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CHAPTER-I

INTRODUCTION

1.1 INTRODUCTION

Well organized, inexpensive and efficient transport facilities are of the first importance in the economic and social life of our cities and towns. In the reconstruction of a region or a nation, transport systems invariably play a vital role. The growth and development of transportation provides a medium, contribution to the progress of agriculture, industry, commerce, administration defence, education, health or any other community activity (H.M. Saxena).

Roads are key for transportation of men and materials. In a developing country like India, with the rapid increase in intensity of traffic and introduction of heavier vehicles, the road pavements of better specialization and quality have become very necessary. The road network in India presents a vast spectrum ranging from rural roads to four lane highway system that accounts for about 40 percent of the national traffic received, about 20 percent of the eighth five year plan investment allocation (World Bank, 1995).

Transport plays an important role in the economy, because of transport raw materials reach the industry and finished goods reach to the consumer. The pace of development of a country depends upon the production of goods and services as well as their movement overspace. Therefore efficient and cheap means of transport are required for fast development. Transport system in a region may be considered as a mirror of economic development and material prosperity of that region. It paves way for the basic infrastructure for the growth and total development of that region. The development of the transport system has been influenced mainly by the accelerated dispersion of economic activities and uncontrolled occupation of urban space (G. Marthandam and S. Subhiah).
Transport development plays a vital role in the socio-economic development of a country. It is important that, these developments are sustainable. Such developments of transport network introduced an element of dynamism and mobility in the study region, for locational structures and patterns. The means of transport provides effective system of vital arteries which could be considered as functional organization. It serves both short terms function of satisfying demand for movement between area and long term function of helping the growth places by inducing changes in comparative advantages as a result of changes in accessibility and relative location (Hodder, 1947). Basically, transport network is regarded as a set of a interconnected route linking of numerous destinations within and outside the region and provide a pace for movement to people and commodities (Sudesh Nangia and LC Mahajan).

India has one of the largest road networks in the world. At present India has a 3.3 million kilometer road network, second largest after the United States. It carries about 80 percent of the passengers and 65 percent of the freight traffic use roads, according to the National Highway Authority of India. In 2001, four percent of the National Highways in India were Four/Six lane, 80 percent were two-lane and the rest were single lane (Sudipt Arora).

India is a land of villages and we cannot achieve economic progress unless we improve agriculture and village industries. In this respect roads helps to connect the isolated villages of the country and bring them into the mainstream of national life. In this direction the village roads should be properly linked with major district roads, inter major district roads should be linked with state highways. All state highways those some of them linked with national highways need proper development such efforts are being done at present.

National Highways play very important role in the mobility and connectivity. Development of industries and various types of roads are closely related with urbanisation. In the last two decades efforts were done to further improve some section of national highways by converting them into Golden Quadrilateral Highway
along with still ongoing North-South corridor and East-West corridor across our country.

The Golden Quadrilateral is one of the major project in India. It is the first phase of the National Highways Development Project (NHDP) and consists of building 5846 km of four /six lane highway. This is the largest express highway project in India launched by former Hon. Prime Minister Atal Bihari Vajpayee during the year 1999.

To begin with the Golden Quadrilateral Highway network connecting India’s four major metropolitan cities like Delhi, Mumbai, Chennai and Kolkata (See Fig.1.1). It also passes through the middle of Indo Gangetic plains, East coast, South Central India and Western India. In the total length of 71,772 kms (2011) of National Highways in the country, this vital stretch of Golden Quadrilateral National Highway network, accounts for about 5846 (8.15%) of entire National Highways distance.

The Golden Quadrilateral project establishes better and faster transport networks between many major cities and ports. It provides an impetus to smoother movement of products and people within India. It enables industrial and job development in smaller towns through access to markets. It provides opportunities for farmers through better transportation of produce from the agricultural hinterland to major cities and ports for export, through lesser wastage and spoils. Finally it drives economic growth directly through construction as well as through indirect demand for cement, steel and other construction materials. It gives an impetus to truck transport throughout India.

The ongoing urbanisation in the country which has several facets like natural growth, rural urban migration, attraction of towns as well as cities and prevalence of certain vital urban functions, while some of the urban settlements are as acting as central places they are also industrial centres located on various National Highways. Their connectivity has seen far reaching changes after 2000 in India. This is due to the development of roads in general and conversion of some of the State Highways into National Highways under the economic liberalization and globalization. The
National Highways are upgrade into super highways with the growth of lorry and allied road transportation. Majority of urban settlements have got augmented urbanization.

Urbanisation along the Golden Quadrilateral stretch has seen expansion of transport services along with increase number of transport vehicles and movement of men and materials. Consequently there is urbanisation related road development which needs to be studied. Information on land use /land cover in the form of maps and statistical data is very vital for spatial planning, management and utilisation of land for agriculture, forestry, pasture, urban industrial environmental studies, economic production etc. Land use is influenced by economic, cultural, political, historical and land tenure factors at multiple scales, one the other hand, is one of the many biophysical attributes of the land that affect how ecosystems function (Turner et al., 1995).

Land use referred to as man’s activities and the various uses which are carried on land. Land cover is referred to as natural vegetation, water bodies, rock /soil and other resulting due to land transformation. Since both landuse /land cover are closely related and are not mutually exclusive they are interchangeable as the former is inferred based on the land cover and on the contextual evidences (P.S. Roy and A. Giriraj). Anthropogenic changes in landuse and land cover are being increasingly recognized as critical factors influencing global change. While land cover and land use are rather quite different. Land cover may be defined as the biophysical earth surface, while land use is often shaped by human, socio-economic and political influences on the land (Pranjit K.R. Sharma et al.).

Land use change can play an important role in environmental changes and contributes to global change and biodiversity loss. changes in urban fringe land use has important consequences for natural resources, especially natural habitat ecosystems, through their impacts on soil and water quality and climatic systems (Chen et al.).
Understanding of land use changes is essential for sustainable management of natural resources and urban areas as it allows decision makers to take a broader view of urban system and its components (Doygun and Alphan).

Studying changes in land use pattern using remote sensed data is based on the comparison of time sequential data. Change detection using satellite data and geographical information system can allow for timely and consistent estimates of changes in land use trends over large urban areas (Prakash et al.). Land use constitutes as an essential element in planning and management of land resources. The increasing demands are contributing to significant transformations of land for a variety of land uses (Ravishankar, G. et al).

At a global scale, land use changes in terrestrial ecosystem are closely linked with the issue of the sustainability of socio-economic development since they affect essential part of our natural capital such as climate, soil, vegetation, water resources and bio-diversity (Nagaraja, R. and Navalgund, R.R.).

1.2 STATEMENT OF THE PROBLEM

In the reconstruction of a nation or a region, transport systems invariably play a vital role. The growth and development of transportation contributing to the progress of agriculture, industry, commerce, administration, education, health or any other community activity.

The rapid increase in intensity of traffic and introduction of heavier vehicles the road pavements of better specialization and quality have become very necessary. The Golden Quadrilateral highway play very important role in the mobility and connectivity of resources together with urban connectivity.

The Golden Quadrilateral project establishes better and faster transport networks between many major cities and towns. It provides an impetus to smoother movement of products and people with in India, Karnataka and Study area. It enables industrial and job development in smaller towns through access to markets. It
provides opportunities for farmers through better transportation of produce from the agricultural hinterland to major cities and ports for export.

The ongoing urbanisation along the Golden Quadrilateral project in India, Karnataka and study area are which has several facets like natural growth, rural urban migration, attraction of towns as well as cities and prevalence of certain vital urban functions. Some of the urban settlements are as acting as central places they are also industrial centres located on Golden Quadrilateral stretch in India, Karnataka and also in the study area. The National Highways are upgraded into highways of International standard with the growth of trucks, lorry and allied road transportation, majority of urban settlements have got a shot in their arm and have got augmented urbanisation.

Understanding of land use changes along the Golden Quadrilateral stretch is essential for sustainable management of natural resources and urban areas as it allows decision makers to take a broader view of urban system and its components. The Golden Quadrilateral highway was one of the major projects conceived by Government of India to promote economic liberalization and globalization.

The Golden Quadrilateral Highways provides impetus for the growth intermediary small towns, big cities with a host of new functions. There is considerable land use change with in Karnataka along the Golden Quadrilateral stretch.

Golden Quadrilateral highway stretch in Karnataka forms an artery running almost in the middle of Karnataka in a rich and evolving horticultural floricultural and vegetable growing areas. Hence this stretch has huge potential for the development of agro processing industries. To some extent some of the formal rural settlements under the influence of the Golden Quadrilateral have emerged as tertiary service providing centres. Non agricultural, functions like petrol bunks, hotels, vulcanizing centres, godowns with other shops providing general and automobile services too have emerged.
In the present piece of Ph.D. research, a south eastern stretch of about 170 kms from Mulbagal a border town of Karnataka in the east on N.H.-4 to Tumkur city in the North West is under consideration. This has been deliberately consider as it represents very evolving mode of road transportation particularly under a buses. National Highway No.4 is very important aspects is this highway part of Golden Quadrilateral highway of India, touches the famous Bangalore metropolis. Which lies almost in the middle of the present study area. On either side of the Bangalore metropolis urban corridor development represents almost a typical urban transportation districts kind of non agricultural land uses. The kind of land use changes which an observed in this stretch of the Golden Quadrilateral highway are typical land uses that Golden Quadrilateral must have initiated closer to big cities elsewhere in India. Study starts with almost completion of four lane highway and researcher has seen which has become highly inadequate owing to very rapid growth of variety of transport. As a result of now this highway beyond urban limits of Bangalore metropolis heralding new type of urban oriented land uses.

1.3 OBJECTIVES OF THE STUDY

The current piece of Ph.D. research on “Urbanisation and Land use /Land Cover change along the Golden Quadrilateral Stretch in Karnataka from Mulbagal to Tumkur” has the following about seven important and clearly set objectives. They are as following :

1. To understand the kind of urbanisation and the growth of towns along Golden Quadrilateral stretch in the study area.

2. To assess the nature of traffic flow along the Golden Quadrilateral stretch in the study area.

3. To assess land use /land cover changes between 2000 and 2012 within the buffer of 5, 10 and 15 km on either side of the Golden Quadrilateral stretch in the study area.
4. To bring out the changing morphological characteristics of the settlements in the adjoining belts of 5, 10 and 15 km on either side of the Golden Quadrilateral stretch in the study area.

5. To analyze the changing occupational structure of the people in the study area.

6. To understand, particularly the development of different tertiary activities along Golden Quadrilateral stretch in the study area.

7. To understand the potential changes in agricultural land uses in years to come owing to increased accessibility by the Golden Quadrilateral stretch in the study area.

1.4 METHODOLOGY AND DATA SOURCES

Present piece of research on Golden Quadrilateral Highway in the study area has adopted with following methodologies.

1.4.1: The present study of urbanisation and land use and land cover change along the Golden Quadrilateral stretch in Karnataka from Mulbagal to Tumkur has been based on both primary and secondary data. Systematic effort has been made to gather information about Golden Quadrilateral highway in India, Karnataka and the study area from secondary sources. Required information is collected from National Highway Authority of India (NHAI), Survey of India, direct field survey, P.W.D. and other sources.

1.4.2: The data related to vehicular composition, frequency and flow of motor vehicles has been collected through field work and toll plaza’s. Suitable tables and graphs have been generated.

1.4.3: Highway related tertiary activities along the Golden Quadrilateral stretch between Mulbagal to Tumkur cities is based on primary data, generated on a traverse along the highway. Broad features of tertiary activities have been studied both qualitatively and quantitatively. Suitable tables and maps have been generated.
1.4.4: Population statistics in different villages which are located on either side of 5, 10 and 15 km of the Golden Quadrilateral stretch in study area have been extracted from census hand books of Kolar, Bangalore Rural, Bangalore Urban and Tumkur respectively for the period of 1991-2011. Population data of the villages has been analysed with simple statistical analysis.

1.4.5: Since the globalization and economic liberalization have started from 1989-90 onwards, census data has been gathered. Keeping settlements morphology, settlements both in urban and rural along the highway has been analysed and suitable tables and figures have been generated.

1.4.6: The urbanisation along the Golden Quadrilateral stretch in Karnataka and study area is based on secondary data. Also to collect growing transport infrastructure and other functions, a traverse along Golden Quadrilateral highway has been done. Appropriate tables maps and figures have been prepared as the out come of analysis. For such study upto 15 km stretch has been considered.

1.4.7: Occupational data of the emerging towns has been analysed by portrayed the analyzed data on triangular graphs. Further inferences have been drawn about the emerging towns along the Golden Quadrilateral stretch. Specially between its southern stretch from Mulbagal to Tumkur. Emphasis given on the trend of settlement growth within the 5, 10 and 15 km buffer zone in Mulbagal to Tumkur.

1.4.8: The data related to land use and land cover is obtained by Kolar, Bangalore Urban, Rural and Tumkur district Census handbooks and other published sources. The current land use data is extracted through digital image interpretation of satellite data, collected from Karnataka State Remote Sensing Agency. Using ERADAS and Arc-GIS software for various analysis, like buffer analysis and land cover/ land use change analysis using IRS LISS III, 29 meter resolution imageries of 2000 and 2012 collected from Karnataka
State Remote Sensing Agency. Ground truth verifications were also conducted in key sector to verify the maps.

1.5 HYPOTHESES

Present study on “Urbanisation and Land Use /Land Cover Change along the Golden Quadrilateral Stretch in Karnataka from Mulbagal to Tumkur” as a Ph.D. research investigation comprises some five major hypotheses. They are,

1. There is remarkable growth of urban population along the Golden Quadrilateral stretch during the study period.

2. Golden Quadrilateral highway stretch has initiated new urban oriented infrastructure related urban functions like petrol bunks, motels, dhabas, vulcanizing centres, godown, trading centres and markets at important junctions.

3. Golden Quadrilateral stretch also influenced on socio-cultural lives of rural people.

4. There are substantial changes in the agricultural and industrial land use near urban settlements and also along Golden Quadrilateral stretch.

5. Golden Quadrilateral stretch has promoted establishment of new industries. There is rapid increase in the nature and composition of vehicles.

1.6 ORGANIZATION OF THE THESIS

The First chapter deals with introduction, statement of the problem, objectives of the study, methodology, hypotheses and limitation of the study. The Second chapter comprises the Review of Literature. The Third chapter deals with present study area. The Fourth chapter is explains dimensions of urbanisation along the Golden Quadrilateral Stretch between Mulbagal and Tumkur and Aspects of Transport along the Golden Quadrilateral Highway. In the Fifth chapter the landuse and land cover change along the Golden Quadrilateral Stretch from Mulbagal to Tumkur and Agricultural Scenario and Green cover along Golden Quadrilateral
highway between Mulbagal-Tumkur are discussed. Chapter Sixth deals with population characteristics and occupational aspects along the Golden Quadrilateral stretch and lastly chapter Seven consists conclusion, findings and suggestions of the present study.

1.7 LIMITATION OF THE STUDY

Present piece of research on “Urbanisation and landuse/ land cover change along the Golden Quadrilateral stretch from Mulbagal to Tumkur” represents a part of highly dynamic stretch of Golden Quadrilateral. Though it is presumed model study of Golden Quadrilateral as it represents a metropolis like Bangalore and its eastern and North western limbs of former national highway No.-4, now it is the southern stretch of the Golden Quadrilateral at national level has its own physiography and also other set of human factors. The post economic liberalization and globalization era has initiated some times a continuous stretch of unique urban land uses along Golden Quadrilateral Stretch. Sometimes we can not see here that in its extreme stretches of study area.