spanning over October to April sees hardly any rains, and as a result the entire Nagaland faces water stress. To supplement the inadequate water supply people buy water from private water suppliers at exorbitant rates. The rates of water in some of the districts of Nagaland per 1000 litres are as follows: (rates increase according to distance and peak dry season with a difference of ₹ 200-300)

Table 4.1. Rate of private water supply in districts: Nagaland (2016)

Sl. No	Districts	Price in Rupees (₹) per 1000 litres
1	**Peren**	600
2	**Kohima**	500
3	**Kiphire**	500
4	**Mokokchung**	400
5	**Wokha**	400
6	**Phek**	350
7	**Longleng**	600
8	**Zunheboto**	300
9	**Tuensang**	-
10	**Mon**	-
11	**Dimapur**	-

Source: Based on survey.

Water resources in Nagaland in terms of resource augmentation, demand and supply side management, and water quality management is handled by the Department of Irrigation and Flood control, Department of Soil and Water Conservation, Department of Public Health Engineering and the Nagaland Pollution Control Board. However, the routine acute water crisis due the lackadaisical attitude of the government agencies in providing the basic amenities in the towns have led to people expressing more faith in the private water suppliers than in the government. Moreover, with rapid urbanization and developmental activities in the hilly areas during the last few years coupled with increase in population, the demand and need for fresh water resources in all sectors is increasing rigorously, posing a challenge to the whole administrative setup of the State. Further, water availability might decrease further exacerbating the vulnerability of the State, as a result of the change in climatic conditions.

4.3.3. Sewerage and Solid Waste Menace

Agricultural practices, industrial establishment and multifarious domestic activities of men produce huge quantities of sewerage and solid wastes. The amount of these is increasing day by day with the increase in human population and great change in the standard of living especially in the urban areas. No other pollution mode is so much explicit in urban centres than solid wastes due to their visual display throughout the town. Some kinds of solid wastes are garbage (decomposable) from food, slaughter houses, poultries etc.; rubbish like worn cloth, rubber, leather, metal scraps, glass, ceramics, solid chemical wastes etc.; large sized solid wastes such as demolition and construction rubble, non-usable automobiles, tyres and rubber tubes, all kinds of house appliances etc.; agricultural wastes comprising crop residues, rotten grains, wastes from oil mills, grinding and

crushing mills etc.; dead animal wastes, sewage wastes, industrial solid wastes, and mining wastes.[62]

In Nagaland, increasing per-capita income along with the concentration of population with higher densities in larger towns like Dimapur, Kohima, Tuensang, Mokokchung, Wokha, Zunheboto, Mon and Chumukedima (20,000 and above), as well as the haphazard growth of settlements are among major causes leading to the problem of municipal solid waste affecting public health and natural environmental systems. So the total elimination of the waste is an impractical suggestion, rather it should be managed in an effective manner. With a total urban population of 5, 70,966, the total waste generation in urban centres in Nagaland would approximately be in the region of 223 tonnes every day or 81,395 tonnes every year.

As of now, none of the urban centres of Nagaland has a sewerage system or treatment facility nor are there a systematic collection and a scientific system of addressing solid waste. Therefore, the untreated waste water is allowed to flow into natural water systems such as rivers, rivulets, streams or springs and the waste water from kitchen is allowed into rain water storms, which in turn flows into the natural water system. As far as private sanitation is concerned, except for few households who have connected their toilets with septic tanks and soak pits most of them have their toilets with outlets into the streams and drains. Even in the case of septic tanks or pit latrines, soak pits are non-existent. Furthermore, public sanitation facilities within the towns are almost absent in all the centres.

[62] Shafi, S.M. (2005), *Environmental Pollution*, Atlantic Publishers and Distributors. New Delhi. p.198-199

In addition to the above mentioned deficiencies in sewerage and sanitation facilities, drainage system is another very important component to ensure a clean environment which is lacking in the towns of Nagaland. Most of the drains along the roads in the towns are kutcha-open drains which lack maintenance. Close to 80% of the drains that exists in Nagaland towns on an average are open unlined drains. The worst case scenario is during the rainy season when the drains get choked with solid wastes and raw sewage flowing through it which then overflows and damages the roads while at the same time spreading the pungent smell around, causing a lot of inconveniences for the town people and population of the nearby residential areas.[63] To compound this, there is also a lack of waste management system in Nagaland. About 90% of the waste is generated from residential, commercial and institutional sources. Biomedical waste is also fairly substantive. The authorities responsible for the collection of wastes and its disposal are the Municipal Councils as in Dimapur, Kohima and Mokokchung and Town Councils for the other urban centres. As of now, there is no waste segregation system or house to house collection of wastes. This, therefore, results in wastes from the towns being dumped on empty sites along the highway corridors. And in the absence of any treatment facilities, blowing of litter and burning of waste is common and the road users are directly exposed to smoke and obnoxious odour from the site which also acts as a breeding ground for vermin. This in addition to polluting the water bodies also result in the formation of vast methane emitting zones.

With an estimate of 70% of the waste being dumped in open drains and open landfills on the highway, it is estimated that the total methane generation could be any equivalent to

[63] *Draft Final Report,* (2009), Urban Development Department, Government of Nagaland, LEA Associates South Asia Pvt. Ltd., New Delhi.

emitting 150 metric tonnes of CO_2 per day, which is based on an estimate that 1 tonne of wet waste is equivalent to 1 metric tonne of CO_2 emissions.[64] Emissions apart, the open landfills and drains are also a major health hazard and from a climate point of view, given that increase in temperatures lead to a faster breeding cycle of mosquitoes and higher intensities of water borne vector diseases, the open landfills help to further increase the intensity of vector borne diseases. Solid wastes are also sometimes used for landfill but decomposed solid waste can similarly pollute groundwater through seepage. This can have enormous health impacts on the people who depend on well water for drinking and other purposes particularly in the plain areas of Dimapur, Mokokchung and Mon districts due to the pollution of ground waters as a result of leaching.

Medical waste is also responsible for serious health hazards. Management of hospital waste has not yet received due attention in our State. No specific guidelines and parameters are being followed and implemented. There are 574 government healthcare facilities, around 100 private establishments and 2 military hospitals in Nagaland. Estimated infectious waste generation in health-care facilities in the State is about 650 kg/day. There are 2 incinerators of 50 kg/hr capacity installed at the Rangapahar and Jakhama Military Hospitals for treating the bio-medical wastes. Two other incinerators of 2.5 kg/hour capacity are installed at the Kohima and Dimapur Civil hospitals; however, they are operating without obtaining the required authorization and also the stack height do not meet the prescribed height. As for the other health-care facilities (government and private), they lack proper disposal system for their effluents and the solid wastes they generate, and are either burnt or mixed with the domestic wastes. The unscientific disposal

[64] Nagaland Action Plan on Climate Change 2012, Draft Copy, Government of Nagaland. p.57

of biomedical waste causes adverse impacts not only on the ecosystem but also on the human environment which is a cause for concern.[65]

Another matter of grave concern is the unhygienic use and disposal of plastics and its effects on human health and environment. Coloured plastics are harmful as their pigment contains heavy metals such as copper, lead, chromium, cobalt, selenium, and cadmium that are highly toxic. Depending on the type of plastic, it is estimated that it takes about 100-500 years for one plastic bag to disintegrate. These plastics not only adversely impacts the environment, our water systems, aesthetic beauty and our health but are also the main reason for choking drains and pipelines causing havoc among the urban residents. Also, there is no serious effort by the local bodies responsible for management of solid wastes towards systematic recovery/ recycling of waste. In most industrialized countries, colour plastics have been legally banned. In India, the Government of Himachal Pradesh has banned the use of plastics and so has Ladakh district. The Dimapur Municipal Council too has imposed a complete ban on the manufacture/ sale/ use of any items of non-biodegradable poly bags in its jurisdiction within a time frame of 3 months as published in the local newspapers on 20th August, 2015. However, how effective or successful this ban has been in achieving its goal is still doubtful as people continue to use them all the same.

At present, Kohima is the only urban centre in Nagaland which has been under study by various agencies on the sewerage and solid waste management both scientifically and systematically. As stated earlier, the responsibility of the waste management lies with the Kohima Municipal Council (KMC). At present, the amount of waste generated from the

[65] Nagaland Pollution Control Board., 2005, *State of Environment Nagaland*, Nagaland Pollution Control Board and The Energy & Resources Institute, New Delhi.p.135

Kohima city is around 100 metric tonnes/ per day. Out of this, around 35-40% of wastes are collected from the entire city as per the present data available.[66] Different types of wastes such as plastics, scrap metal and bottles, i.e. all recyclable wastes, are generally segregated and either sold to rag pickers at household level or scavenged at community bins or disposal sites. Earlier, the collected wastes were disposed off at a sloping site along NH-39, about 8 km. from the city. But the dumping site was affected by landslide in 2008, after which it was abandoned. Since then the solid waste collected from the city is openly and haphazardly dumped on a sloping land about 12 kms. from the city. In the absence of any scientific disposal and treatment facility, the wastes are often subjected to burning, thereby causing air pollution, contamination of the surface and ground water and also act as a vector for many diseases. Many households also continue to throw garbage in the streams and rivers, which are not accounted and is polluting the water courses and creating an unhygienic environment.

Recognizing the urgent need to streamline waste management system in the Capital town, a modern landfill site for waste management is being set up with financial assistance from the Asian Development Bank (ADB) through the Ministry of Urban Development, Government of India. This facility is being developed at Lerie about 10 km from Kohima town and consists of a compost plant and sanitary landfill. The compost plant will have a capacity of processing 50 tons of organic wastes per day and the landfill designed for a period of 15-20 years to accommodate 32,000 m3 of wastes. The landfill is also equipped

[66] Kohima Municipal Council (KMC), 2015.

with a Leachate Treatment Plant to treat the leachates (Liquid that drains from a landfill) for safe disposal as per environmental standards.[67]

Uncollected and improperly handled solid waste can have serious health consequences. Most towns are also unable to manage the increasing amounts of hazardous wastes generated by rapid population growth and urbanization. The agencies that are responsibility for the collection and disposal of solid wastes are often understaffed and underfunded. Also the lack of equipment, like collection trucks, makes the service inefficient. Hence, there is a need to develop an integrated approach where the public, private and community sectors work together to develop local solutions promoting sustainable waste management of material recycling. At the household-level proper segregation of waste has to be done and it should be ensured that all organic matter is kept aside for composting, which is undoubtedly the best method for the correct disposal of this segment of the waste. The collection and disposal of the solid waste needs effective co-operation with vendors and collectors alike.

4.3.4. Deforestation and Land Degradation

With the beginning of settlement of human population on choiced site of land space, the destruction of the natural ecosystem started. Obviously the expansion of human settlement along with the growth of urbanization side by side needed more and more space which was procured at the expense of natural environment. As urban population increased, the demand of land for various urban activities also increased which ultimately resulted in the urban expansion which also had its bearing on land-use. Such a trend continues

[67] The Morung Express, *New Facility to Tackle Kohima's Waste*, Kohima, May 11, 2015.

uninterrupted and even in modern times the destruction of forest and land is a matter of grave concern for modern societies all over the world today.

The usefulness of forests and soil to mankind and the great role it plays in shaping the environment needs no elaboration. The greatest utility of forest is in respect to reduction of physical and chemical contaminants or pollutants of the environment. In fact, forest soil and vegetation act as an effective sink for a number of pollutants. Thus, it can be said that forests help in providing protection to public health and keeping the environment of the human settlement pollution-free to a considerable extent. However, the rapid pace of population growth and urbanization have given rise to a complex situation of deforestation and forest degradation leading to land degradation, desertification, shrinking wetlands among others. It has been identified that demographic factors are one of the five most important underlying causes- leading to agricultural expansion, wood extraction and expansion of infra-structure as most important direct causes of deforestation.

Rampant exploitation of forest resources in Nagaland triggered by the need to fulfil the requirement of the modern urban population for economic development, deforestation has become the biggest threat to the environment. The forest cover in Nagaland has seen a decline from 14,351 ha in 1987 to 13,044 ha in 2013.

Table 4.2. Forest cover: Nagaland (1987 - 2013)

Year	1987	1991	2001	2003	2005	2009	2011	2013
Forest Cover	14,351	14,278	13,345	13,609	13,719	13,464	13,318	13,044

Source: India State of Forest Report 2013.

Deforestation takes place because of many reasons. In the context of the urban centres of Nagaland, the main causes of deforestation include the need of space for settlement of the

expanding urban population, collection of firewood from forests, timber harvesting, construction of new roads, construction of schools, industrial units, factories etc. In most cases the land is left bare after the destruction of the forests. Gradually, the bare ground surface loses its fertility which after some time turns into a dead mass of silt, clay and sand. Such a situation is the cause for land degradation, soil erosion and increase in the frequency of floods and landslides rampant in all the districts of the State.

Land degradation in Nagaland is man-made as well as natural phenomenon. Rapid population growth, improper land use, absence of land use policy, and the growing demands of increasing urbanization are exerting pressure on the environment and on the land resource of the state. Geologically also, the entire Nagaland State is dominated by unstable shale dominant rocks and the type of soil that it has is prone to erosion. Besides, the rainfall pattern is of high intensity. As such, landslides and subsidence or sliding of land are common. This has not only caused morphological changes in the land, but also affected the socio-economic condition of the people.

Among all the existential hazards in the State, the occurrence of landslides is fast becoming one of the major environmental problems. Kohima, for instance, has experienced severe landslides in 1972, 1995, and 2003 and in 2015 causing havoc and loss of lives as a consequence. The soil of Kohima is of loose sedimentary type with high porosity and therefore, highly susceptible to erosion and landslips. Other towns which are vulnerable and have experienced severe landslides in the past include Mokokchung, Mon, Phek, Peren and Zunheboto amongst others.

When we examine the nature of settlements and infrastructure in the hilly towns of Nagaland, we can conclude that landslides are provoked by the rapid urban development

resulting from progressive occupancy of steeper slopes adapted by cutting terrace-like areas and re-distributing materials in order to provide building sites. In addition to that, most of the buildings in the towns are constructed having sloping roofs facing the uphill side. This necessitates construction of longer columns on the downhill side, i.e., on backyard of the buildings. Continuous erosion of this kind reduces the bearing capacity on slopping ground and in many places has even exposed the building foundation and caused the collapse of some buildings. And in most cases, the landslides seemed to occur along the steep slopes where the runoff from the streams is very high during the rainy season. The problem of road transport accessibility becomes more distinct as most of the existing road networks slide down due to tremendous landslides, which disrupt the communication of the towns with rest of State and country.

Some of the major landslide disasters that Nagaland has faced are:[68]

- The August 2003 Kohima town landslide where many houses at New Market colony were razed to the ground. The road was badly affected which had to be abandoned for almost a year.

- The May 26th 2005 landslide at Mokokchung which was one of the most tragic one in the recent past. The damage to life and property was extensive in which 14 people were buried alive and many injured.

- The August 2006 Wokha town landslide where the National Highway 61 was affected very badly. Extensive damage to property was also reported.

[68] NIDM, Nagaland, National Disaster Risk Reduction Portal. p.13

- The September 2006 Zunheboto town landslide was a major landslide which resulted in extensive damage to property.

- The October 2007 landslide at National Highway near Kiruphema which stretched to about 150 metres and slide down almost 400 metres resulting in a complete blockade of the highway for two days.

- The most recent August 20th 2015 landslide at Phesama, around 10 kms. away from the State capital Kohima, which affected about 100 metres of the National Highway 39. Though no human casualties were reported, atleast ten houses on the roadside were directly affected and few motor vehicles were damaged.

Besides landslides, the occurrence of floods is another cause of land degradation in Nagaland. As stated earlier, the clearance of forests and natural vegetation for various urban activities leave the soil bare exposing it at the mercy of the sun, wind and water. Urban areas affect not only the weather patterns, but also the runoff patterns for water. Urban areas generally generate more rain, but they reduce the infiltration of water and lower the water tables. This means that runoff occurs more rapidly with greater peak flows and also at the same time causing soil erosion. Eventually, flood volumes increase, as do floods and water pollution downstream. The different colonies of Dimapur town remained submerged during 11th - 24th September 2008. These colonies included Dhobinulla, Super Market, Nagarjan, Burma Camp, Walford, Sachu Colony, Nagagaon, Khermahal, Netaji Colony, Naharbari and Airport Areas.[69]

[69] Op.cit..p.14.

As a consequence to the above, the urban centres in Nagaland are witnessing an ever increasing high in the number of natural hazards, which very often claim lives; a situation which if left unabated could plunge them into an abyss of widening urban instability and decay. Vulnerability to landslides and erosion is a major factor affecting the stability of structures and in turn endangering the life and properties of the city residents. The environmental costs and maintenance of environmental quality should be taken into account in the process of economic development. The environmental dimensions of the forests should also be considered at various levels which are indispensible for enhancing the quality of human environment and regional development. Except for the general statistics on the loss of forest land for agricultural expansion, area under shifting cultivation etc., comprehensive studies on forest and land degradation are lacking for the urban centres of Nagaland. Some of the institutions involved in addressing issues related to forest and land degradation in the State are the Department of Forest, Ecology, Environment & Wildlife, Land Resources Department, Department of Wastelands Development, Department of Soil & Water Conservation and Department of Irrigation & Flood Control.

4.3.5. Noise Pollution

The present civilization is a 'noisy civilization'. According to Maxwell (1973), "Noise is any sound that is not wanted. It is one of the more common forms of atmospheric pollution."[70] Noise pollution is a major issue of environmental problem in many urbanized and industrialized towns. The 'culture of noise' like 'rock music' is an added dimension of

[70] Maxwell, K.E. (1973), *Environment of Life*, Dickenson Publishing Company, California. p.175

the noisy civilization.[71] Automobiles, industrial operations, low-flying aircraft, construction activities and blaring sound of loudspeakers are some of the major source of noise pollution affecting the urban residents in towns and cities. The problem of noise pollution has only recently received much attention, yet it has been decades in the making.

The health hazards in humans due to noise pollution are of varied types. Apart from sleep disturbance, stress, poorer work performance and increased anxiety, the most notable effect of noise pollution is on hearing. Constant exposure to noise can cause temporary to permanent impairment of hearing in humans. Noise also causes headaches and irritability. At the higher levels, it may lead to physical and psychological damage. Medical scientists have also noted that children born in areas of high noise run the risks of premature hearing loss and low-birth weight in comparison to the children born in peaceful areas.[72] Hence, the nuisance of noise and sound pollution is a serious menace which needs to be curbed in order to decrease the physical and psychological damage it has on the human population.

In Nagaland, the Nagaland Pollution Control Board (NPCB) is the main institution for checking and overlooking the status of all kinds of pollution in the State. As compared to other towns and cities in the country, Nagaland has considerably low level of noise pollution in its towns. However, due to the rapid urbanization in the past decade or so, the level of noise in the public places have been increasing causing deleterious effects on human health and the psychological well being of the general public. The NPCB has taken strong exception to the loud music played by hotels and parties in Dimapur in the night and has expressed unhappiness that the noise from the hotels continues to disturb the

[71] Kayastha, S.L. (2007), *Geography of Population: Selected Essays,* Rawat Publications, Jaipur, India. p.40
[72] http://www.livestrong.com/article/534339-can-loud-noises-hurt-my-unborn-baby/

peace of localities, including Dimapur Civil Hospital. "The Nagaland Pollution Control Board has been receiving complaints of loud music from hotels in Dimapur city that run late into the night. Loud music is also disturbing the Dimapur Civil Hospital at night and the authorities had expressed concern," the board stated in a press release issued by its Member Secretary Rusovil John.[73]

Under the Noise Pollution (Regulation and Control) Rules 2000, the Government of Nagaland on 27th April 2009 designated the Deputy Commissioners of all the districts to be the 'Authority' for maintenance of the Ambient Air Quality standards in respect of noise. Under it, the general observations that were made during the year 2010 in the urban centres of Nagaland was that firecrackers were used mostly during Diwali, Christmas, New Year and during festivals/parties. In the monitoring of noise levels carried out by the Nagaland Pollution Control Board during Diwali 2010 in Dimapur city, all the areas monitored were found to be generating noise exceeding the prescribed levels. The study revealed that firecrackers not only caused nuisance and accident hazards but also the Ambient Air Quality was affected which in turn lead to various respiratory problems.

In a recent press communiqué (2016), the NPCB informed that the manufacture, sale or use of fire-crackers generating noise level exceeding 125 dB or 145dB at a 4 meters distance from the point of bursting is prohibited. It further stated that the use of fireworks or fire-crackers is not permitted except between 6.00 am and 10.00 pm which also would not be permitted to be used at any time in Silence Zones. It also cautioned that a loud speaker or a public address system shall not be used except after obtaining written permission from the Deputy Commissioner. It added that a loud speaker or a public

[73] Eastern Mirror, *When Music Becomes Noise Pollution,* Dimapur, May 8, 2015.

address system or any sound producing instrument or musical instrument or a sound amplifier shall not be used at night (between 10:00 pm to 6:00 am) except in closed premises for communication within.

Since noise is created by man, it can also be controlled by adopting certain measures. Some of the basic measures that we can take to mitigate noise pollution is to make arrangements to minimize noise by replacing noisy and rattling parts of a machine or automobile and by oiling and greasing in time to ensure smooth running. Application of sound proofing techniques to muffle down noises should be done, especially for those pubs and hotels in and around Dimapur and Kohima in order to avoid causing public nuisance during late hours. It has also been scientifically recognized that trees reduce the intensity of noise transmission by absorbing them. Lastly but not the least, every government has enacted certain laws to control noise pollution. Hence, the basic need, therefore, is the proper implementation of these laws and regular supervision by the concerned authorities and institutions.

4.3.6. Cell Tower Radiation

The world has experienced a phenomenal growth in the number of Smartphone users. The increased use of Smartphone's has raised public interest in possible health issues associated with exposure to electromagnetic energy. People are concerned about exposure from Smartphone handsets & cell tower base stations. Though the safety of cell phone towers is the subject of extensive scientific debate, there is a growing body of scientific evidence that the electromagnetic radiation they emit, even at low levels, is dangerous to human health.

Concerns have been raised about continuous exposure to RF radiation emanating from telecom towers which cause harmful thermal and non-thermal health effects. The ill effects of exposure to radiation from mobile tower as per the Consultation Paper On Issues related to Telecommunications Infrastructure policy of the TRAI (Telecom Regulatory Authority of India, 14th Jan'2011), reads, "Among peoples living closer than 300m away from the base station, a French study found an increased incidence of tiredness , of headache, sleep disturbance, discomfort, etc. Within 200m, of irritability, depression, loss of memory, dizziness, libido decrease, etc. Within 100 m, women were found to complain significantly more often than men of headache, nausea, loss of appetite, sleep disturbance, depression, discomfort and visual perturbations. This study, based on the symptoms experienced by people living in vicinity of base stations should not be less than 300m."

However, a group of health experts and doctors have come together on the same platform to dispel fears of harmful effects of radiation from mobile phones and towers. As part of an awareness campaign by the Cellular Operators Association of India (COAI), the experts have assured mobile phone users that radiation does not affect the health of a person. Dr Bhavin Jankharia, Mumbai—based eminent radiologist and president of the Indian Radiology and Imaging Association has said, "Mobile tower radiation is inherently a type of radiation that we believe does not produce any kind of significant harm to humans." He further added that the entire issue began when some people made some co-relation between an incidence of cancer and telecom towers without any basis.[74] Telecom expert Ramachandran, in a meeting of doctors and telecom experts at Dehradun also said, "Mobile phone tower radiation is lakhs of times weaker than X-rays or UV rays, even

[74] The Hindu, *Mobile Radiation not Harmful, Health Experts and Doctors*, Kolkata, June 24, 2014.

visible light. There is absolutely no need to have any concern whatsoever as regards the radio-frequency radiation from mobile phone towers."[75]

Though there is no scientific study being done on the health issues related to mobile towers in Nagaland, there is, however, no denying the fact that health complications do develop and complaints of persistent headache, sleep disturbance, irritability, dizziness, nausea, etc have been reported by the people living in and around the tower area. In Nagaland, there are around 800 mobile towers which are mostly installed on top of buildings and other public residential areas posing a great risk to the people around. Especially in Dimapur and Kohima these towers are installed in the busy towns and public places which is a cause for concern. On the other hand, with the telecommunication companies or service providers willing to pay rent for installation of towers and property owners who may not be aware of the health hazard are letting their buildings for installing cell phone towers to earn extra bid of income. However, in cities like Ahmedabad, Rajasthan, Jaipur, Punjab and metropolitan cities like Mumbai, Delhi, Bangalore, Chennai, and Hyderabad High Court has banned installation of cell phone towers in residential areas.

With the growth of urban population coupled with the empty spaces the wireless communication density and its network have escalated at a rapid pace over the past few years. Though the real impact of the towers on people's health is subject to debate, there is also no such proper study being done on the matter. Therefore, in order to ensure health safety of the people in the State and to avoid any health hazards arising out of radiation exposure, the Government should chalk out policies to crack a whip on cell phone towers

[75] The Tribune, Telecom Tower Radiation not Harmful: Experts, Dehradun, February 26, 2016.

in public and residential areas and come up with strict health safety guidelines to lower radiation limits. Telecom companies should get the requisite permission from the concerned local authorities/ Municipal Corporations before installation of the tower. The operators should also check the emission levels so that it does not cover areas with public exposure.

Each urban centre has a number of environmental problems with varying scale and scopes which are influenced by factors such as size of population and its density, climatic conditions, water resources and the flora and fauna in and around the urban centre. The critical issues and challenges of development and management associated with the urban centre in Nagaland is that of haphazard and mismanaged urban expansion, changing land use/land cover, loss of productive agricultural land, increase in the rainfall runoff and depletion of water table etc. The state of urban environment in Nagaland is deteriorating fast and the sustainability of the urban habitat is threatened. This is also evident from the fact that major urban environmental problems occur due to high population growth (69%) during (2001-2011) where pollution load in terms of air, water, noise, and solid waste generation and disposal etc. has also increased considerably. In the larger towns like Dimapur, Kohima and Mokokchung land environment is under stress due to the pressure of rapid urbanization and expansion. As the towns expand and population increases, the resources, which are limited, are shared. The lack of services such as water supply, sanitation, drainage of storm water, treatment and disposal of waste water, management of solid and hazardous wastes, supply of water and housing are all unable to keep pace with urban growth.

Of all the towns in the State, Dimapur is, perhaps, the most unplanned town. Unfortunately, other towns also fall within the same league. None of the towns of Nagaland has Master Plans so far, which is an important regulatory and planning tool. In addition to that, there are also no building codes or building bye-laws adopted by any of the municipal corporation/town councils to check the unregulated encroachments in the urban centers. Lack of capacity for planning and implementation by municipal bodies is another area of concern which should be looked into at the earliest. The issues pertaining to urban environment in the urban centres are largely to do with the poor quality of life due to the poor access to basic services than with impacts associated with environmental impacts on ecologically significant or protected areas. The main reason for this is the alarming trend of in-migration as well as influx of illegal immigrants that is creating serious impact in these urban centres. This has caused strain on the limited urban services and infrastructure and increase in urban poverty and unemployment levels. As a result, the state is struggling to cope with haphazard growth of main urban centres, traffic and congestion, pollution, inadequacy of water and sanitation facilities, sewerage systems, drainage and solid waste management.

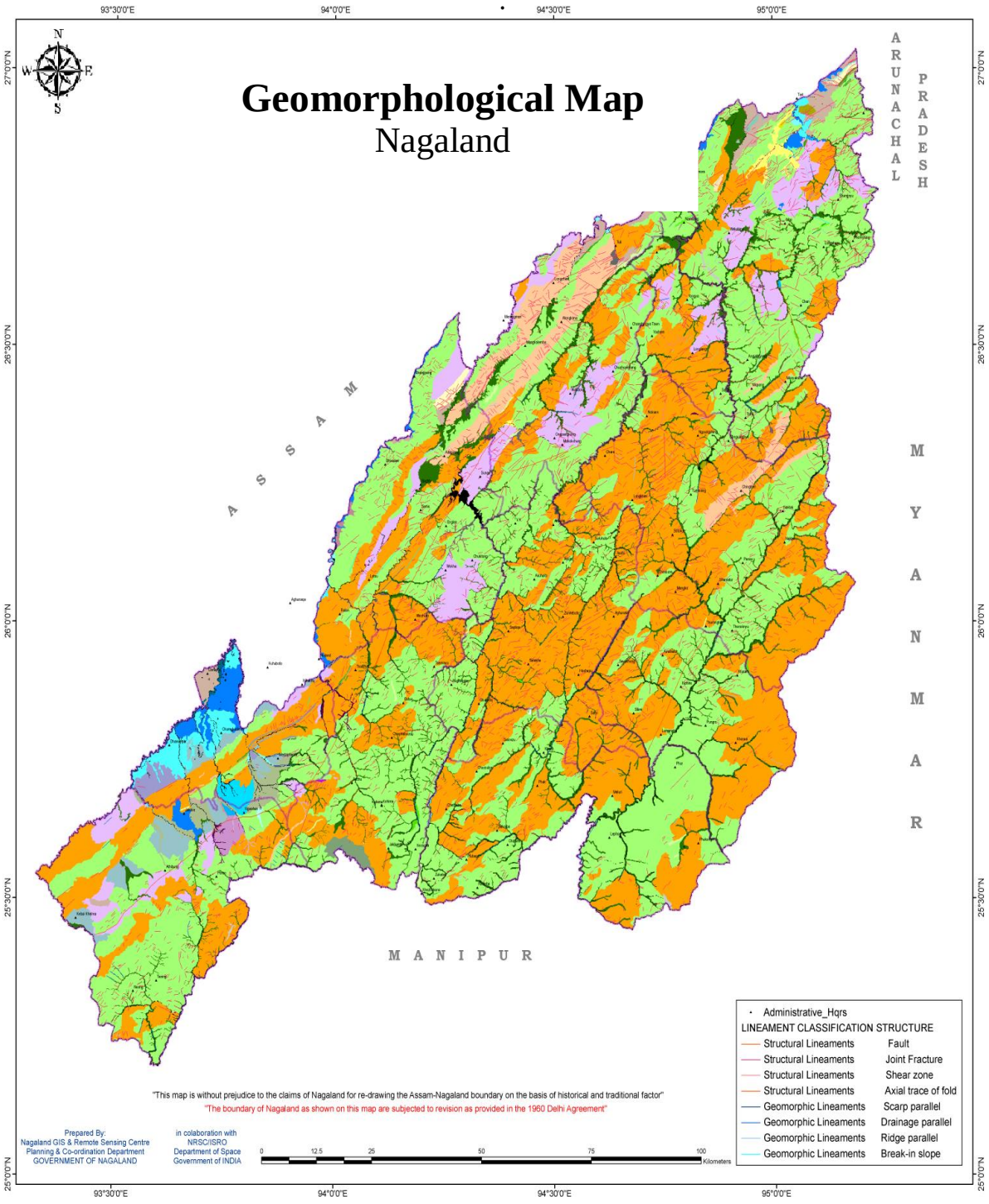
Therefore, the need of the hour is the initiation of proper planning by the government in order to contain the haphazard growth of urbanization and mismanaged sprawls. Alternative realignments to decongest roads or installation of the needful infrastructure such as digitalized traffic control system as in the other North eastern cities and towns of Shillong, Guwahati, Jorhat etc. may be possible in the towns where the congestion has surpassed the carrying capacity of the existing roads. Disposal of wastes that has become one of the biggest problems in the urban areas needs to be dealt upon with all earnestness.

The lack of sewer networks and basic sanitation facilities appears to be a failure on the part of the government and hence, provision of such facilities should be the main priority especially in the poor income areas of the urban centres. Another important initiative that should be encouraged at all levels is social forestry or afforestation programmes not only for the sake of creating 'green lungs' but even for arresting the soil from being eroded. Alternatives to the use of fuel based vehicles such as CNG, LPG, electric and hybrid ones can be thought of as in other countries and in the metros of India to relive the strain on energy resources and pollution.

Another important point to be noted is that not all the urban centres of Nagaland have the same type of environmental issues. For example, the type and intensity of traffic congestions in Dimapur, Kohima or Mokokchung is not the same in towns like Kiphire, Longleng or Peren and thus are less polluted. But at the same time, the road connectivity and conditions of the roads in Kiphire, Longleng and Peren may be worse than the other major centres. Furthermore, the frequency of landslides occurring in Kohima, Mokokchung and Zunheboto may not be matched by any other urban centres in Nagaland. Again the distance of the urban centres from the main towns like Dimapur, Kohima and Mokokchung has a remarkable impact on their development and growth due to transportation constraints and communication breakdown besides other socio-economic and political reasons. Hence, the geographical and geological characteristic of the area plays an important role in determining the environmental constraints and issues faced by the area and the correct measures that should be taken to contain them. However, in the case of Nagaland, despite the geographical and geological differences, the one thing in common which create roadblocks for development is the issue of poor administration and

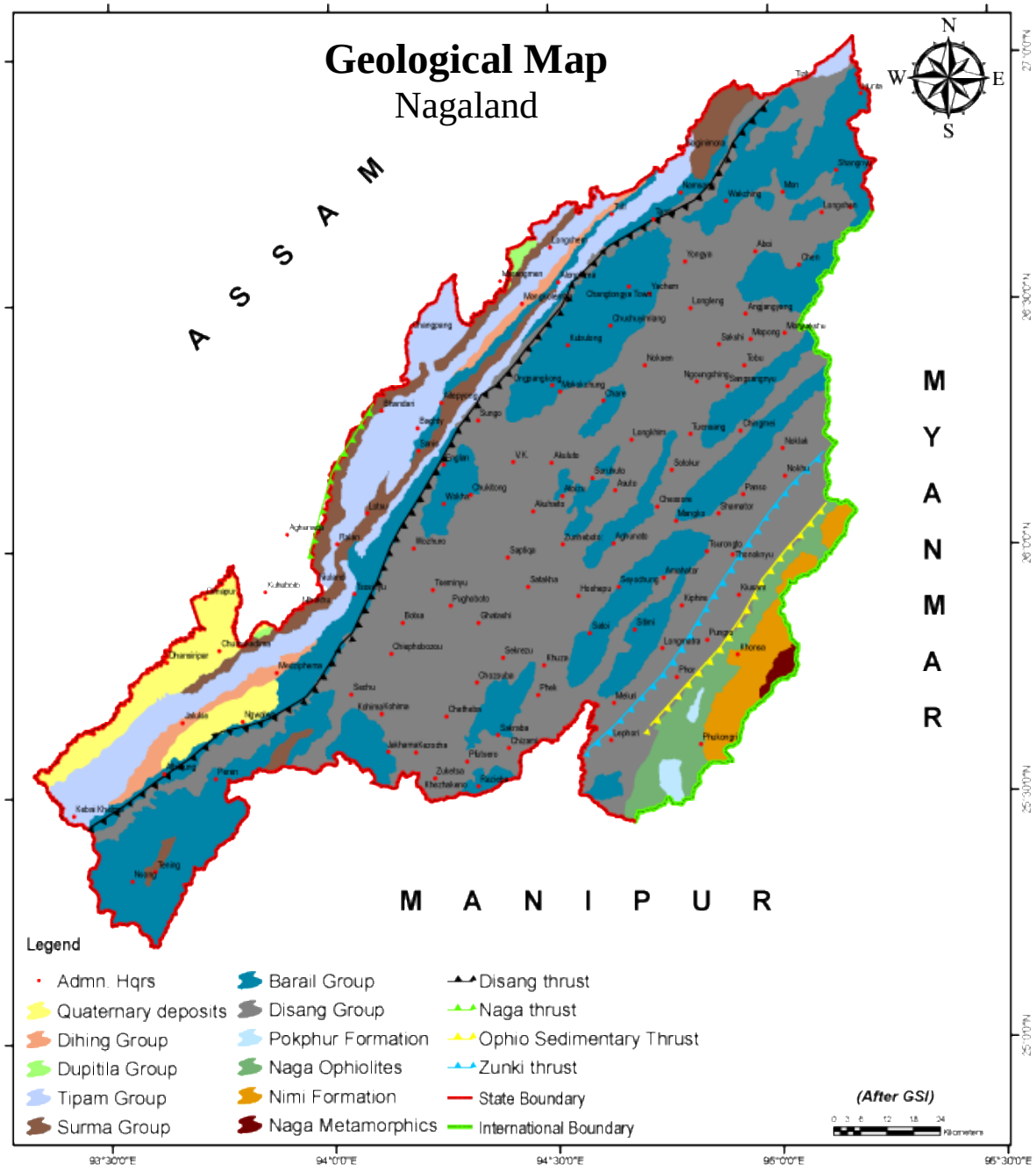
corruption at all levels of functioning. On top of that, the lack of comprehensive master plans, bureaucratisation in the plan implementation process, absence of a centralized authority to coordinate different segments connected with development policies, and most importantly the implementation of western and Indian models of urban development in a completely different environment such as that of Nagaland will always fail to produce the desired results. Therefore, the local governments while focussing on scientific and modern approaches to planning should not neglect the community approach in preparing and implementing plans of development. At the same time, unless the urban public get committed to the plan and be ready to sacrifice personal interests in favour of community interests it is bound to fail and lose its significance. Therefore, no matter how bad or worst the natural surroundings may seem, healthy and peaceful living can be achieved largely by changing the mindset of the people towards the environment and not just by decorating the outer façade of the same.

Map 5.1



Source: Nagaland GIS and Remote Sensing Centre

Map 5.2



Source: Nagaland GIS and Remote Sensing Centre

Environmentally fragile or sensitive areas are places that have special environmental attributes worthy of retention or special care. A more exacting definition is: any parcel of land that already has, or with remedial action could achieve desirable environmental attributes. These attributes contribute to the retention and/or creation of wildlife habitat, soil stability, water retention or recharge, vegetative cover and similar vital ecological functions.[76] The UNEP (United Nations Environment Programme) states that mountains are the areas most sensitive to all climatic changes in the atmosphere. Mountains are an important source of water, energy and biological diversity. Furthermore, they are a source of such key resources as minerals, forest products and agricultural products and of recreation. However, the mountain ecosystem is rapidly changing due to its fragility and susceptibility to soil erosion, landslides and rapid loss of habitat and genetic diversity mostly caused by human intervention. In the same light, Nagaland being a mountainous region is no exception to the fragility of the urban areas and the rural areas as well which requires an immediate action.

5.1. Fragile Geology of Nagaland

Geologically, Nagaland forms a part of the northern extension of the Arakan-Yoma Range representing some of the Cretaceous and Tertiary orogenic upheavals forming a fairly young and mobile belt of the earth. The Disang group of rocks spread over about half the surface area of Nagaland State. These rocks are characterized by monotonous sequences of splintery shales and are classified as a geosynclinal facies comprising flysch sediments that range in age from Upper Cretaceous to Eocene. They occupy the intermediate hill region of Nagaland to the east of the Disang Thrust. The shales of the Disang Group of

[76] Best Management Practices Documents. p.10

rocks are very fine grained, finely laminated and commonly exhibit curved or concentric surfaces. These are weak rocks and cover greater part of Nagaland. The Barail group of rocks comprises thick sequences of sandstones intercalated with very thin beds of shales and conformably overlies the Disang (Map 5.2). Though they are hard and compact, they occupy only a few tracts of the state. Alluvium and High-level terraces cover extensive portions of Nagaland. The High-level terraces are dominantly boulder beds with coarse sands, gravels and un-assorted clays at various levels above the present rivers.[77]

In the case of Nagaland, which lies in the ecologically sensitive region of the northeast India, the priority consideration is the identification of such areas and the mitigation of the same. Seismically, entire Nagaland falls under Earthquake Prone Zone-V. It is located in one of the most seismically active areas. Though mild tremors occur every now and then the most notable ones are the Great Shillong Earthquake on 12th June 1897 which measured 8.7 in the Richter scale and the Assam Tibet earthquake on 15th August 1950 which also measured 8.5 in the Richter scale. [78]

The physical layout of Nagaland is characterised by high hills comprising of steep slopes and high relief which makes it vulnerable to landslides. Moreover, most of the rocks, particularly the shales are sheared, fractured, crumpled, and weathered to various extents. They are normally saturated with water which leads to the building up of high pore-water pressure thereby causing the loss of shearing strength and collapse of the soil structure.[79] Every year, especially during the rainy season the State is affected by landslides causing huge damage to structures, lives and property. Most of these disasters are often caused

[77] NIDM, Nagaland, National Disaster Risk Reduction Portal. p.9
[78] *Disaster Management in India*, 2011, Ministry of Home Affairs, Government of India. p.26
[79] Op.cit.p.12

under the impact of urban growth when the steep slopes come under constructional activities thereby resulting to break of slopes thereby enhancing landslides. Another important factor causing landslides in Nagaland is faulty road construction methods. Landslides occur because road construction design and slope stabilization structures are very poor. Not only is this, the present unregulated and unplanned urban sprawls in the State is also affecting the drainage basins due to unscientific waste disposal and land reclamation from the streams resulting to geo-environmental problems.

Some of the major landslide disasters that Nagaland has faced are - in August 2001 Dimapur area experienced a cloud burst which lasted almost for one hour. This gave rise to so many landslides in that area, particularly the Paglapahar region which experienced the heavy down pour. In a stretch of just 4 kms on National Highway 39, seven major slides occurred which brought traffic to a standstill killing three people and injuring a few others in the process. In August 2003 the whole New Market colony in Kohima Town was affected by landslides. Many houses were razed to the ground, and many more were made unfit for habitation and property worth lakhs were destroyed by this slide. Another tragic landslide that occurred was on May 26th 2005 in Mokokchung town. In this pre dawn landslide, 14 people were buried alive, so many more injured and damage to property was extensive. Wokha town was also affected very badly by a landslide in August 2006. National Highway 61 was damaged very badly and extensive damage to property was reported. During September 2006, Zunheboto Town was affected by a major landslide which resulted in extensive damage to property.[80] The most notable recent major landslide was that which occurred on August 22, 2015 at Phesama (Kohima) along National

[80] Op.cit.p.13

Highway 29, the main road link between Manipur and Nagaland. The mudslide which swept down the hills destroyed the road, farmlands and 23 houses affecting 30 families. Preliminary examinations of the area by geologists found that the soil contained a mixture of sand, clay and sticky mud type, which absorbed excess water and reduced soil's grabbing capacity resulting in the continuous mudslide.[81]

Natural hazards in the form of flash floods are also very common along the foothills of the State such as Dimapur, Chumukedima and Tuli etc. The impacts of such disasters are further multiplied due to the lack of proper drainage system and planning. Another factor for the frequent occurrence may be attributed to the rapid growth of urbanization and constructional activities which does not allow the water to soak into the soil and this excess water is then directed into nearby streams and open drainages which overflows leading to floods. In the year 2005 and April of 2016, the Township of Tuli and the adjoining areas were very badly affected by flood, forcing the residents to vacate their homes and temporary suspension of vehicular movements along a section of the National Highway 61. Though floods are a regular phenomenon in Dimapur, the most recent one of importance would be the one that occurred in 2011 where a few thousand houses including shops were inundated with four to five feet deep rain water while people in at least ten colonies had to abandon homes. Estimates of losses ran into several lakh rupees. It was reported that a combination of factors such as lack of proper drainage system and blocked drains led to the massive inundation.

Another vulnerability of Nagaland is the increased concentration of population in hazardous environments. This is also another cause of concern because as of 2011 Census,

[81] Nagaland Post, *Landslide near Phesama threat to villages*, Kohima, August 12, 2015.

5,70,966 persons (28.86%) of the total population of the State live in urban areas, which is an increase of 69% (Highest in the Country) and is still increasing at an alarming rate without being aware of the dangers of concentrating in hazardous areas. Lack of adequate infrastructure is a major vulnerability, because most of the structures in Nagaland, both Government and Private have been constructed without proper planning and expert consultancy. Besides natural environmental factors, excavation for rocks and slope modification for agriculture have made many parts of our environment susceptible to mass wasting. Above that, land use planning has never been a point for consideration for all types of developmental activities.

5.2. Strategy for Management of the Urban Environment

Today, no discussion in the field of science, society, planning, policy and politics is complete without a reference to the environment. Environment is not only about the birds and the bees and tigers, leopards or the poaching of elephants for tusks. The environmental issue is one of livelihood and societal relations. It is an issue of the distribution and exploitation of natural resources and the way in which the environment is used. It is over-exploitation to the extent that natural resources lose its regenerative capacity and is thus a denial to the future generations. As such, the environmental issue is not only a problem of cross-sectional inequality at a point of time but one that involves inter-generational considerations.[82]

The concept of urban management from the management point of view has to be efficient, integrated and holistic to achieve the objectives or goals of running a city. It is aimed at

[82] Kumar, A. (2005), *Environmental Protection in India – Socio-Economic Aspects*, New Century Publications, New Delhi. p.27

strengthening the capacity of government and non-government organizations (NGOs) to identify policy and program alternatives and to implement them with optimal results. The last 25 years of development has led to major increases in the percentage of the population living in urban areas, from 40% in 1980 to 50% in 2000 and an estimated 66% in 2030 (UN 2003). Not only the number of 'mega-cities' is growing, but also medium sized and smaller urban agglomerations are experiencing explosive growth and the pressure on the urban areas has increased dramatically. The effects have been harshly felt by the increasing number of poor in the urban areas and the increase in inequality in relation to the provision of services (water, sanitation, waste management, health, education) which has not been sufficient and issues of housing and land are left unsolved.

Some of the institutional mechanisms governing the urban sector in Nagaland for development planning and implementation of urban policies and programmes are:

1. The Public Health and Engineering Department, which is entrusted with the task of ensuring water supply, maintenance of sewerage and storm water system and in collaboration with the Municipal Council ensures the maintenance of sanitation and solid waste system and management.
2. The other departments involved in urban planning include the town planning department, the public works department and for road maintenance, in some cases the Border Roads Organization (BRO).
3. In addition to the above, the Town Municipal Council performs the functions of regulation of land-use and construction of planning, development and management of sanitation and solid waste management, upgradation and maintenance of public amenities.

The main programmes and policies governing the sector are all the reforms as per the 74th Constitutional Amendment in addition to central programmes namely:

1. The Swarna Jayanti Shahari Rozgar Yojana, which is a unified Centrally Sponsored Scheme aimed at providing gainful employment to urban poor, setting up self-employment ventures and community empowerment through creation of suitable community structures.
2. The Jawaharlal Nehru Urban Renewal Mission aimed at creating urban infrastructure.
3. The Asia Development Bank Assisted Programme for the North Eastern Region aimed at creating and improving urban infrastructure.
4. The Integrated Development of Small and Medium towns, aimed at providing basic infrastructure and amenities to small and medium sized towns.[83]

Though the above mentioned mechanisms are to function effectively for the urban development of the State, the outcome of the various schemes and programmes implemented so far has not at all been satisfactory. Instead of marching forward, sadly, the development of the urban areas in Nagaland over the years has taken more steps backward. There are numerous reasons for such a debacle on the issue of urban development in the State among which rampant corruption from the highest to the lowest level of governance is the root cause. The sanctions for developmental projects and programmes pouring into the State trickles from the top to the ground level and only a small percentage of the budget reaches for the actual work of action. Still, the inadequacy of the budget factor is always the excuse given for the inefficiency in the development and

[83] Nagaland State Climate Action Plan, 2012, Sector Paper: Urban Development and Planning. p.15

maintenance of the urban sectors. Besides these, the fragile geology as well as geography of the region is another factor for the inability in implementing developmental schemes and programmes of urban transformation. Another important point to be noted is that all the urban areas in Nagaland are unplanned and the haphazard growth of such centres has proved to be a stumbling block in the urban development process.

As highlighted in the previous chapter with regard to Nagaland, the environmental issues that are plaguing the urban areas are air and water pollution, sewerage and solid waste menace, deforestation and land degradation besides various other relevant concerns related to the above mentioned points such as migration leading to congestion resulting in the incapability of providing adequate infrastructural amenities to the people. As regards to air pollution, the level is increasing at an alarming rate each year, even surpassing the national permissible limit. Under the National Air Monitoring Programme (NAMP), there are four stations identified in Nagaland, two each in Kohima and Dimapur, from which the experts from Nagaland Pollution Control Board (NPCB) monitor the air quality of the particular localities. A data comparison for the last four consecutive years, from the year 2010, showed an increasing trend for both the monitoring stations. This can mainly be attributed to the disturbing factors like bad road conditions, unregulated mushrooming of stone crusher units, burning of wastes, vehicle exhausts, etc. Therefore, some strategies and suggestions for the management of air pollution in Nagaland are given below:

1. Vehicular emission is one major source of pollution as there is no significant industrialization. Hence, emphasis should be given for equipping the towns with adequate traffic management system in order to ease traffic congestions which ultimately lead to air pollution if left unchecked. Apart from that, solution for

easing the vehicular congestion would be to construct new road networks emphasizing on quality and durability, capacity enhancement of existing public transport system by adding to transport infrastructure, and building parking lots, sidewalks and the extension of the existing roads. Last but not the least, creation of pedestrian pathways and cycle pathways to promote non-motorised transport within urban areas as an alternative transportation would in a big way ease the problem of traffic congestion and the menace of air pollution.

2. Mass awareness among the city dwellers on pollution and civic sense should be organized from time to time with focus on environmental issues, phasing out of old polluting vehicles to check vehicular emissions, curbing fuel adulteration, improvement of roads to reduce dust etc. and adoption of clean and new eco-friendly technologies to check pollution levels in the towns and urban centres.
3. Existing industries located within residential area should be closed or relocated to earmarked industrial areas in order to improve air quality for the urban dwellers.
4. Trees are a great source of clean air which acts as a barrier to air pollution. Therefore, mass plantation drives in and around the towns and the protection of the existing ones should be carried out from time to time.
5. Waste should not be burnt as it contributes to particulate matters, smoke, carbon dioxide and other gases harmful to human health and the environment. Instead safe and modern techniques such as Sanitary Land Filling[84], composting, recycling, source segregation of residential wastes, segregation of biomedical waste from

[84] It is a technique in which the waste is placed in a trench or other prepared area, adequately compacted and finally covered with earth at the end of the working day.

municipal solid waste and regular maintenance of waste disposal mechanisms should be adhered to strictly.

6. Lastly, it is crucial that the governing bodies and concerned departments should implement proper monitoring and assessment of the air quality and its causal factors by adopting modern technology and manpower for peaceful and healthy urban living.

The problem of water pollution and scarcity of water in Nagaland arises mainly from the fact that there is little or no proper monitoring or documentation on the state of water bodies to assess the quality of water. Lack of proper drainage system coupled with inadequate sewerage and solid waste treatment is another factor causing water pollution particularly in the urban centres which is the main reason for the acute shortage of safe drinking water in such areas. The untreated waste water is allowed to flow into natural water systems such as river, rivulets, streams or springs, which in turn flows into the natural water system. The following are some of the suggestions for curbing and finding a solution to the problem of water pollution and water scarcity in the urban areas of Nagaland:

1. The major sources of water pollution being domestic effluents, sewage disposal, industrial wastes and lack of proper drainage, the first and foremost step towards water pollution management would be to strengthen the sanitation and solid waste management system. The towns need to be equipped with underground piped sewerage system and functional sewerage treatment system for its safe disposal. This will prevent the flow of untreated domestic and other waste water into the natural water systems.

2. Documentation of water resources all across the urban centres would be the primary step towards handling the situation. Along with trained personnel, the local communities should be made to understand and document the geo-hydrology of their respective localities and map all springs, identify their sources and map natural lakes and ponds. This will not only help in the assessment of water quality but also help in enhancing the water production capacity by exploring new sources of water development.
3. Ground water exploration is a recent venture in Nagaland under which a number of projects have been commissioned for extraction of underground water for the public and has been beneficial to some extent. However, low level of awareness, surveillance, monitoring and testing; non-adaption of mitigation measures, non-availability of alternate water sources etc. continue to remain roadblocks for development. As such, water quality monitoring and surveillance at the grassroots level by the community to identify problems and to take corrective measures would go a long way in achieving continuous supply of quality drinking water to the urban population.
4. Strict regulation of digging of wells should be imposed especially in Dimapur and other low lying areas of the State as severe decline in groundwater levels have been reported in recent years. Unregulated digging of well also increases the possibility of high level of water contamination.
5. In order to solve the problem of water scarcity especially in the hilly urban centres, creation of new water treatment plants and reservoirs for increasing storage capacity for drinking water is the need of the hour. Increase in storage capacities needs to have a two-fold approach. The first is to build reservoirs for storing and

supplying drinking water in all the urban centres and secondly, to simultaneously promote the age-old practice of roof-top rainwater harvesting and rejuvenating traditional wells in water scarce areas.

6. Lastly, creation of a financial arrangement under which the costs of the system are recovered from the consumers and the utility is able to repair, replace and expand infrastructure without undue financial constraints.

Deforestation and land degradation resulting in natural hazards and environmental degradation is another serious problem faced by the urban centres. With the rapid growth of urban population and the need of space for accommodating the various infrastructure that comes with urbanization is a major problem. Not only this, as pointed out earlier all the towns of Nagaland follow a pattern of haphazard, unplanned growth and most of the open spaces has been occupied or illegally encroached upon in the course of time. Moreover, none of the towns of Nagaland has Master Plans, though a Comprehensive Development Plan was prepared for Kohima and has initiated the preparation of infrastructure investment strategy plan for all the other towns.[85] Furthermore, to make things worse, there are also no building codes nor building bye-laws adopted by any of the municipal corporations/town councils nor are there hardly any capacities for planning and implementation of plans. The land holding system in Nagaland where 90% of the land belongs to individuals and communities is also another obstacle towards implementing governmental schemes and projects. With all these issues prevailing in the urban scenario, rampant deforestation and land degradation due to lack of enforcement of developmental

[85] Nagaland Action Plan on Climate Change 2012, Draft Copy, Government of Nagaland.p.59

controls have put the people in the urban centres at a high risk. The following are some strategies that can be adopted for the management of landuse and natural hazards:

1. Since the ownership of majority of the forests is with the individuals and community, the best way to check indiscriminate deforestation would be to mainstream the Joint Forest Management (JFM) programme which was adopted by the Government of Nagaland in 1997. Under this programme, the community along with the government work hand in hand towards the creation, management and protection of the forest lands. Its main objective is to conserve biodiversity through people's action and to create and generate a forest based economy for the community. It also aims to achieve ecological needs consistent with sustainable productivity of wood and other non-timber forest resources.
2. The nature of urban growth in Nagaland being unplanned and haphazard there are too many unprecedented nuisances that create roadblocks for development. Therefore, mass awareness from the grassroots level should be initiated by the concerned departments and agencies on issues such as building bye-laws, maintaining certain safety standards etc. and instil in the minds of the people the consequence of haphazard construction as an urban disaster in the making.
3. Landslides are a regular phenomenon in Nagaland that cause immense destruction of environment, property and lives. It is important to note that landslides in the urban centres occur mainly due to unregulated and unplanned construction of buildings in the slopes and unstable ground. Hence, regulation of urban sprawl and constructional activities should be strictly implemented to avoid such disasters. Except for Kohima, which has prepared a Detailed Project Report (DPR) for landslide mitigation and Storm Drainage Development Scheme, none of the other

urban centres has any of such DPR. As such, in the event of any natural disaster, preparedness and mitigation measures is a pre-requisite to reduce the risks as well as loss and damage of life and property. This can be imparted to the public by organizing mock drills, seminars and programmes for mass awareness.

4. Occurrence of floods is another frequent phenomenon especially in the low-lying southern part of the State. Lack of proper drainage system, choked drains, buildings with shallow foundations etc. increase the risk in the flood plain settlements. This entails extending drainage where it does not exist and improving drainage systems where it is not fully effective. Mapping of the flood prone areas is a primary step involved in reducing the risk of flood in the region. Community awareness such as issuing warnings at the local level, stockpiling needed materials, planning emergency supplies of food and clean drinking water, conducting trainings on search and rescue etc. should also be built up so that people respond effectively to the flooding.[86]

Sewerage and solid waste management is another menace bugging the urban environment in Nagaland. No other pollution mode is so much explicit in urban centres than solid wastes due to their visual display throughout the town. To make things worse, none of the urban centres in Nagaland has a functional sewerage system, except for Kohima, that too only in D Block, which is built and operated by the community. There are also no sewerage treatment facilities nor are there a systematic collection and scientific system of addressing solid waste. Furthermore, public sanitation facilities within the towns are almost non-existent in all the centres. Therefore, in order to manage this menace of sewerage and solid waste management, the following strategies may be adopted:

[86] *District Disaster Management Plan*, 2013, Dimapur District, Government of Nagaland.

1. Since most of the dumping grounds and landfill sites are located along the highway corridors and residential areas, frequent landslides, soil erosion, air and water pollution, and outbreak of diseases are common. Hence, as part of the town planning, appropriate land allocation should be made for sanitary land filling and composting processes which should be made mandatory pre-requisite for an approval of the new urban settlements.
2. At present, there is no segregation of waste at source. Moreover, whatever waste is collected is disposed off without any processing. Therefore, public awareness programmes may be undertaken to propagate the concept of segregation of waste at the household level, waste minimization and advocate the method of home composting and dispensation of waste generation habits.
3. Encouragement of private participation in setting up of pilot projects and modern technologies for urban waste management is vital for easing the burden of the municipalities in waste management.
4. The prevailing municipal bye-laws should be reviewed and necessary modifications made to ensure safe disposal of urban waste including hazardous industrial and hospital waste in a safe and hygienic manner. This would also imply fully equipping the municipalities with proper vehicles and machinery and implementing scientific disposal by monitoring the level of pollution at the disposal sites.
5. Lastly, there is an urgent need for improving the operational efficiencies of the existing collection and transportation mechanisms of the towns and this can be best achieved with the involvement of the communities and NGOs together with the concerned respective councils and municipalities.

From the above discussions it is quite plain to comprehend the sorry state of urban affairs and the deteriorating urban environment in Nagaland. In the first place, the ecological and geological sensitivity of the region is a major hindrance to the urban development of the urban centres. On top of that, the unplanned, unregulated and haphazard development and urban sprawls contribute a major factor in the recurrence of natural hazards such as landslides, floods etc. and the destruction of the environment through indiscriminate deforestation, improper waste management, lack of civic sense and weak governing machinery. The continued loss of forest cover and land degradation due to rapid increase in the urban population is a major cause for the fragility of the urban areas of the State. Besides that, improper land use, absence of land use policy, encroachment into forest land for agriculture and settlements, inadequate soil conservation measures are some other important factors contributing to land degradation. Therefore, a comprehensive study on the forest and land cover is required to keep the degradation of the forest and land in check.

In terms of magnitude and extension of pollution there is no other greater threat than untreated sewerage and waste mismanagement in Nagaland. At present, none of the urban centres has a sewerage treatment facility nor do they have a functional sewerage system. Only a single block (D Block) in Kohima has a functional sewerage system covering around 25-30 households which is way inadequate for the whole town of about 25,686 households (Census 2011). Leaving aside the smaller urban centres like Kiphire, Peren, Longleng, Tuli, Tseminyu etc. the lack of sewerage management system in the bigger centres like Dimapur, Kohima Mokokchung and Wokha is a cause of major concern. The drains along the roads in the towns are mostly kutcha-open drains and without side-drains.

As a result, during the rainy season, not only do these open drains overflow and cause damage to the roads and land slips, they also carry the household wastes and sewerage and join the natural water system thereby polluting it.

Among all the urban centres of Nagaland, the one centre which is most lacking in terms of sewerage and sanitation is Peren town. As per the Urban Development Department reports and Census 2011, out of the 1,027 households only 58% of the households have toilet facility within the house out of which 43% have only pit latrines. Furthermore, only 27% of the households have excess to bathroom facility while 73% uses open space, or along ponds, hand pumps and well space. In addition to this, around 40% of households are covered by septic tanks, 40% use low cost sanitation units and the remaining 20% defecate in the open. This shows that the overall sanitation conditions in the town are very poor and below healthy and quality living average. Therefore, the actions required to address the issues pertaining to sewerage and sanitation in the urban centres should include the construction of reliable primary and secondary sewage collection networks, sewage pumping stations, adequate sewage treatment plants and disposal systems for septic tanks and conservancy wastes.

The primary process of collection of waste in all the urban centres is carried out through street sweeping and from storage bins and no house-to-house collection or source segregation of waste is followed. The existing waste collection is a manual/multi handling system which is not in conformance with the Solid Waste Handling Rules 2000 which envisages improvements towards improvement of collection, transportation and treatment of wastes apart from improvement of the operational efficiencies of the system. The solid wastes collected from the towns are usually dumped on the hill slopes or on empty sites

along the highway corridors and in the absence of any treatment facilities, blowing of litter and burning of waste is common and the road users are directly exposed to the smoke and vulgar odour from the sites.

Lack of proper drainage and waste management results in a number of hazards in the urban centres among which Zunheboto town is most prominent. The numerous drains crossing the town are mostly choked with solid waste and raw sewage flowing through it. The poor drainage conditions along with unregulated construction activities and porous soils have increased the recurrence of landslides within the town area. Most of the landslides are observed in the steep slopes where the runoff from the streams is very high during rainy season. The general problems associated with the drainage in Zunheboto and elsewhere are inadequate coverage, flooding and blockage of outlets. Therefore, a master plan for drainage, considering the levels of the towns and drainage patterns are needed to minimize and avoid the problems due to recurrent flooding. Developmental controls especially within the town areas should be introduced to avoid encroachment onto water bodies and natural watercourses. Most importantly, creation of awareness and sensitization of the town dwellers towards better waste management practices is paramount in solving the problems of sanitation, waste and hazards.

It is an inevitable fact that the development agencies and governmental organizations alone can never achieve the objective of sustainable development of cities and towns with regards to safer urban living and an improved quality of life without the meaningful involvement of stakeholders. Commitments and inputs from a wide range of public and private organizations and individuals are the key to the successful implementation of strategies and plans. Improving the urban governance, in particular, through increasing

transparency and accountability of policy formulation and decision making processes, is a key to success in implementing any urban management policies and plans. Participation of all stakeholders who are benefiting from relevant decisions and actions should be ensured at all levels of planning activities, in combination with greater access to relevant information and enhancement of public awareness of urbanization issues.

In addition to the above, there is a need to rectify the unplanned and haphazard growth of the towns by introducing mandatory planning tools such as Master Plans, building bye-laws, appropriate land management practices and zoning and identifying vulnerable areas to natural disasters. There are also a number of technical tools which are now widely used as part of effective urban planning approaches such as Geographic Information Systems (GIS) and Land Market Assessments amongst others. GIS mapping techniques help in detecting change over a period of time of the urban areas which is then monitored and mapped for specific developmental projects. On the other hand, Land Market Assessments provide accurate and up-to date information on land prices, present and future land projects, housing typologies, and other aspects of the housing and land market, and thus is used to support government planning and decision making, the evaluation of government policies and actions, private sector investment and development decisions. Existing research and development efforts also need to be strengthened to develop the appropriate low cost technologies considering the possibilities, opened by biotechnology, genetic engineering, information and material technologies and remote sensing, tailored to the local environmental conditions.[87] Along with it, Environmental Information Centres should be set up at the district level to generate knowledge regarding traditional and

[87] Op.cit.p.129

endogenous system management practices. Lastly, provision of infrastructure should not be merely a reactive response to the current ongoing urbanization but, rather it should be used as a guide to future urban build-up in a more positive way as implementation of urban planning help the urban centres in playing a key role in making it economically vibrant and environmentally sustainable along with social upgradation and better human living.

Nagaland being an agrarian economy with nearly 70% of the population involved in it, the process of urbanization has taken remarkable strides since the last few decades. Even though it is not possible to trace back the exact time when the urbanization process, the British occupation of the Naga Hills in the late nineteenth century is tentatively accepted as the period of the onset of the process of urbanization in Nagaland. It was marked by the establishments of new townships and expansion of administrative settlements in Kohima and Wokha in 1878, Mokokchung in 1888 and Wakching in 1913. However, it was only after the introduction of national policy for tribal development since the 1950s that significant urbanization started in Nagaland. Subsequently, the small townships and hamlets have been expanding and growing in complexity to accommodate the growing population.

As per the latest Census 2011, Nagaland has a total of 11 districts, namely, Kohima, Dimapur, Mokokchung, Wokha, Zunheboto, Phek, Tuensang, Mon, Kiphire, Longleng, Peren, 114 sub-districts, 26 towns (19 statutory and 7 census towns) and 1,428 villages. And the total population of the State stands at 19,78,502 persons out of which the rural population is 14,07,536 (71.14%) and the urban population 5,70,966 (28.86%) persons. Dimapur district has the highest urban population (1,97,869) while the district of Mon has the largest rural population (2,15,816) in the State. The lowest rural population i.e. 42,871 and urban population of just 7,613 are both recorded in Longleng district, accounting for 3.04% of the total rural population and 1.33% of the total urban population of the State.

The entire study of my research has been organized into six chapters. The first chapter consists of the general introduction and concept of urbanization and the review of literatures related to the topic to get an insight of the theoretical, conceptual and practical

works done by various scholars, scientists and organizations in the global, national, and regional scenarios. It also consists of a brief description of the issues related to urbanization in Nagaland, statement of the problems, objectives and significance of the study, hypotheses, and the methodology applied in the research work for acquiring relevant datas and quantitative analysis of the topic.

Chapter 2 gives a general introduction about the process and growth pattern of urbanization in Nagaland. It starts with a brief description of the history of urbanization, physiography, demography and the economy of Nagaland followed by the history and process of urbanization of each district. Among the urban centres in Nagaland, Dimapur has the highest number of urban residents with a total of 1,97,869 persons, followed by Kohima and Mokokchung with a total of 1,21,088 and 55,725 persons respectively. Dimapur district has the highest percentage of urban population with 51.95%, followed by Kohima with 45.60% while Mon district with 13.85% has the lowest percentage of urban population. This shows that the process of urbanization in Nagaland has taken remarkable strides since the last few decades which is evident from the fact that urban population of the State has risen from 2,08,223 persons in 1991 to a staggering 5,70,966 in 2011 at a growth rate of 174.21% in just two decades. Though the natural growth of population is not to be ruled out, the swelling of population in the major urban centres of Dimapur, Kohima and Mokokchung is attributed largely to the overwhelming growth of migrants from the rural areas as well as from the neighbouring states and countries for economic, social, official and various other reasons. The fact that the process of urbanization and urban growth is taking giant leaps in Nagaland is a sign of development and a matter of pride. However, on the other hand, such an influx of population into the major urban

centres has given rise to problems of space and accommodation, strain on the limited urban resources, issues of public safety and environment protection etc. which has surpassed the manageable limits of the centres on the part of the municipalities. As such, unless the present social, physical and developmental issues are addressed on time and managed, further growth of urbanization in Nagaland will lead to more chaos and do more harm than good.

Chapter 3 provides an overview of the types of amenities- physical and social- that are available in the urban centres of Nagaland for enhancing the quality of urban living. Some of the basic amenities that are discussed in the chapter include literacy rate and educational institutions, medical and health facilities, transportation network and connectivity, electricity and drinking water facilities, and sanitation and solid waste management. The urban scenario of Nagaland with regard to urban amenities is among the poorest and much below expected standards in the country. The growth of literacy in Nagaland over the last 50 years has been fast and spectacular. Ranked 15th in the country, the literacy rate of Nagaland as of 2011 stood at 79.6%. Among the districts, Mokokchung with 91.6% has the highest literacy rate while Mon with 57% makes it the least literate district of Nagaland. With regards to the educational infrastructure in Nagaland, at present there is one Central University, 55 colleges, 69 higher secondary schools, 337 high schools, 465 middle schools, 1662 primary schools and a handful of colleges for professional education. However, despite the laudable achievements made in the field of education, the quality of infrastructure and the education being made available is a matter of concern, particularly those schools and institutions run by the State. Shortage of teaching faculty, lack of funds and the overall step-motherly treatment of the state-run

institutions by the concerned departments are the root cause of poor quality of education in Nagaland. Besides that, opportunities and facilities for vocational training and entrepreneurial skill building still lack behind in the State.

The medical and health facilities in the State fall under the supervision of the Department of Health and Family Welfare. Though the department has over the years steadily strived to restructure the health delivery mechanism to provide universal access to equitable, affordable and quality healthcare amenities, at the same time, yet there are enormous challenges for attainment of the goal due to insufficient resources, weak infrastructure, absence of reliable database, shortage of manpower and lack of systematic monitoring system. Among the districts of Nagaland, Mokokchung with a total of 73 various types of health units is the highest in the State, while Longleng with just 12 health units is ranked lowest in terms of healthcare infrastructure and facilities. Even though a number of healthcare schemes and programmes such as the National Urban Health Mission (NUHM), National Health Mission (NHM), Revised National Tuberculosis Control Programme (RNTTCP) and a host of others have been initiated over the years, the impact and effectiveness of such programmes has not been satisfactory. Moreover, most of these programmes start and end in the major urban centres while the rest is most times neglected. However, it should also be noted that the reason for this negligence cannot be entirely blamed on the health department because most of the health centres in the districts and interior areas are not accessible due to poor road conditions, lack of infrastructure and those that have are in deplorable conditions due to lack of funds for maintenance. Furthermore, there is also an acute shortage of specialist doctors and staffs to man the

health units which ultimately is affecting the delivery of quality health services in the State.

Transport and communication connectivity is paramount for propelling the economic and physical development of the urban centres. Apart from Dimapur and Naginimora, in Nagaland, the only means of transportation for passenger and goods are roads since the rest of the urban centres are located on the hills. With regard to the transport infrastructure, the Nagaland State Transport (NST) is the department that provides transport facility to the people of Nagaland. Initially, the NST buses were the only means of transport in the State in the absence of alternative means of transport. But today there are plenty of private buses and taxis connecting almost all the regions of the State. However, the NST still plays the important role of providing the lowest fare in passenger services as the private operators provide services only for optimum profit generation with much higher rate of fares. The biggest problem in the development of the transport sector is that, as the road network expands, the issue of lack of maintenance is the big question which is evident from the pathetic road conditions in the entire State that are mostly non-motorable especially during the monsoons. With regard to the development of communication and information technology, the rugged terrain of the State makes connectivity almost impossible. Moreover, about 85% of the total connections in the State are concentrated in Kohima, Dimapur and Mokokchung districts alone. Though mobile phone service providers have made significant progress in the provision of communication and network services in the urban centres and internet usage is increasing, the crucial cause of hindrance for overall progress of the State is the fact that awareness about

Information Technology (IT) is largely confined to Kohima, Dimapur and just a few other prominent towns of the State.

The Department of Power, Nagaland is responsible for generation, transmission and distribution of power in the state. There is only one power generating station in the State; Likimro (Kiphire district) accounting for only 104.12 MU (Million Units of Electricity) while the energy requirement of the State even during 2013-14 was around 680 MU. The total peak hour power requirement of the State is 120 MW, out of which, about 80 percent of the requirement is purchased from neighbouring states. During 2012-13, the total expenditure incurred for purchase of power was Rs. 133.31 crores while the total amount realized from consumers was only Rs.77.66 Crores. This is a clear indication of the uninspiring history of electricity in Nagaland which is plagued by consistent power shortage and load shedding since its inception. Though the maximum number of habitation being electrified is recorded at Dimapur, among the districts, Kiphire ranks first with absolute 100% of the villages being electrified while Longleng ranks the least electrified district with 71.42% in proportion to the number of villages each district has. Hence, only 89.91% of the total villages in Nagaland are electrified. Power is a key input for bringing about socio-economic development in the State. However, minimalistic implementation of the various power projects, ageing infrastructure and the inability to expand and build on its current capacities can be cited as possible reasons for the anomalies in the power sector of the State. Therefore, as the demand for electricity will only grow higher and higher, the department of power in Nagaland should lay more attention to large hydro power plants which are cost effective in generating electricity.

Focus should also be on to search for new, clean and renewable sources of energy such as solar, wind, bio-energy, etc. which are more reliable and plentiful in nature.

The Public Health Engineering Department (PHED) is the nodal agency for the supply of water and the implementation of water supply schemes and programmes in Nagaland. Though the main sources of water in Nagaland are the numerous perennial rivers, streams, springs and ground water reserves, the present water supply system in Nagaland is insufficient to meet the needs of the people in both rural as well as the urban sectors. Hence, the majority of the population, particularly the urban dwellers resort to digging up wells and using community springs. Besides that, buying water at high rates from private distributors especially during the dry season is a common sight all over the State except for Dimapur, Tuensang and Mon. Though a number of schemes and programmes like National Rural Drinking Water Programme (NRDWP) and Rajiv Gandhi National Drinking Water Mission (RGNDWM) have been initiated in recent years, their area coverage is mostly confined within the main urban centres which are not enough to solve the acute water crisis in the State. Leaving aside the rural areas, even in many of the urban areas people still travel long distances to fetch water for domestic purposes. Therefore, the concerned departments should work towards augmentation of the existing water supply systems, regulate proper water distribution, implement the traditional method of roof top rainwater harvesting, rejuvenate traditional wells in water scarce areas and most importantly water quality monitoring and surveillance at the grassroots level so as to identify problems and to take corrective measures would go long way in achieving supply of quality drinking water to the local populace.

Sanitation and solid waste management is another area of concern in Nagaland. So far, none of the urban centres in the State has a proper sewerage system nor do they have any systematic collection or scientific system of addressing solid waste. The most general mode of disposal of human and domestic waste in the urban areas is the septic tank while the untreated waste water is allowed to flow into natural water systems. Another emerging concern in the urban areas and towns is the problem of unattended garbage which gets flooded during the monsoon choking the drains and overflowing the towns. The open and unregulated landfills and rampant dumping of waste in open spaces often cause damage to road and landslides due to water clogging. And the lack of waste segregation system and lack of putting in place a recycle mechanism for recyclable waste further raises the concern of environmental as well as human health. Though a comprehensive project plan for solid waste management was proposed for Kohima in 2009, the outcome of the project is yet unknown. Moreover, a single project for a single town is not in any sense adequate to address the magnitude of sewerage and solid waste menace in the urban centres of the state. Hence, awareness should be generated among the communities which would help in capacity building of institutions to reach out to uncovered areas.

Chapter 4 gives an overview of the emerging environmental issues that are plaguing the present urban environment of Nagaland. It starts with brief descriptions of urban environmental issues in the global context, Indian and Northeast scenario and ends with a discussion on various emerging urban environmental issues in Nagaland. The emergence and expansion of urban centres has direct consequences on the conversion of forest agricultural lands to commercial and industrial establishments and the depletion of natural resources followed by the pollution of land, air and water at the same time. The urban

growth rate of 69% from 2001-2011 in Nagaland is another cause of concern as it not only puts immense pressure on the physical aspects of the environment but also on the social well being of the urbanites such as sewerage and sanitation infrastructure, transport, administration and governance among others. With regard to air pollution in Nagaland, the burning of fossil fuels, motor vehicles and heating are the main polluters. The use of firewood, charcoal and other solid fuel for cooking and heating purposes is still very prominent even in the urban centres. This kind of heating method which releases harmful gases to the environment and pose serious health hazards is considered the main air polluter in the urban centres of Nagaland. In the absence of any major industries in Nagaland, the transport sector contributes a major share of environmental pollution in all the major urban centres of Nagaland. With the increase in population and the increasing economy, the average growth rate of the vehicle population of Nagaland has been in the region of 5-7% in the last decade. As a result, traffic congestion and snarls are common features especially in the towns of Dimapur Kohima, and Mokokchung where the Respirable Suspended Particulate Matter (RSPM) and Suspended Particulate Matter (SPM) concentrations cross national limits.

Water pollution is another emerging issue of the degrading environment of Nagaland. Lack of sanitation and sewage treatment facilities along with the lack of proper documentation and monitoring of the rivers/water bodies has led to the usage of local water bodies as dumping ground for untreated water from the urban areas. Another major cause of water pollution in the urban centres is the fact that the rivers and springs, which are the main sources of water supply in the hilly State, on reaching the city are converted into carriers of solid waste and sewage making the water unfit for drinking or for any

other domestic purposes. With rapid urbanization and developmental activities in the hilly areas during the last few years coupled with increase in population, the demand and need for fresh water resources in all sectors is increasing rigorously, posing a challenge to the whole administrative setup of the State.

In Nagaland, along with the increasing per-capita income and the population concentration in the urban centres, the haphazard growth of settlements are among the major causes of municipal solid waste affecting public health and natural environmental systems. As of now, none of the urban centres of Nagaland has a sewerage system or treatment facility nor are there a systematic collection and a scientific system of addressing solid waste. Therefore, the untreated waste water is allowed to flow into natural water systems and the waste water from kitchen is allowed into rain water storms, which in turn flows into the natural water systems, thereby polluting them. As of now, there is no waste segregation system or house to house collection of wastes. This, therefore, results in wastes from the towns being dumped along the roadside drains and on empty sites along the highway corridors. During the monsoon season most of these drains get choked up and the waste water along with the garbage overflows and damages the roads while at the same time causing untold inconveniences to the people around. Furthermore, due to the absence of any scientific disposal and treatment facility, the wastes are often subjected to burning, thereby causing air pollution, contamination of the surface and ground water and also act as a vector for many diseases.

Deforestation and land degradation are two serious environmental consequences arising out of rapid urban growth. Rampant exploitation of forest resources in Nagaland triggered by the need to fulfil the requirement of the modern urban population for economic

development, deforestation has become the biggest threat to the environment. In most cases the land is left bare after the destruction of the forests. Gradually, the bare ground surface loses its fertility which after some time turns into a dead mass of silt, clay and sand. Such a situation is the cause for land degradation, soil erosion and increase in the frequency of floods and landslides rampant in all the districts of the State. Among all the existential hazards in the State, the occurrence of landslides is fast becoming one of the major environmental problems causing havoc and loss of life and property every year. Besides landslides, the occurrence of floods is also frequent especially in Dimapur which is due to the fact that urban areas generally generate more rain, but they reduce the infiltration of water and lower the water tables. This means that runoff occurs more rapidly with greater peak flows, and in the absence of proper drainage system causes floods.

Noise pollution is another emerging issue of environmental concern today. However, the level and intensity of noise in the urban centres of Nagaland are comparatively within safe limits. Nevertheless, the Nagaland Pollution Control Board (NPCB) has issued certain notifications in Dimapur and Kohima to maintain silence in the late hours of the night especially during festive seasons. Each urban centre has a number of environmental problems with varying scale and scopes which are influenced by factors such as size of population and its density, climatic conditions, water resources and the flora and fauna in and around the urban centre. In the larger towns like Dimapur, Kohima and Mokokchung land environment is under stress due to the pressure of rapid urbanization and expansion. As the towns expand and population increases, the resources, which are limited, are shared. The lack of services such as water supply, sanitation, drainage of storm water,

treatment and disposal of waste water, management of solid and hazardous wastes, supply of water and housing are all unable to keep pace with urban growth. Therefore, the need of the hour is the initiation of proper planning by the government in order to contain the haphazard growth of urbanization and mismanaged sprawls.

Chapter 5 attempts to identify the environmentally fragile urban areas in Nagaland and suggests strategy for their management. It starts with a brief description of the fragile geology of Nagaland which mostly comprise of steep slopes and high relief of sandstone and shales which make it vulnerable to landslides. The urban centres where the major landslides occur are Kohima, Mokokchung, Wokha, Zunheboto and parts of Dimapur. Some of the recent incidents of landslides in these areas are presented in detail. Another phenomenon of natural hazards is flash floods very common along the foothills of the State such as Dimapur, Chumukedima, Tuli and Naginimora, etc. The rapid growth of urbanization and constructional activities prevent water to soak into the soil and this excess water is then directed into nearby streams and open drainages which overflow leading to floods. Apart from that, the impacts of such disasters are further multiplied due to the lack of proper drainage system and planning. The rest of chapter five is an elaboration of the strategies for management with regard to air pollution, water pollution, deforestation and land degradation, and sewerage and solid waste management in the urban centres of Nagaland.

6.1. Findings and Suggestions

1. Nagaland is experiencing fast rate of growth in the urban centres since the past decade or so. Kohima and Dimapur, being the growth centres in the State have witnessed higher growth rates as compared to the other urban centres which can be

attributed to a number of socio-economic and lifestyle conditions, such as the higher capacity of the urban institutions to absorb more workers, avenues for a non-agricultural means of livelihood and higher income generation opportunities. Though the natural growth of population is not to be ruled out, migration from within the State as well as the influx of illegal immigrants from outside have caused serious strain on the limited urban resources, services and infrastructure, thereby leading to an increase in urban poverty and unemployment levels. Besides the social aspects, population growth is a contributing factor to many types of environmental stress. The increasing population size is a major force which is driving the need to increase food production, and environmental stress on water, forests, soil and air. Not only that, but the ever-growing traffic fuelled by the swelling population has contributed immensely to the increase in pollution levels in the urban centres. Thus, it is most important for us that every possible inch of land is brought under some vegetation cover. Since the major urban centres are the worst sufferers due to over population, the government should focus on the smaller urban centres by adopting necessary measures by providing good connectivity and adequate amenities so as to bring them to an equal level of progress and development with the rest. As our development challenges have evolved and our understanding of the importance of development are sharpened, there is also a need to review the earlier objectives, instruments and strategies. The policy makers should seek to realize a spirit of partnership of different stakeholders i.e. public agencies, local communities, the investment community and other development partners to harness their respective resources and strength for effective environment management.

2. As against the three major urban centre viz. Dimapur, Kohima and Mokokchung, the rest of the centres especially those located in the far flung eastern parts of the state experience a slower urban growth. Apparently, this is due to the geographical remoteness of the regions compounded by the lack of proper transportation and communication networks, weak or inefficient governing authorities and the absence of basic urban infrastructures such as schools, hospitals etc. As such, instead of people flocking into such centres, they migrate to the bigger urban centres in search of better livelihood opportunities and comfortable living, thereby making them handicapped in the developmental process and decay of urban growth. Apart from the geographical remoteness, another reason why people flock to Kohima and Dimapur is also due to the fact that all the major departmental directorates and other important government offices are mainly concentrated in Kohima and Dimapur. Such heavy concentrations not only lead to the overcrowding of the centres but also cause untold inconveniences for the people to travel from other parts of the State even for simple official purposes. Instead, such departments should be scattered as much as possible in all the urban centres so that people may not only save time and resources but also choose to stay in their respective places rather than migrate to the major centres and overcrowding them. At the same time, such a move will also initiate developmental projects which will help in providing necessary urban amenities in the minor centres, thereby removing the lure of the big towns.
3. The phenomenon of sub-urbanization in Mokokchung which started in the late nineties is a commendable one. Over the years, this trend has speeded up so much so that the erstwhile satellite towns of Yimyu and Marepkong has boomed and

spread towards Mokokchung and have become conjoined as a ward of Mokokchung today. As a result of this "flight to the suburbs", population growth in Mokokchung town (the area under the municipality) has gradually slowed down while the satellite towns are booming. This trend of sub-urbanization is in sharp contrast to other towns/urban centres in Nagaland where an overwhelming majority of the population tends to be concentrated in the main town (i.e. the area under the municipality/council). As such, the government should encourage and propose the establishment of satellite towns around the urban centres so as to ease the pressure exerted upon the municipalities in providing adequate amenities to the urban residents. This will ultimately improve the problems arising out of land encroachments and housing problems and lead to the improvement in the quality of living in the urban centres.

4. With respect to urban services in Nagaland, the urban centres lack efficiency and the ability to meet even the basic needs of the inhabitants. The stupendous growth of population and growing affluence in the urban centres during the last few decades have already resulted in the rapid consumption of energy and resources in Nagaland. Even the carrying capacity of the hill towns for urban expansion and development is arguably lower than the low lands. A steady stream of migrants only add to the already existing problems. Except for Dimapur which is in the plains, the rest of the urban centres either located on hill slopes or hill tops face acute problem of space and unregulated urban sprawl. Therefore, in order to contain urban sprawl and control the unregulated growth of settlements in the urban centres zoning and land use plans can be important tools in reserving open space and environmental protection. Furthermore, the service of landscape

planners can be vital in diagnosing the health of the landscape, the visual impacts, ecological impacts, hydrological and recreational impacts caused by rapid urbanization and exploitation.

5. Among all the existential hazards in the State, the occurrence of landslides is fast becoming a major environmental hitch. Examining the nature of settlements in the hilly towns in Nagaland and the occurrence of landslides, it is apparent that landslides are provoked by the rapid and progressive occupancy of steeper slopes adapted by cutting terrace-like areas and re-distributing materials in order to provide building sites. And in most cases, the landslides seemed to occur along the steep slopes where the runoff from the streams is very high during the rainy season. The occurrences of landslides are also becoming a regular phenomenon with the increase and expansion of roads and transport infrastructure. Land-cutting for construction of new roads immensely renders the soil vulnerable and the high porosity of the soils of Nagaland especially towards the Northern and Eastern parts only add to the problem. Therefore, the government along with the Nagaland State Disaster Management (NSDM) should take up preventive measures to control the recurrence of landslides in the State. One such measure would be to restrict heavy constructional activities in the hill slopes especially in the populated areas to avoid major hazards. Flattening of the slope angle at the hilltops can also help in stabilizing the landslide prone slopes. Increasing vegetation cover is one of the best and easiest way to control erosion of soil and landslides as it minimizes the amount of water to infiltrate into the soil and at the same time the roots of the trees help in binding the soil from soil erosion. However, despite all these measures that can be

undertaken to prevent soil erosion and landslides, avoiding settlement and constructional activities in the landslide prone areas will be the best option.

6. Environmental, socio-economic, political and cultural problems cause the State to go through many struggles for urban reform or urban renewal. Such reforms should be able to address the underlying physical and socio-economic problem faced by the urban centres. The most common characteristic of urbanization and development in Nagaland is the haphazard growth of the towns. None of the towns have Master Plans so far, which is a key regulatory and planning tool. There are also no building codes or building bylaws adopted by any of the municipal corporations/town councils to check the unregulated encroachments in the urban centres. Such trends of urbanization and development indicate the lack of coordination among various departments involved in developing, maintaining and providing urban services to the people. Therefore, proper policy guidelines need to be implemented in order to promote economic growth and amenities so as to improve the quality of life without compromising the environmental health of the urban centres. Also no sites within the jurisdiction of the municipalities or town councils should be allotted for building apartments or structures of any sort without confirming the environmental safety pass and building byelaws.
7. Despite the geographical and geological differences, the one thing in common which create roadblocks for development in Nagaland is the issue of poor administration and corruption at all levels of functioning. On top of that, the lack of comprehensive master plans, bureaucratisation in the plan implementation process, absence of a centralized authority to coordinate different segments connected with development policies, and most importantly the implementation of

Western and Indian models of urban development in a completely different environment such as that of Nagaland will always fail to produce the desired results.

8. Despite the various hindrance and hitches in the process of development, the one common feature in all the urban centres is the swelling up of unregulated population and random developments. Therefore, the concept of new satellite towns to control migration of rural people to the towns in order to ease congestion and pressure on the existing urban centres would be a viable initiative for Nagaland. In fact, as stated earlier, satellite towns like Yimyu and Marepkong in Mokokchung have been mushrooming since the late 1990s. Even the nearby villages in and around Mokokchung town such as Chuchuyimpang, Khensa and Ungma have been absorbed by the rapid urban spread of the town and have attained urban characteristics. Consequently, this phenomenon of sub-urbanization has resulted in slowing down the growth of population in the main town area while the satellite towns are blooming rapidly. Creating such satellite model towns can also offer an alternative to the people living in the interior districts to look for better possibilities in their respective districts instead of migrating to the major urban centres particularly Dimapur, Kohima and Mokokchung. Not only this, but more government land would be made available for more public use and development and that the towns can also move forward and grow over time rather than become stagnant and non-productive.

6.2. Programmes and Policies

The Government of Nagaland has also taken up several programmes and policies under various national schemes and programmes in the State. Some of the programmes and policies are mentioned below:

1. Smart City Mission: Under this, the Ministry of Urban Development in September 2015, had sanctioned Rs.194 crore- 2 crore each for the 98 cities selected for the mission of which Kohima is one of the 98 towns selected for the mission. The essential features of the mission includes bottom-up planning based on citizen participation, complete autonomy to states and UTs in project proposal, appraisal and approval, selection of cities and towns under new urban missions based on objective criteria, convergence of different schemes to enable integrated planning and better utilization of resources for visible impact on ground and unprecedented resource support to states and urban local bodies.
2. Housing for All (Urban) Mission for 2015-16: The Ministry of Housing and Urban Poverty Alleviation has in 2015 allocated Rs.4000 crore to the states in the country for implementing it. Under this scheme, the states have committed to implementing mandatory reforms essential for making a success of the housing mission in the urban areas which include preparing or amending Master Plans earmarking land for Affordable Housing, putting in place a single-window-time bound clearance system for layout approvals and building permissions, doing away with approvals below certain built up area/ plot size in respect of Economically Weaker Sections and Low Income Groups and To provide additional Floor Area

Ratio (FAR)/Floor Space Index/Transferable Development Rights (TDR) and relax density norms, for slum redevelopment and low cost housing.

3. National Ambient Air Monitoring Programme: Under the National Air Monitoring Programme (NAMP) there are four monitoring stations in Nagaland i.e. two stations at Dimapur and two stations at Kohima. Under this programme four air pollutants are monitored and analyzed viz., Nitrogen dioxide (NO_2), Sulphur dioxide (SO_2), Respirable Suspended Particulate Matter (RSPM) and Suspended Particulate Matter (SPM). The monitoring of pollutants is carried out for 24 hours (4 hourly sampling for gaseous pollutants (NO_2 & SO_2) and 8 hourly sampling for particulate matter (RSPM & SPM)) twice in a week. The Nagaland Pollution Control Board regularly monitors ambient air quality of Dimapur and Kohima city throughout the year using manually operated Respirable Dust Samplers. The data generated in the NAMP stations are uploaded in the Environmental Data Bank of the Central Pollution Control Board.
4. National Water Quality Monitoring Programme (NWMP): One of the main functions of the Board is to monitor the water quality of water bodies so that a comprehensive programme for prevention and control on abatement of water pollution can be planned. In order to assess the water quality in the State, the Nagaland Pollution Control Board in collaboration with the Central Pollution Control Board under the National Water Quality Monitoring Programme (NWMP) monitors eight stations consisting of three rivers namely Dhansiri (six stations) and Chathe (one station) at Dimapur District and Dzu (one station) at Kohima District on quarterly basis.

5. National Environment Awareness Campaign: The National Environment Awareness Campaign (NEAC) was launched by the Ministry of Environment & Forest (MoEF), Government of India in 1986, with the objective of creating environment awareness. Several non-governmental organizations, educational and training institutions, professional associations, scientific bodies, community organizations, and also a whole range of other agencies participate in the campaign. NPCB was appointed as the Regional Resource Agency (RRA) for Nagaland State by the Ministry of Environment & Forests, Government of India in 2006. Under this programme, selected non-governmental organizations (NGO's), educational and training institutions, professional associations, scientific bodies and community organizations are given financial assistance by the MoEF to carry out various environmental awareness activities comprising of awareness and action component.
6. Landslide Hazard Zonation and Disaster Management/Mitigation Plan using Remote Sensing and Geographic Information System- a case study along NH 29 between Kohima and Dimapur was funded under State Plan with Directorate of Geology and Mining as the implementing agency in 2009. According to the reports, six district townships, Phek, Zunheboto, Mokokchung, Wokha, Kohima and Dimapur have been taken up for geological hazard studies during 2009-10 and 2010-11. The above mentioned townships are prone to landslides and under threat by geo-hazards like earthquakes, water contamination, etc and except Dimapur which is annually affected by Dhansiri river flood, the Department of Geology and Mining has placed its final report under compilation with suggestion and recommendation including remedial measures for implementation, the report

stated. Detailed landslide inventory map by collecting all existing information and current data on landslide was also generated for the first time including preliminary investigation of major slides along NH-29 of Dimapur-Kohima section for understanding and suggestion of remedial plans.

Besides the above mentioned policies and programmes of the Government of Nagaland, there are also various initiatives that have or are being undertaken at various levels to educate the people on the emerging environmental issues that are slowly becoming an issue of serious concern especially in the urban centres of the State. A very important pre-requisite to address this issue is to integrate climate change in the development planning and policy formulation. This would therefore require the building of capacities at various levels, from the policy makers to the officials who implement programmes and the capacities need to be built on both adaptation and mitigation. Failure of governance has resulted in the growth of informal settlements and slums that constitute unhealthy living and working environment. Therefore, serious attention should be given to the need for improving urban strategies, which promote efficiency in resource use and to diversify livelihoods and utilising limited resources in an optimum manner. The above objectives can be achieved through implementation of measures that not only starts and end in paper but that it should strengthen institutional structure from the top to the villages at the grassroots level.

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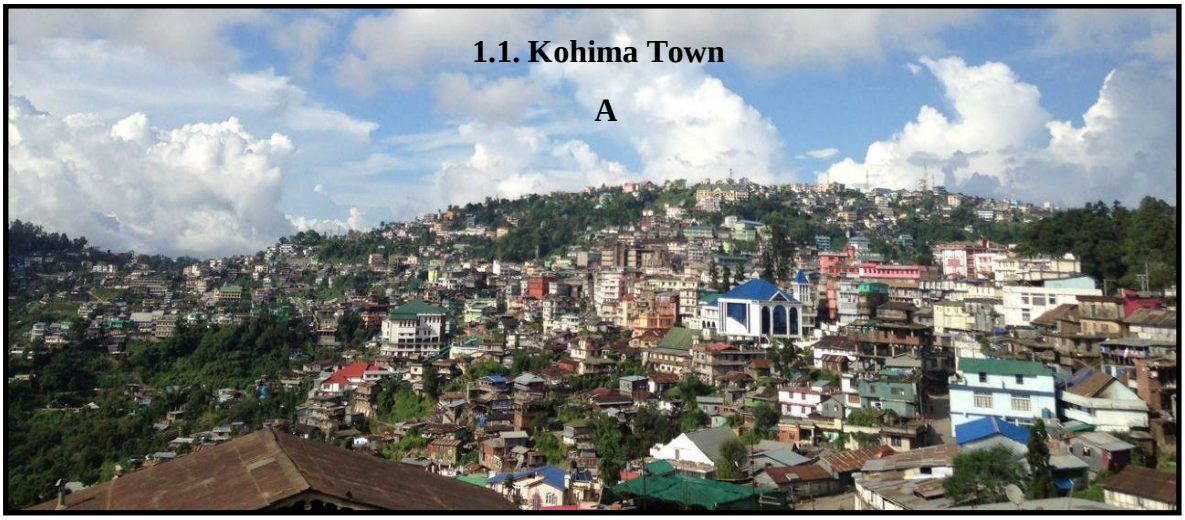
Plate 1



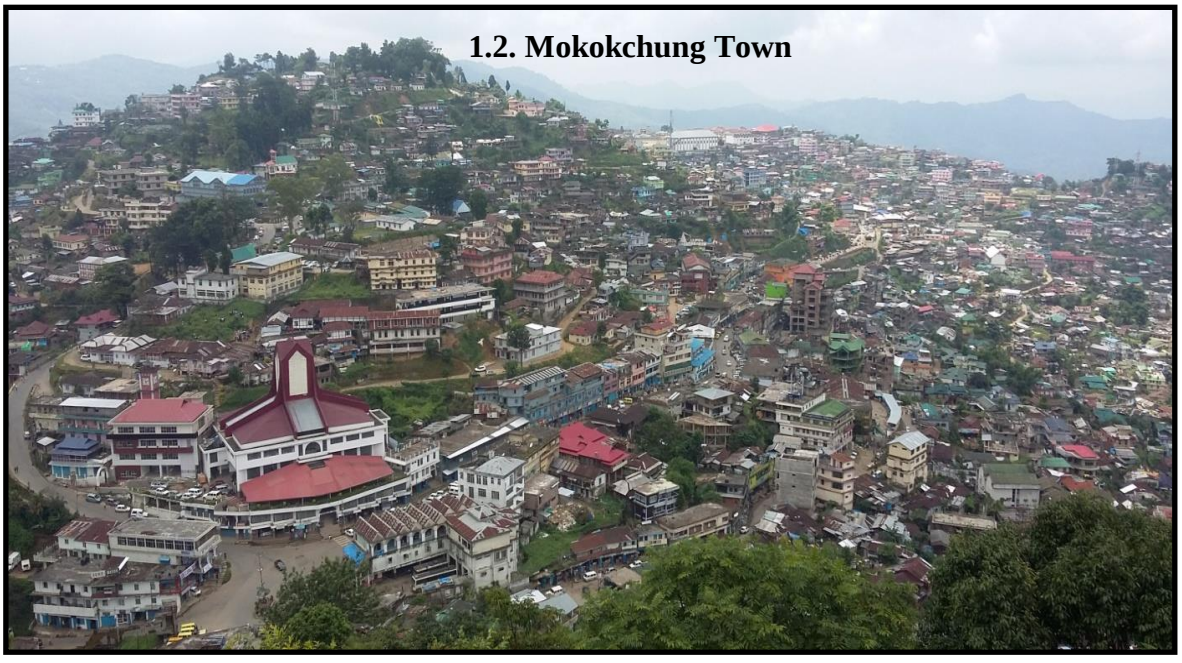
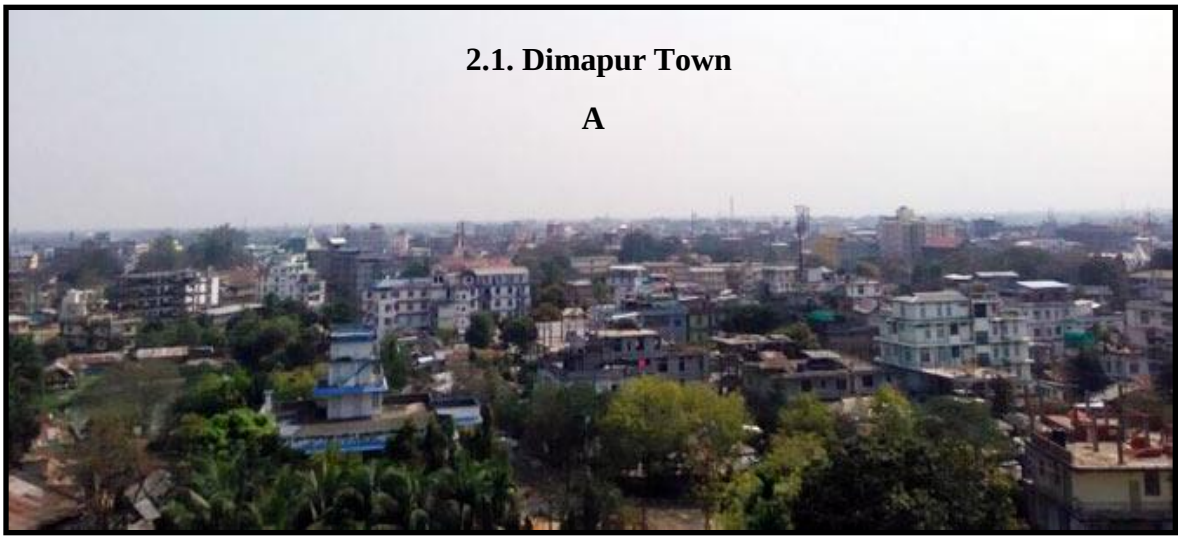


Plate 2

2.1. Dimapur Town

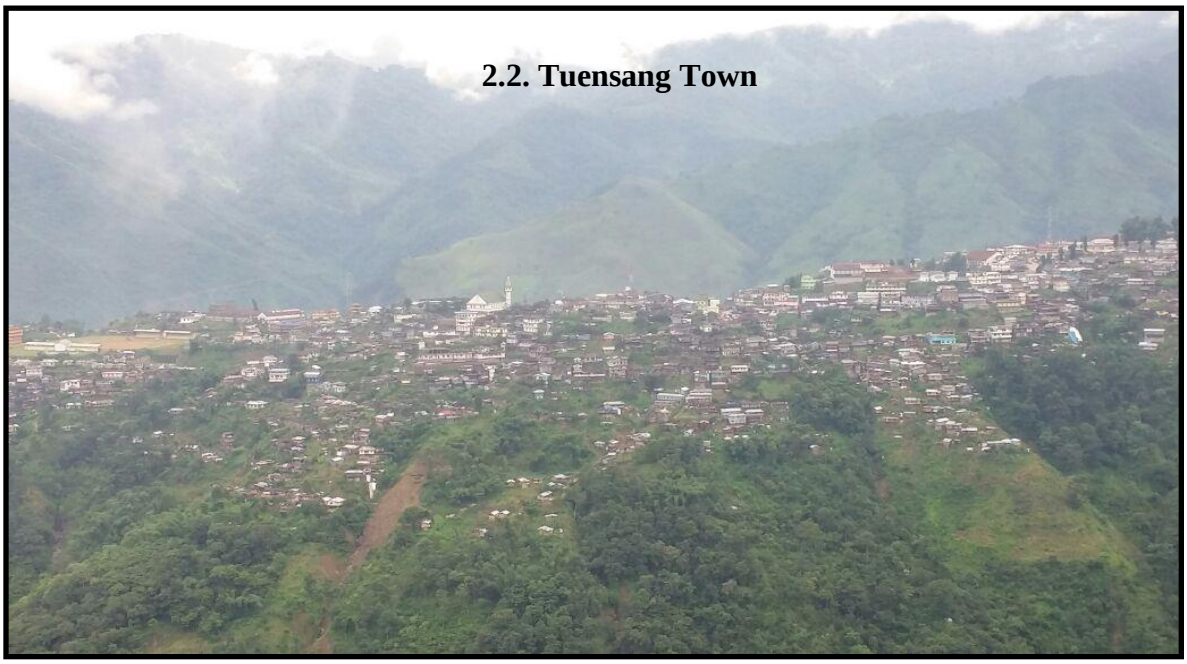
A



B

C

2.2. Tuensang Town



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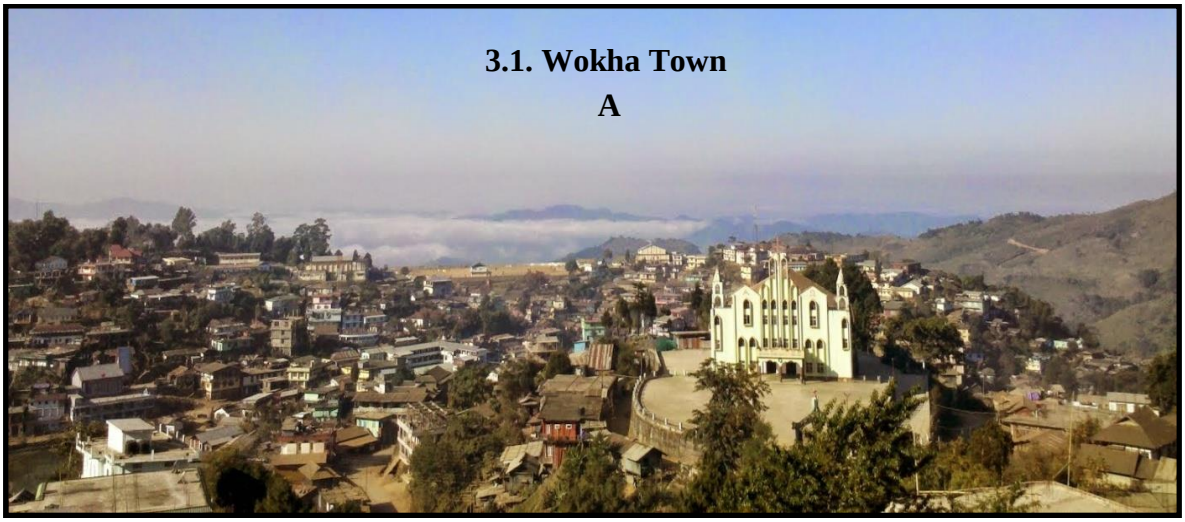
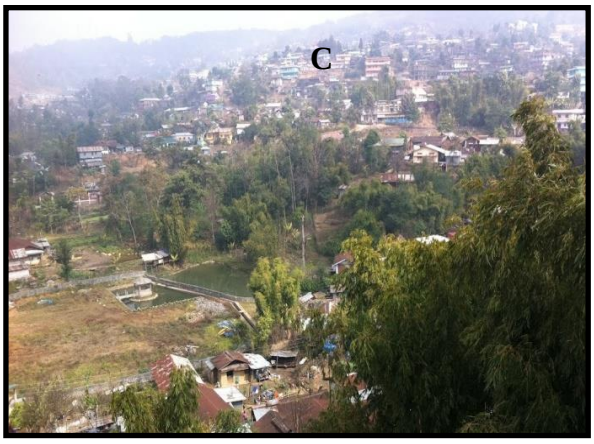




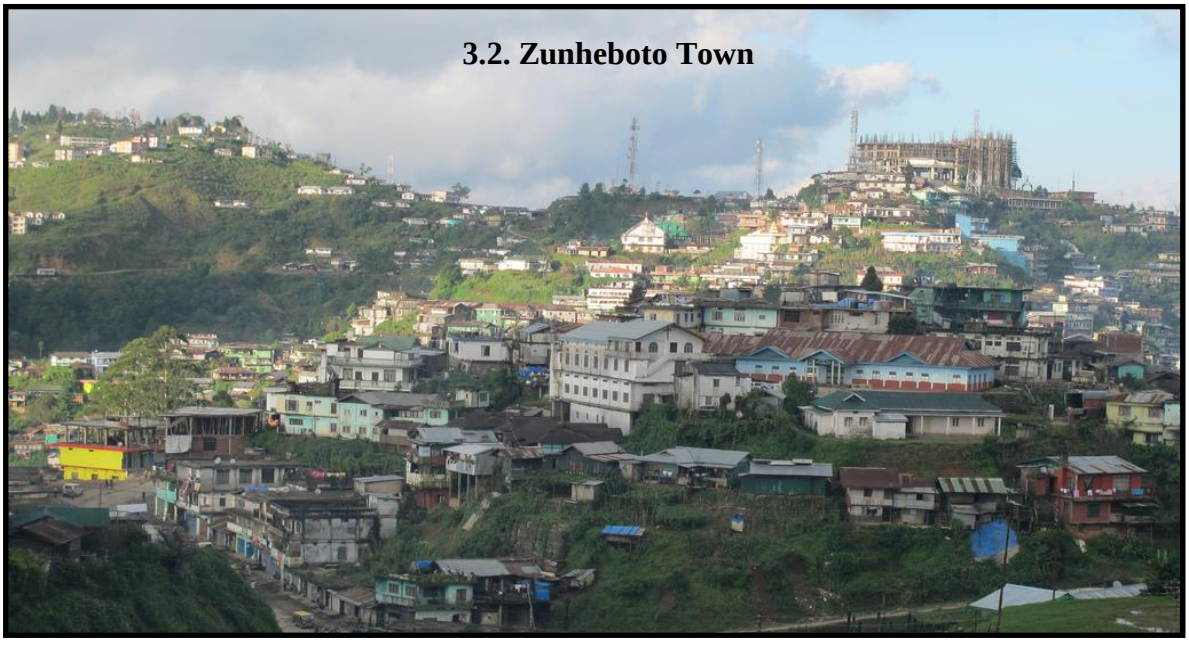
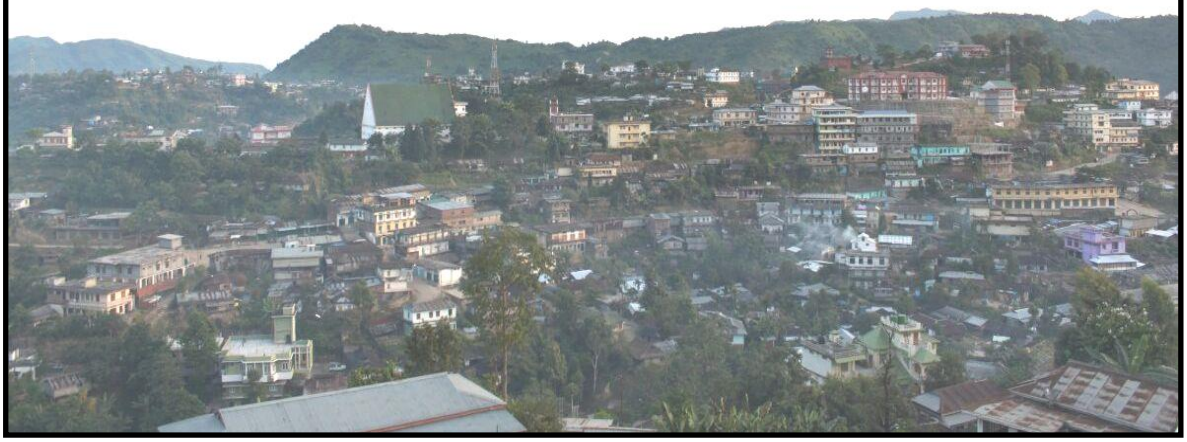


Plate 4

4.1. Mon Town

A



B

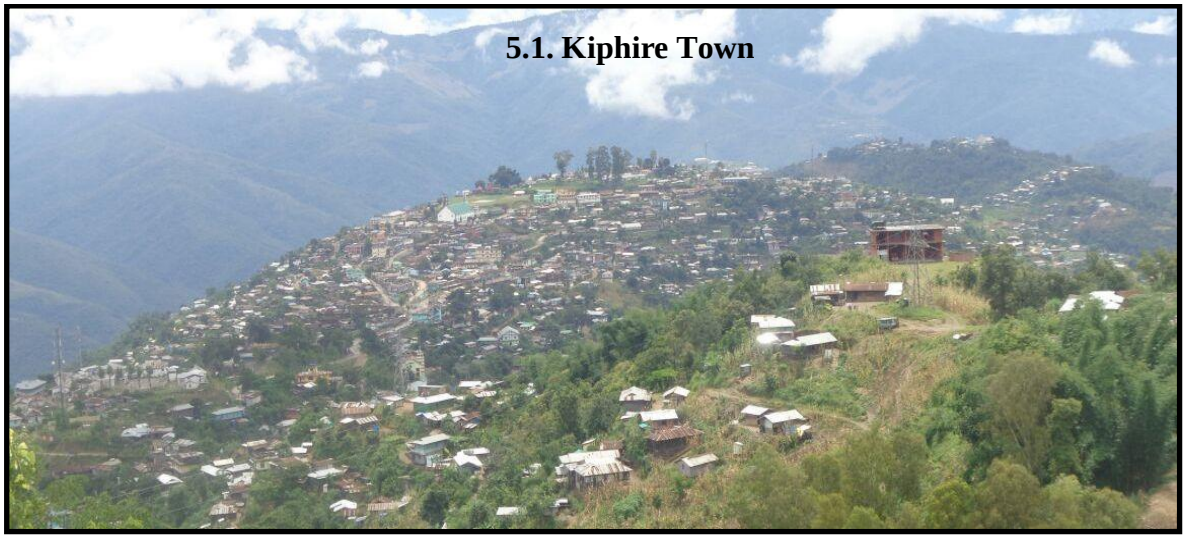
C

4.2. Phek Town

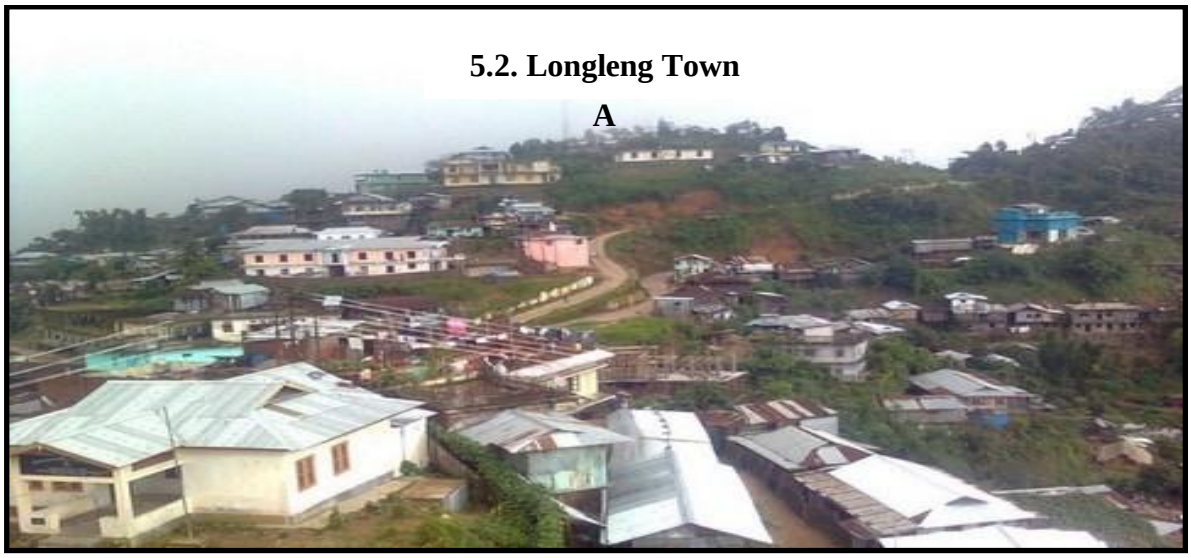
A

B

Plate 5

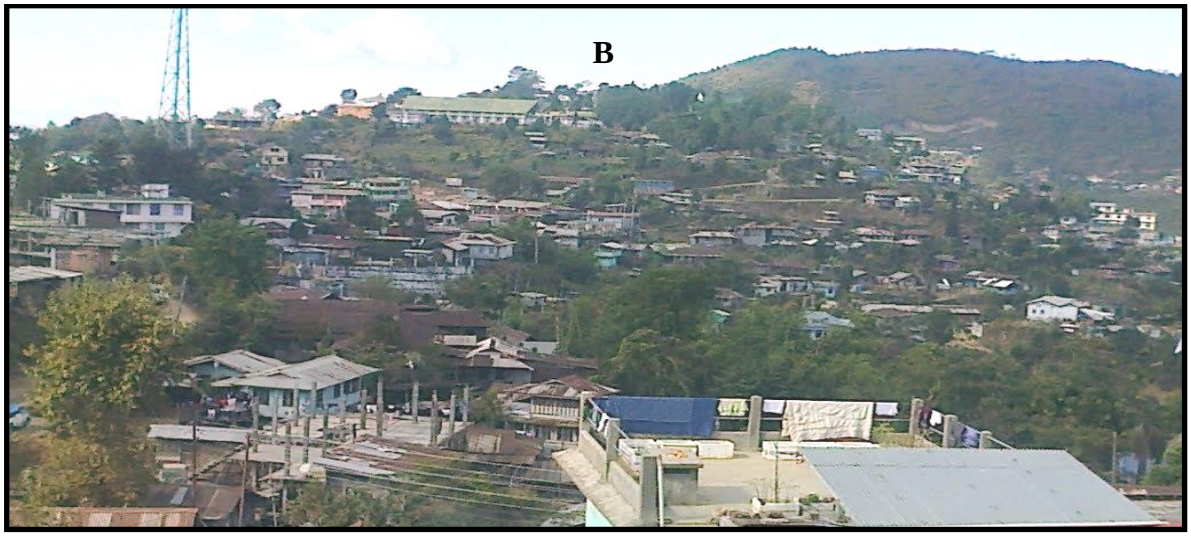


5.1. Kiphire Town



5.2. Longleng Town

A



B

Plate 6