ABSTRACT

A settlement is a collection of shelters where people live. The study of settlements is largely a product of twentieth century. A settlement is man’s first step towards adaptation to his environment. Settlement designates an organised colony of human beings, together with their residences and other buildings (shops, hotels, banks etc.), the roads, streets which are used for travel. Settlements are situated as advantageously as possible with respect to natural features such as water, fuel, food, protection and drainage and access to transportation and communication.

Human Settlement Development is responsible to facilitate, promote, co-ordinate and manage integrated human settlements, emergency housing, and upgrading of informal settlements. Good transport facilities like highways help in this upgradation.

Highways work as life lines for the country or the region in which they are situated. So, naturally, they have tremendous influence on the settlements situated along them. In some cases the highways are the very ‘raison d’être’ of the settlement. Precisely these are the reasons of selecting area along Grand Trunk Road for this particular study. Being an old
and historic road and being an important highway, Grand Trunk Road has an overwhelming influence on the patterns of settlement situated along its course. The settlements along Grand Trunk Road are mainly of linear and rectangular pattern. Checkerboard and amorphous patterns are also found as a result of continuous growth.

Good settlement planning is necessary for sustainable future of the world. Planning for future needs analysis of past trends, prospects and projection of growth and decay. Involvement of experts as well as people should be sought to develop a model and for this purpose a comprehensive database is a must. This study tries to do that. An attempt has been made to prepare a wide ranging database for the planners and policy makers.

The significance of transport is essentially felt in a large country like India with diverse people speaking a number of languages. There are innumerable modes of transport and roads hold a place of pride amongst them. They are flexible, feasible, efficient and cost effective. Flexibility is the hallmark of a good road-network. Economic feasibility often tips the balance in favour of road development first and foremost.

Grand Trunk Road is like a river of life to this country, in the old, old days, when Muhammad-bin-Tughlaq, Sultan of
Delhi streamlined the country’s roads, bullock-carts and camel caravans were the chief transporters. In 1333, when Moroccan traveller *Ibne Battuta* visited India, he was deeply impressed by the Sultan’s road network. Sher Shah Suri, who ruled from 1540 till 1545, made further improvements, especially to the Grand Trunk Road. He built caravanserais and inns for travellers, and planted fine trees along it and other important highways.

When the British consolidated their power in India, they found the Grand Trunk Road, stretching as it did from Calcutta to Peshawar, a great line of communication. Due to its importance it touched the life of people residing along its course and in neighbouring area in many ways. It has a tremendous impact over the settlement patterns in the areas it traverses.

The study analyses the impact of distance from G.T. Road on the settlement pattern; socio-economic conditions along this road; the intensity of impact with the increase and decrease of distance of settlements from roads; examine the impact of other roads on settlements; effect of canal and railway line on the settlement patterns; status of environment in study are through various social indicators and highlights the urban sprawl in *Gyanpur, Gopiganj, Bhadohi, Madhosingh , Ghosia* and *Aurai* as case studies.
Patterns of sprawl and analyses of spatial and temporal changes could be done cost effectively and efficiently with the help of spatial and temporal technologies such as Geographic Information System (GIS) and Remote Sensing (RS) along with collateral data (such as Survey of India maps, etc.). GIS and remote sensing are land related technologies and are therefore very useful in the formulation and implementation of the land related component of the sustainable development strategy.

For this study GIS maps were prepared at two points of time 1976 and 2007. Urban sprawl maps are prepared by overlaying 1976 and 2007 settlement layers. Buffers of 500, 1000, 1500, 2000 and 3000 metres are prepared to show the growth of settlements and extent of urban sprawl. Survey of India topographical sheets of 1976 and Landsat-7 images of 2007 have been used. Survey of India Topographical sheets and Landsat-7 imageries were on 1:50000 scale. These have been georeferenced, rectified and analyzed to study the development and growth of settlements on spatio-temporal basis. Imageries were first registered with SOI topographical sheets. For georeferencing, digitization and analysis, GIS soft wares ILWIS 3.2 and ERDAS IMAGINE 8.5 have been used. Ground Control Points (GCPs) were taken with the help of Global Positioning System (GPS) receiver (Model-Map 76).
For the study of socio-economic environment a questionnaire based structured survey by interview method was also conducted. The whole study deals with

- Patterns, growth and urban sprawl in the study area.
- The quality of life in the settlements of study area.

The World Health Organization currently defines Quality of Life (QOL) as "the individual's perception of their position in life in the context of the culture and value system in which they live and in relation to their goals". The Organization for Economic Cooperation and Development (OECD) preferred not to formally define QOL, because it "has fewer roots in any particular scientific discipline". Instead the organisation recommended the term "Social Well-being". United Nations restricts the measurement of QOL by social indicators rather than by 'quantitative' measures of income and production. United Nation’s approach is derived from the sociological perspective. Social indicators appear to be the only way to measure environmental conditions and subjective satisfaction of happiness as well as the specific domains of daily and mental life.

*Social Well-Being* has a cumulative effect on an individual's aspirations, needs, achievements and feeling of
satisfaction. Quite often these aspects are well reflected in the visual and factual circumstances of an individual or a group of individuals.

Social Well Being is best reflected in the Quality of Living, which depends among other things, on the number, type, quality and availability of infrastructure.

The main social indicators taken in the study are general environment, noise, cooking environment, sanitation facilities, ventilation, industrial waste, garbage collection, infrastructure, occupational structure, school-going children, access to open area, use of building, health services, water quality, drainage and electrification.

The sprawl takes place either in radial direction from a well-established city or linearly along the highways. In the area under consideration most of the urban sprawl is seen along the highways because they enable people to live farther away from downtown jobs by giving commuters easy access to main city from once-distant suburbs. Thus, highways create residential development in suburbs near highway exits. The interrelationship of settlement systems, growth of settlements and sprawl in study area shows a radial pattern of urban sprawl.

Gopiganj has developed very fast being an important loading and unloading point of carpet industry related raw
Abstract

material and processed products. The radial pattern of urban sprawl is seen in the growth of Gopiganj. Linear settlement development is shown on roads especially on G.T. Road and Gyanpur road connecting Gopiganj to Gyanpur, District Headquarter. A railway line runs parallel to the Grand Trunk Road whose impact is also felt on the pattern of settlement and the shape of the settlement is the result of the impact of both of these transport routes.

Gyanpur is a compact polygonal settlement. This settlement has grown fast and significant urban sprawl on road connecting it to Gopiganj and Bhadohi. There is development of distinct settlement patches between Gyanpur and Bhadohi. A canal named Gyanpur Canal crosses Gyanpur-Gopiganj road and the effect of this intersection can be seen in the settlement pattern.

Bhadohi town is the financial hub of the district and a good example of Radial pattern of urban sprawl. Here urban sprawl can be seen along all roads especially connecting to Aurai, Jaunpur, Varanasi and Gyanpur.

Madhosingh, Ghosia and Aurai are small settlements, which have rural as well as urban characteristics. These settlements are very close to each other and are situated along the Grant Trunk Road. Grant Trunk Road has a very strong influence on these three settlements. A railway route
also runs parallel to this road, which incidentally is known as Grant Trunk Route. The map also shows the impact of this railway line on these settlements. These settlements are showing substantial urban sprawl along G. T Road and in due course of time they are expected to coalesce with each other.

All the case studies taken here have grown at quite a fast pace. Bhadohi town is the financial hub of the district. It is the biggest settlement of the district. It is well connected with neighbouring districts. Bhadohi is a market centre for the surrounding villages. The growth can be seen in 1000 and 3000 metre buffers. Gyanpur has grown at a good pace mainly by virtue of being the administrative headquarters of the district since long, besides this Gyanpur functions as market centre for nearby villages. It can be seen in buffer zone maps of 500,1000,1500,2000 and 3000 metres. Gopiganj has grown quite a big as it is benefited by its proximity to Grand Trunk road. Madhosingh, Ghosia and Aural have also grown at quite a pace.

It is clearly seen that along the Grand Trunk Road there are many common elements between the settlements. The common elements come from the fact that G.T. Road works as all pervasive link for all these settlements.